Sweet Tooth Obsession & Its Impact on Oral & Systemic Health

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Sucrose: 50% Fructose / 50% Glucose

High Fructose Corn Syrup: 55% Fructose / 45% Glucose

Other Names for Sugar:
HFCS, Coconut/Palm sugar, Maple Syrup, Evaporated Cane Juice, Honey, Brown Rice Syrup, Agave Syrup, Juice Concentrates, Maltose

World Health Organization

- Free sugars = < 10% total energy intake
- 5% or 25g per day = additional health benefits

American Heart Association 2009 Dietary Sugar Intake & Cardiovascular Health Scientific Statement

- Limit daily intake: Women = 24g / Men 36g

Canadian Stats:
- ADULT TOTAL SUGAR FROM BEVERAGES: 63g/day 2004 to 47g/day 2015
- ADULT TOTAL SUGAR FROM FOOD: 56g/day 2004 to 70g/day 2015
- CHILDREN 2 – 8 TOTAL SUGAR FROM BEVERAGES: 48g/day 2004 to 35g/day 2015
- CHILDREN TOTAL SUGAR FROM FOOD: 48g/day 2004 to 63g/day 2015
- According to 2019 report 25% of total daily energy intake for Canadians comes from total sugar consumption
- Canadian Sugar Institute (CSI): Added sugar = estimated at 51 g/day or 11% total energy intake, based upon 2015 data
- Heart and Stroke Foundation: Free sugars (100% fruit juice, syrup and honey) NOT included in added sugar percentage from CSI. Estimated consumption is higher.
www.fooducate.com - make better food choices / track sugar grams daily
www.coheso.com - Label information on 9000+ foods

<table>
<thead>
<tr>
<th>DRINK</th>
<th>SIZE</th>
<th>SUGAR</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMP</td>
<td>8 oz.</td>
<td>31g</td>
<td>2.7</td>
</tr>
<tr>
<td>7-Up</td>
<td>12 oz.</td>
<td>37g</td>
<td>3.2</td>
</tr>
<tr>
<td>Coke</td>
<td>12 oz.</td>
<td>40.5g</td>
<td>2.5</td>
</tr>
<tr>
<td>Mt. Dew</td>
<td>12 oz.</td>
<td>47g</td>
<td>3.2</td>
</tr>
<tr>
<td>AZ Green Tea</td>
<td>16 oz.</td>
<td>50g</td>
<td>3.4</td>
</tr>
<tr>
<td>Langer Apple Juice</td>
<td>16 oz.</td>
<td>52g</td>
<td>3.2</td>
</tr>
<tr>
<td>Monster</td>
<td>16 oz.</td>
<td>54g</td>
<td>2.7</td>
</tr>
<tr>
<td>Nestea Gr. Peach Tea</td>
<td>20 oz.</td>
<td>57.7</td>
<td>2.9</td>
</tr>
<tr>
<td>Rockstar Energy</td>
<td>16 oz.</td>
<td>62g</td>
<td>1.5</td>
</tr>
<tr>
<td>Sobe Mango</td>
<td>16 oz.</td>
<td>70g</td>
<td>3.5</td>
</tr>
<tr>
<td>Tropicana Twist.</td>
<td>20 oz.</td>
<td>87.5</td>
<td>2.9</td>
</tr>
</tbody>
</table>

www.ycchololate.com - Stevia sweetened dark chocolate bars
www.lilysweets.com - Stevia sweetened dark chocolate bars
www.purelovechocolate.com – Stevia sweetened chocolates
www.netrition.com - NutiLight erythritol sweetened hazelnut / chocolate spread
www.CocoaVia.com - Unsweetened dark cocoa high in antioxidants
www.drjohns.com - Xylitol chocolate bars and assorted candies
www.sweetleaf.com - Stevia flavored drops
www.loloz.com – Lollipops and lozenges to kill cariogenic bacteria

Low Fructose / Low GI
Blackberry
Grapefruit
Lemon / Lime
Nectarine
Raspberry
Wild Strawberry

High Fructose / High GI
Ripe Banana
Grapes
Dates
Raisins
Mango
Custard Apples
**Sugar Alcohols:**
Carbohydrates called “polyols”
Occur naturally in plants
Not completely absorbed
Lower Glycemic Index than sucrose
Fewer calories per gram
Do not promote decay (mostly)

**SUGAR SUBSTITUTES AND SWEETENERS**

**Non-Nutritive Sweeteners**

<table>
<thead>
<tr>
<th>SACCHARIN</th>
<th>ASPARTAME NutraSweet Equal</th>
<th>NEOTAME</th>
<th>SUCROLOSE Splenda</th>
<th>ACELSUFAME POTASSIUM</th>
<th>STEVIA Truvia Purvia</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 X’s sweeter</td>
<td>200 X’s sweeter</td>
<td>7000 – 13,000 sweeter</td>
<td>600 X’s sweeter</td>
<td>200 X’s sweeter</td>
<td>200-300 X’s sweeter</td>
</tr>
<tr>
<td>100 countries</td>
<td>Greatest use worldwide</td>
<td>US, AK, UK</td>
<td>80+ countries</td>
<td>30+ countries</td>
<td>Worldwide use</td>
</tr>
<tr>
<td>Added to Aspartame in soft drinks</td>
<td>Must be avoided by those with PKT</td>
<td>No amino acid concern for those with PKT</td>
<td>Tri-chlorination process</td>
<td>Blended with other sweeteners</td>
<td>No daily limit</td>
</tr>
<tr>
<td>Substitute &amp; commercial</td>
<td>Substitute</td>
<td>Commercial</td>
<td>Substitute &amp; commercial</td>
<td>Commercial</td>
<td>Substitute &amp; commercial</td>
</tr>
</tbody>
</table>
### Sugar Alcohols

<table>
<thead>
<tr>
<th>ISOMALT</th>
<th>SORBITOL</th>
<th>HSH</th>
<th>MANNITOL/ MALTITOL</th>
<th>ERYTHRITOL</th>
<th>XYLITOL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 kg/cal 45-65%</td>
<td>2.5 kg/cal 60%</td>
<td>Blend 40-90%</td>
<td>2.1 kg/cal 75-90%</td>
<td>kg/cal 70%</td>
<td>2.4 kg/cal 100%</td>
</tr>
<tr>
<td>Hard candies, jams, cough drops, commercial</td>
<td>Gum, candies, cough drops, baked goods, commercial</td>
<td>Bulk sweetener commercial</td>
<td>Candy, chocolates, ice cream, commercial</td>
<td>Baking confections, beverages, commercial</td>
<td>Gums, candies, lozenges, syrups, vitamins, dental products</td>
</tr>
<tr>
<td>Lrg. Amt. Laxative 50g/day 25g/day</td>
<td>Lrg. Amt. Laxative &gt;50g/day  IBS Caution</td>
<td>Lrg. Amt. Laxative &gt;100g/day Laxative</td>
<td>Kinder to GI tract than most</td>
<td>&gt;50g/day Kinder to GI tract than most</td>
<td></td>
</tr>
</tbody>
</table>

**Caution: Xylitol is toxic to dogs!**

Caution regarding prolonged use of sorbitol, isomalt, HSH found in hard candies, mints and lozenges! Potentially becomes cariogenic!

- [www.xylimart.com](http://www.xylimart.com) - RDH based clearing house for Xylitol products on sale
- [www.xlear.com](http://www.xlear.com) - Xylitol Mints, gum, sweetener toothpaste, rinse, nose spray, etc.
- [www.orahealth.com](http://www.orahealth.com) - Xylimelts discs [www.quantumhealth.com](http://www.quantumhealth.com) OraMoist discs
- [www.carifree.com](http://www.carifree.com) - Xylitol products for infants & children & adults
- [www.3MESPE.com](http://www.3MESPE.com) - Xylitol Theramints & Theragum
- [www.epicdental.com](http://www.epicdental.com) - Xylitol gum, mints, toothpaste, mouth rinse, sweetener
- [www.icechips.com](http://www.icechips.com) - exotic flavored Xylitol hard candies (some flavors have citric acid)
- [www.forevermints.com](http://www.forevermints.com) - long lasting Xylitol mints
Obesity by the Stats

- >60% of the global disease burden will be associated with obesity by 2020*
- 2016-2017 Canadian Data: 34% Overweight / 27% Obesity**
- Obesity Increases with age: 20% ages 18 – 29 / 30% ages 40-59 / 33% ages 60-79**
- 2013 31% of Canadian children 2 – 17 were overweight or obese (ages 5-11 26%) (ages 12-17 37%)**
- Lowest proportions of obesity found in British Columbia**
- Highest proportions of obesity found in Newfoundland**
- 85% of children with Type II diabetes are obese: “Diabetes”

*Current Genomics 9:239, 2008  
**www.statcan.gc.ca accessed February 9, 2019

Literature Supports Systemic Impact of Chronically High Sugar Consumption

- Adverse effects on HDL & Triglyceride levels
- Increased BP levels
- Compromises intake of dietary vitamin & mineral intake
- Increased risk of diabetes & decreased insulin sensitivity
- Diabetes + poor glycemic control = cognitive decline
- Increased visceral fat mass
- BMI increases cancer risk & kindergartner’s weight strong predictor of later childhood obesity
- Increased risk for Non-alcoholic Fatty Liver Disease (NFLD)
- Increased risk for gout
- Increased proliferation of pancreatic cancer cells

High Sugar-Sweetened Beverage (SSB) group, i.e. > 2 SSB per day = 7% higher Visceral Adipose Tissue (VAT) and higher cortisol rates than those with low consumption of SSB in minority youth ages 14-18  
Physiological Behavior 2016

Dietary sugars and body weight: systematic review and meta-analysis of randomized controlled trials and cohort studies  
British Medical Journal 2012

Fructose: “Its alcohol without the buzz”  
Advanced Nutrition 2013

Review Article: Fructose in Non-Alcoholic Fatty Liver Disease  
Alimentary Pharmacology Therapeutics 2013 www.medscape.com
Sugar consumption, metabolic disease and obesity: The state of controversy
Clinical Reviews in Clinical Laboratory Sciences 2015
http://dx.doi.org/10.3109/10408363.2015.1084990

CVD and Metabolic Diseases
Excess sugar consumption influencing CVD and T2DM – Direct Pathway:
Unregulated liver uptake and metabolism of fructose
  ◦ Increased liver lipid accumulation
  ◦ Dyslipidemia (Elevated total CHD or LDL/HDL imbalance)
  ◦ Decreased insulin sensitivity (More insulin required to balance blood glucose) Insulin Resistance = “gas guzzler” vs. “economy car”
  ◦ Increased uric acid levels (Increased mortality w/ CVD due to increased endothelial dysfunction)
Excess sugar consumption influencing CVD and T2DM – Indirect Pathway:
  ◦ Weight gain
  ◦ Failure to stimulate leptin production

Critical Reviews of Clinical Laboratory Sciences 2016

Excess sugar consumption influencing CVD and Metabolic Diseases: Potential Pathways:
  ◦ Increased visceral fat deposition
  ◦ Increased intrahepatic fat deposition
  ◦ Increased blood triglycerides
  ◦ Increased hypertension

Current Hypertension Reports 2016

Grain Brain by David Perlmutter, MD
Crazy Good Living Healthy Gums, Healthy Gut, Healthy Life by Alvin H. Danenberg, DDS

Remineralization is the natural repair process where calcium and phosphate form a new sub-surface mineral coating, which is less soluble than the original surface, especially in the presence of fluoride.
Dimensions of Dental Hygiene April 2010

AMORPHOUS CALCIUM PHOSPHATE
- Fills defects
- Increases Fl2 bioavailability
- Increases luster

TRI-CALCIUM PHOSPHATE
- Calcium & phosphate work synergistically with Fluoride
- Effective in neutral or acidic pH
- Enhances surface & subsurface mineralization
**NOVAMIN**
- Raises pH >7
- Creates layer of hydroxyapatite & reduces sensitivity
- Antimicrobial

**CALCIUM PHOSPHOPEPTITE & AMORPHOUS CALCIUM PHOSPHATE – RECALDENT®**
- Binds to tooth & plaque
- Remineralizes sub-surface lesions
- Removes white spot lesions

**FLUORIDE**
- Adheres to partially demineralized crystallites
- Attracts calcium & phosphate
- Inhibits acid production
- Antimicrobial

**HYDROXYAPATITE**
- Natural calcium mineral
- Crystalline lattice structure
- Hardens tooth structure

**CHLORHEXIDINE THYMOL VARNISH**
- Hardens tooth structure
- Helps control established lesions on exposed roots

**ARGININE + CALCIUM CARBONATE + FLUORIDE**
- Synergistic effect to prevent caries and reduce sensitivity [www.basicbites.com](http://www.basicbites.com)
  - AlkaGen Technology to raise the pH & coat the teeth

**SILVER DIAMINE FLUORIDE**
- Antibacterial
- Desensitizing

**CAMBRA Resources**
[www.cdafoundation.org/journal](http://www.cdafoundation.org/journal) - CAMBRA update and forms
[www.philipsoralhealthcare.com](http://www.philipsoralhealthcare.com) - C.A.R.E. risk assessments
[www.carifree.com](http://www.carifree.com)
Bacterial & Saliva Testing

**CRT®** Bacteria by Ivoclar Vivadent [www.ivoclarvivadent.us](http://www.ivoclarvivadent.us) Tests for Strep Mutans & Lactobacilli
Culture results in 2 days

**CariScreen** Susceptibility Testing Meter by CariFree® [www.carifree.com](http://www.carifree.com)
Chairside detection of Streptococci bacterial load

**Saliva-Check Mutans** by GC America [www.gcamerica.com](http://www.gcamerica.com) Chairside salivary test for Strep Mutans

**Saliva-Check** by GC America
Measures salivary production & buffering capacity
Resting & chewing pH

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**REMINERALIZATION REALITY FOR THE MODERATE CARIES RISK PATIENT**

- Xylitol 6-10 g daily (3-5 times daily)
- OTC Fluoride toothpaste twice daily
- OTC Sodium Fluoride rinse daily
- Calcium Phosphate paste for exposed roots for sensitivity
- Sealants on pits & fissures at risk
- Every 4-6 months Fluoride varnish, or chlorhexidine thymol varnish on roots
- Assess salivary flow and pH if hyposalivation is suspected
- Every 4-6 months re-exam to evaluate risk
- Bitewings every 12-24 months
- Power toothbrush & interdental care for daily plaque removal

*Adapted from Dimensions of DH 2010 & Journal of Evidence-Based Dental Practice 2014*

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**REMINERALIZATION REALITY FOR THE HIGH CARIES RISK PATIENT** *(Modifications in italics)*

- Xylitol 6-10 g daily (3-5 times daily)
- *Chlorhexidine rinse 0.12% 10 ml daily for 1 week per month*
- *5000 ppm Fluoride paste twice daily*
- Calcium Phosphate paste *several times* per day for exposed roots or sensitivity
- Sealants on pits and fissures at risk
- Every 3-4 *months* Fluoride varnish, or chlorhexidine thymol varnish on roots
- Assess salivary flow & pH if hyposalivation is suspected
- Every 3-4 *months* re-exam to evaluate risk
- *Objective measurement of acidogenic bacterial load*
- Bitewings every 6-18 *months*
- Power toothbrush & interdental care for daily plaque removal

*Adapted from Dimensions of DH 2010 & Journal of Evidence-Based Dental Practice 2014*
“10 Ways to Treat Tooth Decay” According to Brian Novy, DDS
www.whollymolar.com

All CAMBRA should include dietary modifications of fermentable carbs and reduction in amount & frequency of sugar

www.brushdj.com - customized music for 2-minute increments

Tips for Gaining Control of the Sugar Binge for Improved Health

1. Be a label detective & decide wisely!
2. Eliminate sugary beverages!
3. Substitute sugar alcohols for sugar in foods & beverages (start slowly)
4. Count sugar grams throughout the day (smart APP)
5. Xylitol gum or mints following meals – strive for 5 - 10 exposures daily
6. Reduce cravings with substitution
   ◦ Almonds, walnuts & cheese & substitute fresh fruit for desserts
7. Prepare foods with fresh herbs to increase satisfaction with meals
8. Don’t keep processed/sugary items at home
9. Enjoy the delectable in moderation, on occasion (3 bite rule)
10. Move more to burn more!
SUGAR, HEART DISEASE AND STROKE

FACTS

- Heart disease and stroke are leading causes of death in Canada, responsible for 27.3% of all deaths. Over 1.3 million Canadians are living with heart disease\(^1\) and 315,000 Canadians are living with the effects of stroke.\(^3\)
- More than 60% of Canadian adults\(^4\) and 31% of children and youth aged 5 to 17 years are overweight or obese.\(^5\)
- Children who are obese are at increased risk of remaining overweight or obese as adults.\(^6\)
- Up to 80% of early heart disease and stroke can be prevented through adopting healthy behaviors including eating a healthy diet.
- Sugar is a carbohydrate that provides energy to the body. Other than providing energy, sugar has no other nutritional benefits.
- Sugar can occur naturally in milk, fruit, vegetables, starches, grains and most plant-based foods. Sugars can also be added to foods and drinks for flavor, as a sweetener, as a preservative or to enhance the texture of products.
- Free sugars include all monosaccharides and disaccharides added to foods by the manufacturer, cook or consumer, plus sugars naturally present in honey, syrups and fruit juices.\(^7\)
- It is estimated that Canadians consume as much as 13% of their total calorie intake from added sugars.\(^8,9\) This added sugar estimate does not take into account the broader range of sugars captured by free sugars (which also include 100% fruit juice, honey, etc.). Consumption of free sugars among Canadians would be higher than 13%.
- Ten per cent of total energy (calories) from free sugars in a 2,000-calorie-a-day diet is equivalent to about 48 grams (roughly 12 teaspoons) of sugar. Five per cent of total energy is equivalent to about 24 grams (roughly 6 teaspoons) of sugar.
- Excess sugar consumption is associated with adverse health effects including heart disease,\(^10-12\) stroke,\(^10\) obesity,\(^13-17\) diabetes,\(^18-20\) high blood cholesterol,\(^21-24\) cancer\(^25\) and dental caries (cavities).\(^26\)
- Individuals who consume greater than or equal to 10% but less than 25% of total energy (calories) from added sugar have a 30% higher risk of death from heart disease or stroke when compared to those who consume less than 10%. For those who consume 25% or more of calories from added sugar, the risk is nearly tripled.\(^10\)
- While there are a variety of causes of obesity, researchers speculate that excess caloric intake may be the single largest driver.\(^27\) Larger portion sizes contribute to over consumption of calories and excess body weight.\(^16\)
- Sugar sweetened beverages (SSBs) are the single largest contributor of sugar in the diet.\(^10\) A single 355 mL can of sugar sweetened soda contains up to 40 grams (about 10 teaspoons) of sugar and no health benefits.\(^28\)
- The total volume of SSBs available to Canadians is 3.5 billion litres, the equivalent of 110 L per person per year or over 300 mL per day.\(^29\) A standard sized soft drink can is 355 mL.
- As children get older, they consume more sugar from soft drinks. Boys' average daily consumption of regular soft drinks is 68 grams at ages 4 to 8 years and increases to 376 grams at ages 14 to 18 years. Among girls the increase is from 47 to 179 g.\(^30\)
WHAT ARE SUGAR LOADED DRINKS OR SUGARY DRINKS?

These include soda/soft drinks, fruit drinks (punch, cocktail), juices (including 100% fruit juice) sport drinks, sweetened coffees and teas, vitamin waters and energy drinks.

WHY ARE SUGARY DRINKS AN ISSUE?

• Sugary drinks contain empty calories with little to no nutritional benefit. The average 32 ounce soft drink (standard large size) has 374 calories and 102 grams of added sugar.
• Sugary drinks are the single largest contributor of sugar in the diet. It is estimated that Canadians consume about 13 per cent of their total calorie intake from added sugars. However, this added sugar estimate does not take into account the broader range of sugars captured by free sugars (which also include 100% fruit juice, honey, etc.) and as such, consumption of free sugars among Canadians is likely around 15 per cent.
• In Canada, almost 1/3 of those ages 5 – 19 reported daily consumption of sugary drinks. Research shows that soda, energy and sports drinks are the top calorie source among North Americans ages 12 – 30.
• As children get older, they consume more sugar from soft drinks. Boys’ average daily consumption of regular soft drinks is 68 grams at ages 4 to 8 years and increases to 376 grams at ages 14 to 18 years. Among girls the increase is from 47 to 179 grams.
• Among adolescents, soft drink intake is associated with lower intakes of milk, calcium and other essential nutrients.
• Individuals who drink sugary drinks do not feel as full as they do if they eat the same number of calories from solid food. Furthermore, they do not compensate by eating less, which causes excess calorie intake.
• Sugary drink portion sizes have increased over time. Originally, a 16 ounce bottle size was intended to serve three people while the same volume is now the standard small single serving size fountain drink. Today, single serving size fountain drinks can be as high as 40 ounces in Canada.
• Sugar loaded drinks and excess sugar consumption are associated with chronic disease including obesity, heart disease and stroke, diabetes, dental caries and some cancers. Drinking just one can of sugar-laced soda per day can increase the risk of developing diabetes by 22 per cent and increase the risk of death from cardiovascular disease. With every additional sugary beverage a child drinks daily, the odds of becoming obese increase by 40 per cent.
• The obesity epidemic continues to grow and currently 60 per cent of Canadians are overweight or obese. Obesity is a major public health concern because overweight and obese individuals are more likely to develop serious health problems such as cancer and cardiovascular disease. Obesity can reduce lifespan and quality of life.
• While the causes of chronic disease are numerous, poor diet and excess caloric intake are the leading factors for chronic disease and obesity. Larger portion sizes contribute to the overconsumption of calories and excess body weight. Health experts cite sugary drinks to be a leading driver of obesity and chronic disease.
• Chronic disease treatment takes up 67 per cent of health care spending and costs the Canadian economy $190 billion annually in direct and indirect costs. These numbers are expected to grow as chronic disease rates are increasing by approximately 14 per cent each year.
• Worldwide it is estimated that 180,000 deaths annually are attributed to the consumption of sugary drinks including 133,000 from diabetes, 44,000 from cardiovascular disease, and 6,000 from cancer.

Sugary drinks are the single largest contributor of sugar in the diet and contain empty calories with little to no nutritional benefit. Health experts cite sugary drinks to be a leading driver of obesity and chronic disease.