

## **Sugar and Sugar Alternatives: The Bittersweet Truth**

**Lisa F. Mallonee, MPH, RDH, RD,LD**

*Professor, Associate Dean Faculty Affairs*

**Texas A&M University School of Dentistry**

**3302 Gaston Avenue, Room 139B Dallas, Texas 75246**

[lmallonee@tamu.edu](mailto:lmallonee@tamu.edu) | 214-828-8914

### **Academy of Nutrition and Dietetics (AND) Position on Sweeteners**

“It is the position of the Academy of Nutrition and Dietetics (AND) that consumers can safely enjoy a range of nutritive sweeteners and nonnutritive sweeteners (NNS) when consumed within an eating plan that is guided by current federal nutrition recommendations, such as the Dietary Guidelines for Americans and the Dietary Reference Intakes, as well as individual health goals and personal preference.” J Acad Nutr Diet. 2012 May; 112(5):739-5

### **Canadian Dietary Guidelines on Sugar**

Health Canada suggests choosing foods with little to no added sugars, saturated fat, and salt, and choosing water rather than sugars-sweetened drinks.

<https://sugar.ca/sugars-consumption-guidelines/dietary-guidelines-on-sugars>

- Currently Canada does not have a quantitative guideline specific to total or added sugars intake as part of a healthy diet.

### **How much Sugar can you have??**

- **2015: DGAs recommend limiting added sugars to 10% (2000 kcals= 12 tsp)**
- **2015: WHO lowered recommendation from 10% to 5% (6 tsp)**

### **Added Sugars vs Natural Sugars:**

- “Added sugars” refers to ANY caloric sweetener added to a food during processing, cooking or at the table
- “Natural” sweeteners like honey or raw sugar, a refined product like table sugar or manufactured sweetener like HFCS—they are ALL added sugars

### **NOTES:**

## Major Sources of Added Sugars in the Diet:

Beverages account for the largest intake of added sugars in the diet at 47%; with snacks and sweet coming in second at 31%.

_____	=25%
_____	=11%
_____	=7%
_____	=3%
_____	=1%

## Who consumes more sugary drinks?

- Males vs. Females
- Children (1.5-3) vs. Children (4-10) vs Teen (11-18)
- Adults (aged 19-64 and 65+)
- Low SES vs. Higher SES

## Sugar and Tooth Decay

Chi DL, Scott JM. Added sugar and dental caries in children: a scientific update and future steps. *Dent Clin North Am.* 2019;63(1):17-33.

Sheiham A, James WP. A reappraisal of the quantitative relationship between sugar intake and dental caries: the need for new criteria for developing goals for sugar intake. *BMC Public Health.* 2014; 14:863.

## Caries and Obesity Connection

Garcia RI, Kleinman D, Holt K, et al. Healthy Futures: Engaging the oral health community in childhood obesity prevention - Conference summary and recommendations. *J Public Health Dent.* 2017;77 Suppl 1:S136-S140.

Hayden C, Bowler JO, Chambers S et. al. Obesity and dental caries in children: a systematic review and meta-analysis. *Community Dent Oral Epidemiol.* 2013; 41:289-308.

Mallonee LF, Boyd LD, Stegeman C. A scoping review of skills and tools oral health professionals need to engage children and parents in dietary changes to prevent childhood obesity and consumption of sugar-sweetened beverages. *J Public Health Dent.* 2017 Jun; 77 Suppl 1:S128-S135.

[Healthy Futures: Engaging the Oral Health Community in Childhood Obesity Prevention National Conference—Executive Summary](#) describes Robert Wood Johnson Foundation efforts and provides an overview of the conference, the conference agenda, and key findings. <https://www.mchoralhealth.org/PDFs/RWJF-HF-ExecSumm.pdf>

[Journal of Public Health Dentistry \(volume 77, supplement 1\)](#): includes nine articles prepared for the conference that identified through systematic reviews or scoping reviews the state of the science related to preventing childhood obesity and reducing children’s consumption of sugar-sweetened beverages and strategies that oral health professionals and organizations can employ to prevent childhood obesity. Available from: <https://onlinelibrary.wiley.com/toc/17527325/2017/77/S1> Accessed April 22, 2022

February 22, 2022 - Carbohydrate Nutrition News

## How Much Sugars Are Canadian Children and Adolescents Consuming?

Average sugars intakes for the different age categories:

	Total Sugars	Free Sugars	Added Sugars
Children and Adolescents (2-18 years)	24.1% Energy	12.9% Energy	10.3% Energy
Children (2-8 years)	25.8% Energy	12.6% Energy	9.5% Energy
Young Adolescents (9-13 years)	23.9% Energy	13.5% Energy	11.0% Energy
Older Adolescents (14-18 years)	22.0% Energy	12.0% Energy	10.7% Energy

Chiavaroli L, Wang YF, Ahmed M, et al. Intakes of nutrients and food categories in Canadian children and adolescents across levels of sugars intake: cross-sectional analyses of the Canadian Community Health Survey 2015 Public Use Microdata File. *Appl Physiol Nutr Metab.* 2022;47(4):415-428.

### What’s IN Your Cup?

#### DID YOU KNOW?

- ✓ 20 oz drink daily = 1750 kcals which equates to 7000 calories over a month!
- ✓ Along with normal diet and limited activity, this could lead to 2 lb weight gain/month OR 24 lbs in a year.

### **ONLY ONE A DAY:**

12 oz can non-diet beverage = \_\_\_\_\_ tsp sugar = \_\_\_\_\_ pounds annually

20 oz can non-diet beverage = \_\_\_\_\_ tsp sugar = \_\_\_\_\_ pounds annually

40 oz can non-diet beverage = \_\_\_\_\_ tsp sugar = \_\_\_\_\_ pounds annually

## **SUGAR AND....**

### **AGING**

Evidence has demonstrated that drinking a 20 oz sugar sweetened beverage daily is linked to 4.6 years of additional aging.

Ross S. Sugar-induced aging: the deleterious effects of excess dietary sugar intake. *Holistic Nursing Practice* [serial online]. March 2015; 29 (2):114-116.

Leung C, Laraia B, Epel E, et al. Soda and Cell Aging: Associations Between Sugar-Sweetened Beverage Consumption and Leukocyte Telomere Length in Healthy Adults From the National Health and Nutrition Examination Surveys. *Am J Pub Health*. 2014; 104(12):2425-2431.

### **HEART DISEASE**

Johnson RK, Appel LJ, Brands M et al. Dietary sugars intake and cardiovascular health: a scientific statement from the American Heart Association. *Circulation*. 2009 Sep 15;120 (11):1011-20.

2014 review in *Am J Clin Nutr* concluded more added sugars in the diet resulted in higher:

- ✓ Triglycerides
- ✓ Total cholesterol
- ✓ LDL cholesterol
- ✓ Elevated blood pressure

### **DIABETES**

Malik VS et al found individuals who had 1-2servings of sugar sweetened beverages per day had a 26% risk of developing type 2 diabetes than those who rarely consumed.

Malik VS, Popkin BM, Bray GA, Després JP, Willett WC, Hu FB. Sugar-sweetened beverages and risk of metabolic syndrome and type 2 diabetes: a meta-analysis. *Diabetes Care*. 2010;33(11):2477-83.

Malik VS, Hu FB. The role of sugar-sweetened beverages in the global epidemics of obesity and chronic diseases. *Nat Rev Endocrinol*. 2022 Apr;18(4):205-218.

Ma X, Nan F, Liang H, Shu P, Fan X, Song X, Hou Y, Zhang D. Excessive intake of sugar: An accomplice of inflammation. *Front Immunol*. 2022 Aug 31;13:988481.

## **PERIODONTAL DISEASE**

Moreira ARO, Batista RFL, Ladeira LLC, et al. Higher sugar intake is associated with periodontal disease in adolescents. *Clin Oral Investig*. 2021;25(3):983-991.

Lula ECO, Riberiro CCC, Hugo FN et al. Added sugars and periodontal disease in young adults: an analysis of NHANES III data. *Am J Clin Nutr*. 2014; 1182-7

<b>SUGAR SUBSTITUTES</b>	
<b>Non Nutritive</b>	<b>Nutritive</b>
<b>Saccharin Acesulfame-K</b>	<b>Sucrose Fructose</b>
<b>Neotame Aspartame Sucralose Stevia</b>	<b>Xylitol Maltitol Sorbitol Mannitol</b>

### **“Natural” Sweeteners: Monk Fruit Extract, Stevia Leaf Extract**

Shankar P, Ahua S, Sriram K. Non-nutritive sweeteners: Review and Update. *Nutrition*. 2013; 29(11-12):1293-9

## **SUGAR, SUGAR SUBSTITUTES AND WEIGHT**

Wilk K, Korytek W, Pelczyńska M, Moszak M, Bogdański P. The Effect of Artificial Sweeteners Use on Sweet Taste Perception and Weight Loss Efficacy: A Review. *Nutrients*. 2022 Mar 16;14(6):1261.

Higgins KA, Mattes RD. A randomized controlled trial contrasting the effects of 4 low-calorie sweeteners and sucrose on body weight in adults with overweight or obesity. *Am J Clin Nutr*. 2019 May 1;109(5):1288-1301.

Pearlman M, Obert J, Casey L. The Association Between Artificial Sweeteners and Obesity. *Curr Gastroenterol Rep*. 2017;19(12):64.

Luger M, Lafontan M, Bes-Rastrollo M, Winzer E, Yumuk V, Farpour-Lambert N. Sugar-Sweetened Beverages and Weight Gain in Children and Adults: A Systematic Review from 2013 to 2015 and a Comparison with Previous Studies. *Obes Facts*. 2017;10(6):674-693.

Plaza-Diaz J, Pastor-Villaescusa B, Rueda-Robles A, Abadia-Molina F, Ruiz-Ojeda FJ. Plausible Biological Interactions of Low- and Non-Calorie Sweeteners with the Intestinal Microbiota: An Update of Recent Studies. *Nutrients*. 2020;12(4):1153.

Ahmad SY, Friel J, Mackay D. The Effects of Non-Nutritive Artificial Sweeteners, Aspartame and Sucralose, on the Gut Microbiome in Healthy Adults: Secondary Outcomes of a Randomized Double-Blinded Crossover Clinical Trial. *Nutrients*. 2020;12(11):3408.

Anton SD, Martin CK, Hongmei H et al. Effects of stevia, aspartame and sucrose on food intake, satiety, and postprandial glucose and insulin levels. *Appetite*. 2010; 55(1): 27-43.

De Ruttyer JC, Olthof MR, Seidell JC, et al. A trial of sugar free or sugar sweetened beverages and body weight in children. *N Engl J Med*. 2012; 367: 1397-1406

Brown RJ, Rother KI. Non Nutritive sweeteners and their role in the gastrointestinal tract. *J Clin Endocrinol Metab*. 2012; 97(8):2597-2605.

Suez J, Korem T, Zeevi D, et al. Artificial sweeteners induce glucose intolerance by altering the gut microbiota. *Nature*. 2014; 514(7521):181-6.

### **Tips on Sugar for Patients...**

#### **Limit intake:**

- ✓ Adults- 6 to 9 teaspoons
- ✓ Preschoolers- 4 teaspoons
- ✓ Children- 3 teaspoons
- ✓ Teens- 5 to 8 teaspoons

#### **Everything in moderation:**

- ✓ Read food labels
- ✓ Learn sugar's aliases
- ✓ Buy unsweetened
- ✓ Be realistic—don't go cold turkey
- ✓ Add fat and protein
- ✓ Don't be fake all the time
- ✓ Add more flavor
- ✓ Fruit juice in moderation
- ✓ Drink more water
- ✓ Enjoy dessert
- ✓ Stick with it

**NOTES:**