THE EFFECT OF NUTRITION AND DIET ON DENTAL CARIES

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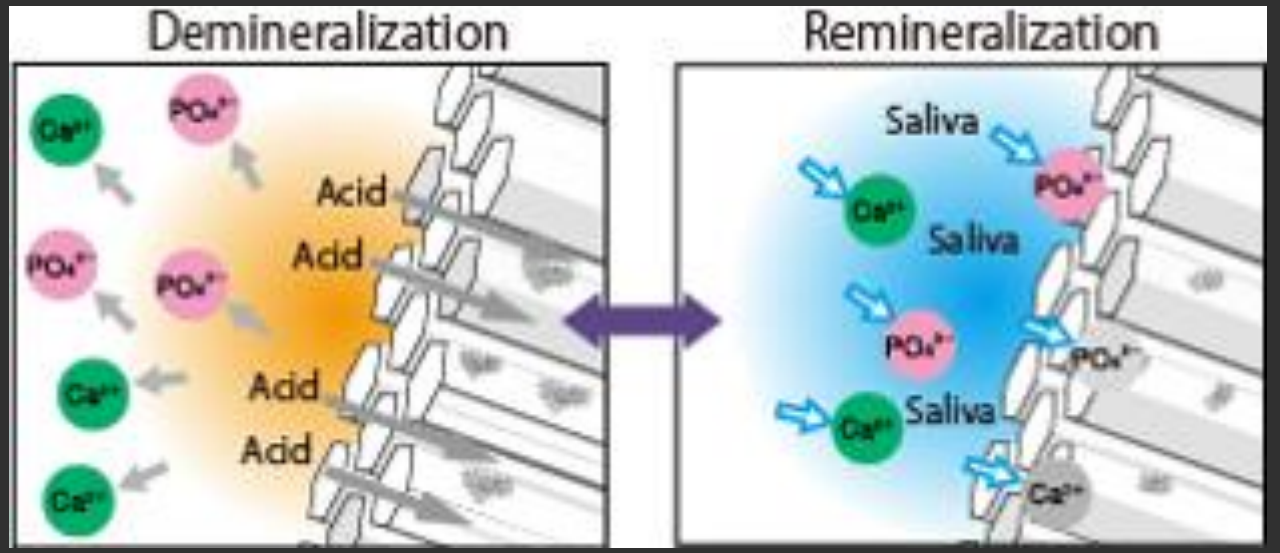
Dental caries results when plaque forms on the surface of a tooth and the bacteria in the plaque converts the free sugars contained in foods and drinks into acids that destroy the tooth over time.

The formed acids decreases the pH in the mouth and the teeth loses minerals to rise the pH. This mineral loss is named ‘demineralisation’.

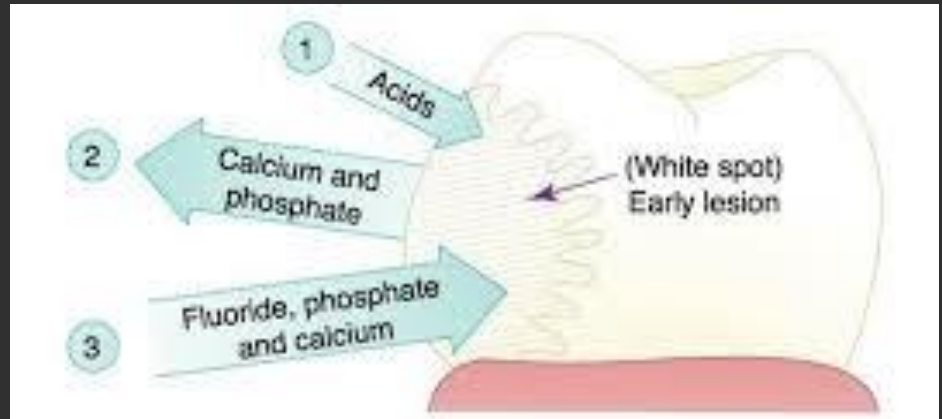
Saliva is one of the mouth's natural defenses against this process. It has the ability to redeposit minerals in areas where enamel or dentine is demineralized. This mineral regain is named ‘remineralisation’.

Mineral loss and regain happen each time an individual eats or drinks sugary things. This is called ‘demineralisation-remineralisation cycle’.

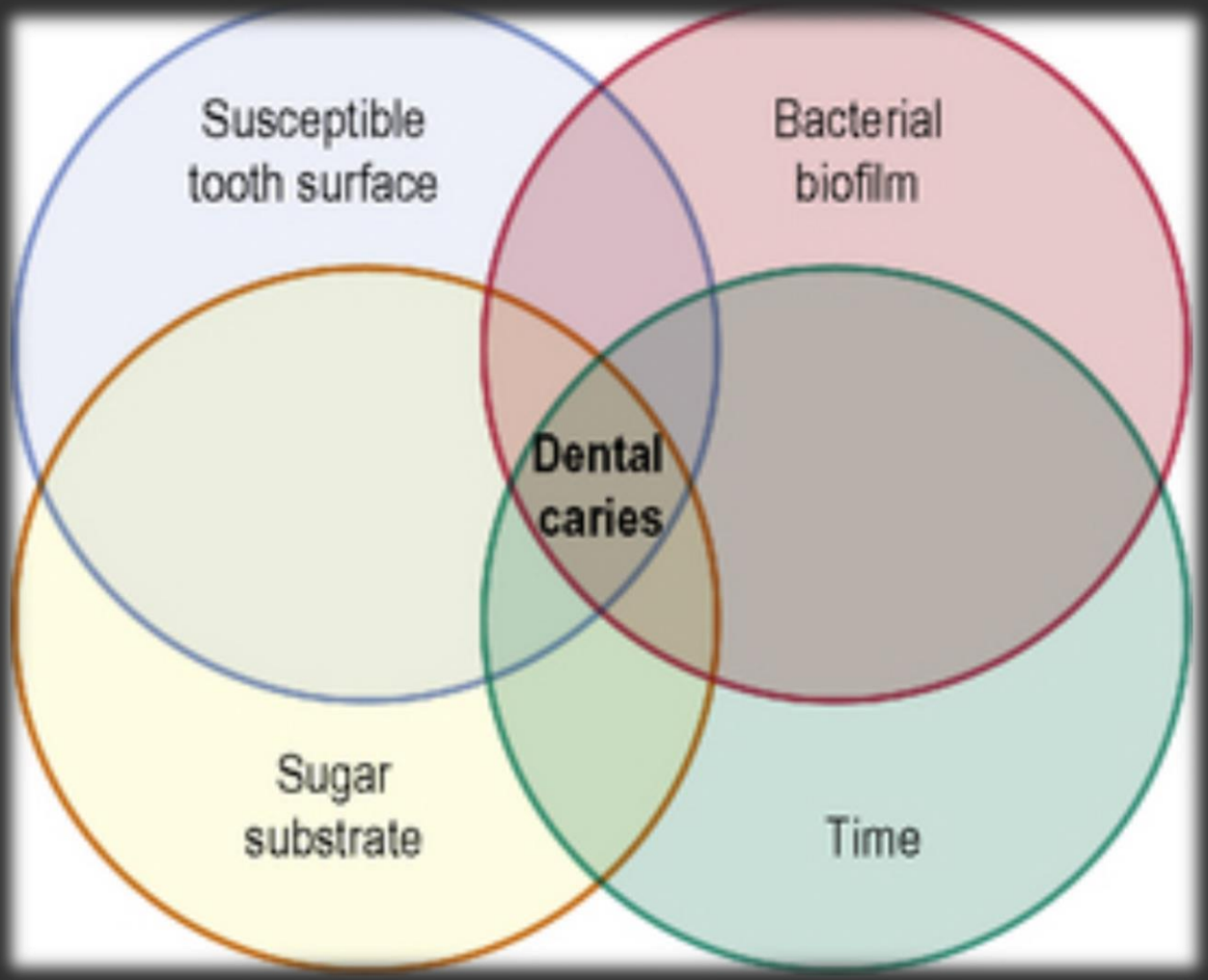


If the pH in the mouth remains high for a sufficient time, complete remineralisation of the enamel occurs.

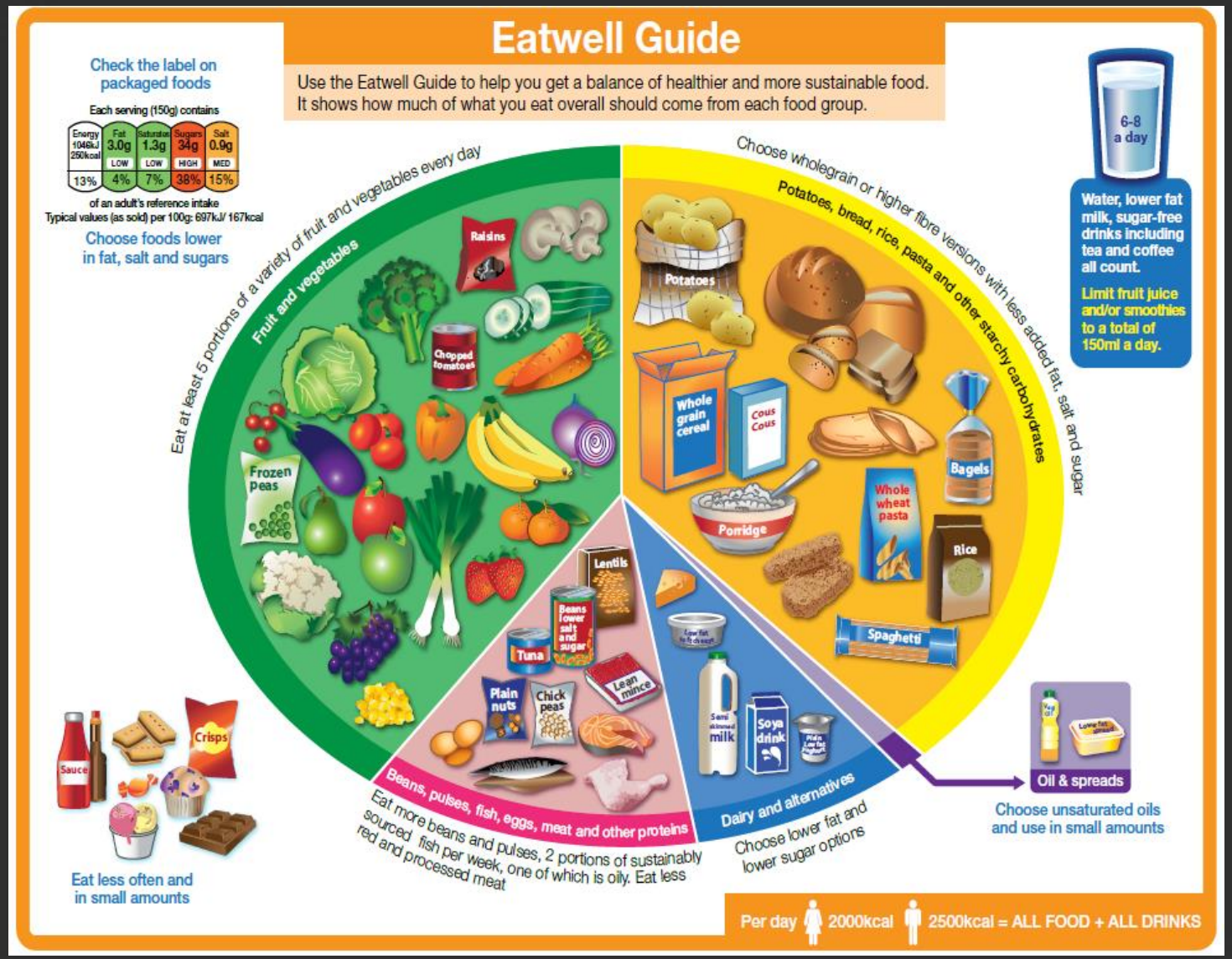
However, if the acid attack is severe, demineralisation prevails and eventually the first carious lesion begins to form in the enamel. Generally, caries occurs when demineralisation exceeds remineralisation.



1. The tooth is attacked by acids in plaque and saliva.
2. Calcium and phosphate dissolve from the enamel in the process of demineralization.
3. Fluoride, phosphate and calcium re-enter the enamel in a process called remineralization.



The development of caries requires the presence of sugar and bacteria, and also is affected by the sensitivity of the tooth, the bacterial profile, the quantity and quality of saliva, and aslo level of protective agents such as fluoride in the saliva.



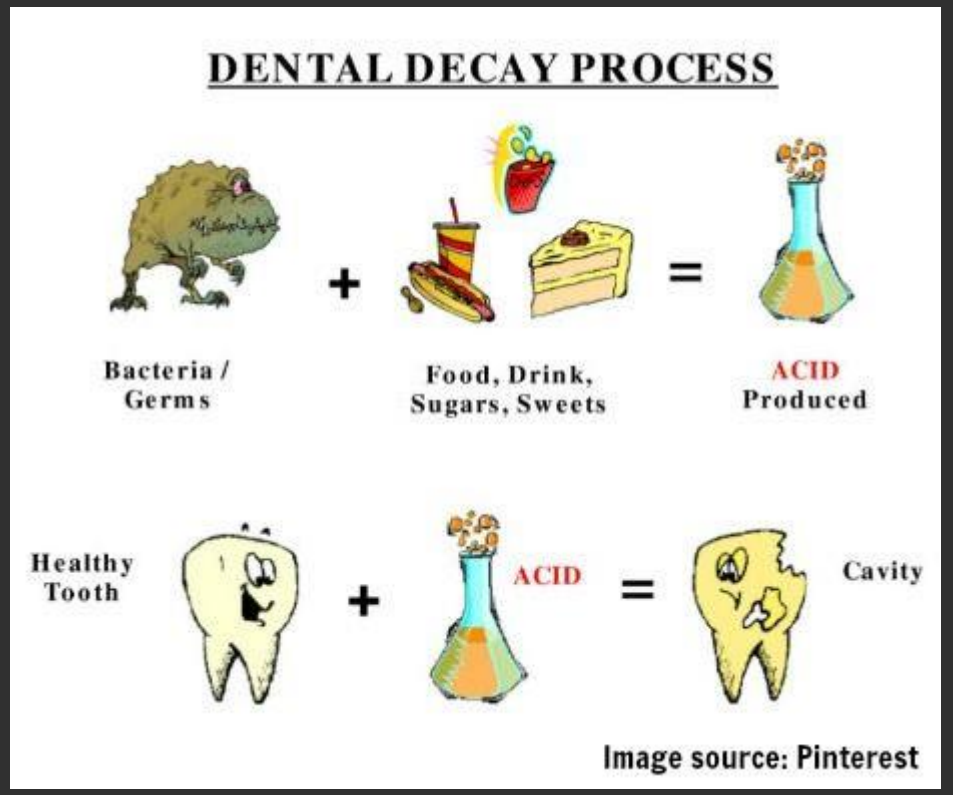
Nutrition: Living things take substances from outside that they will use to provide energy and create tissue. In other words, it is the adequate intake of carbohydrates, fats, vitamines and minerals.

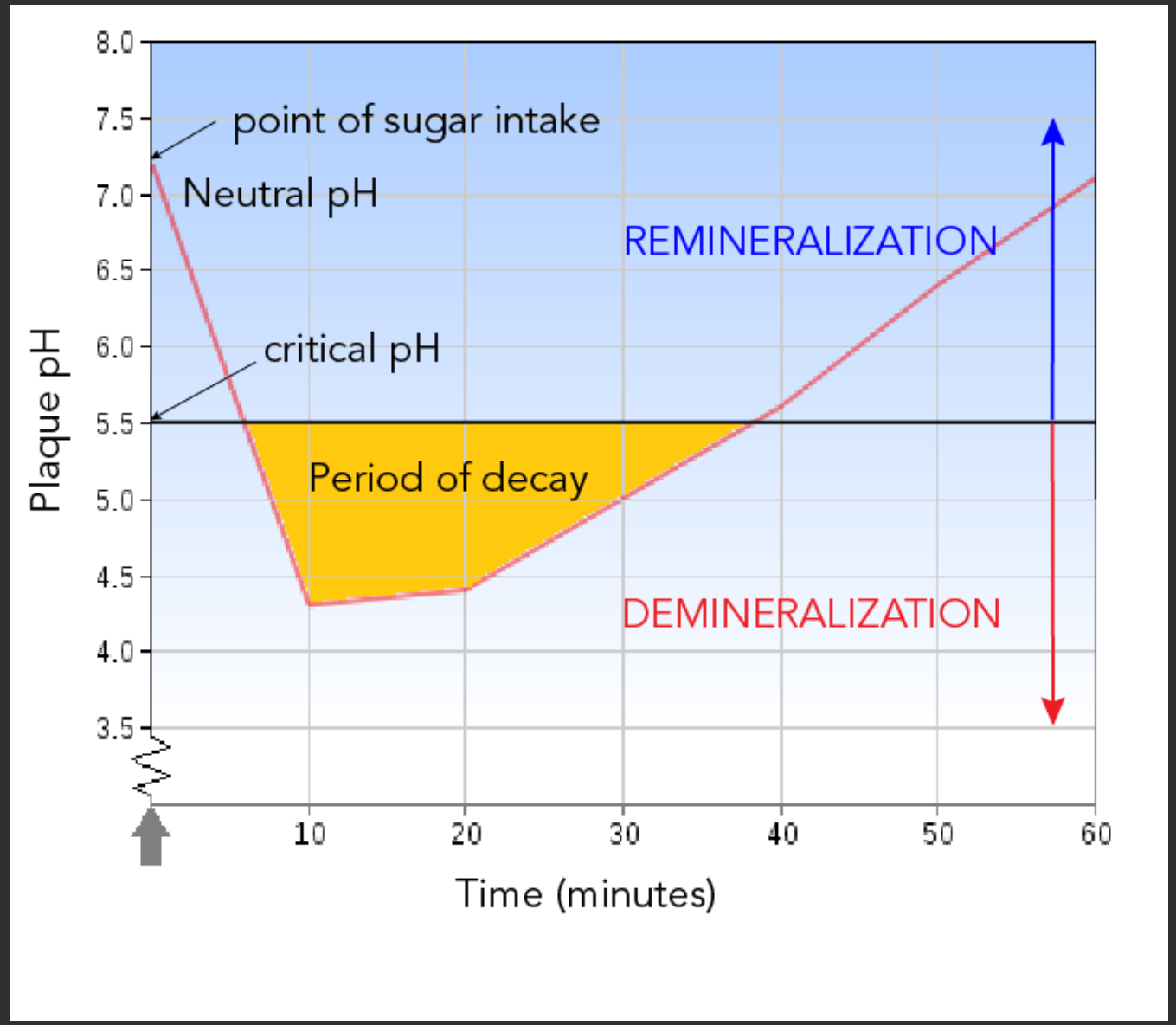
Diet: Foods and drinks that a person consumes throughout the day.

Cariogenic potential: The potential of a food to produce or promote dental caries.

Cariogenity is the ability of food to turn into acid in the mouth.

Measuring the pH of the plaque before, during and after ingestion of foods is an important guide in evaluating the carious potential of those foods.





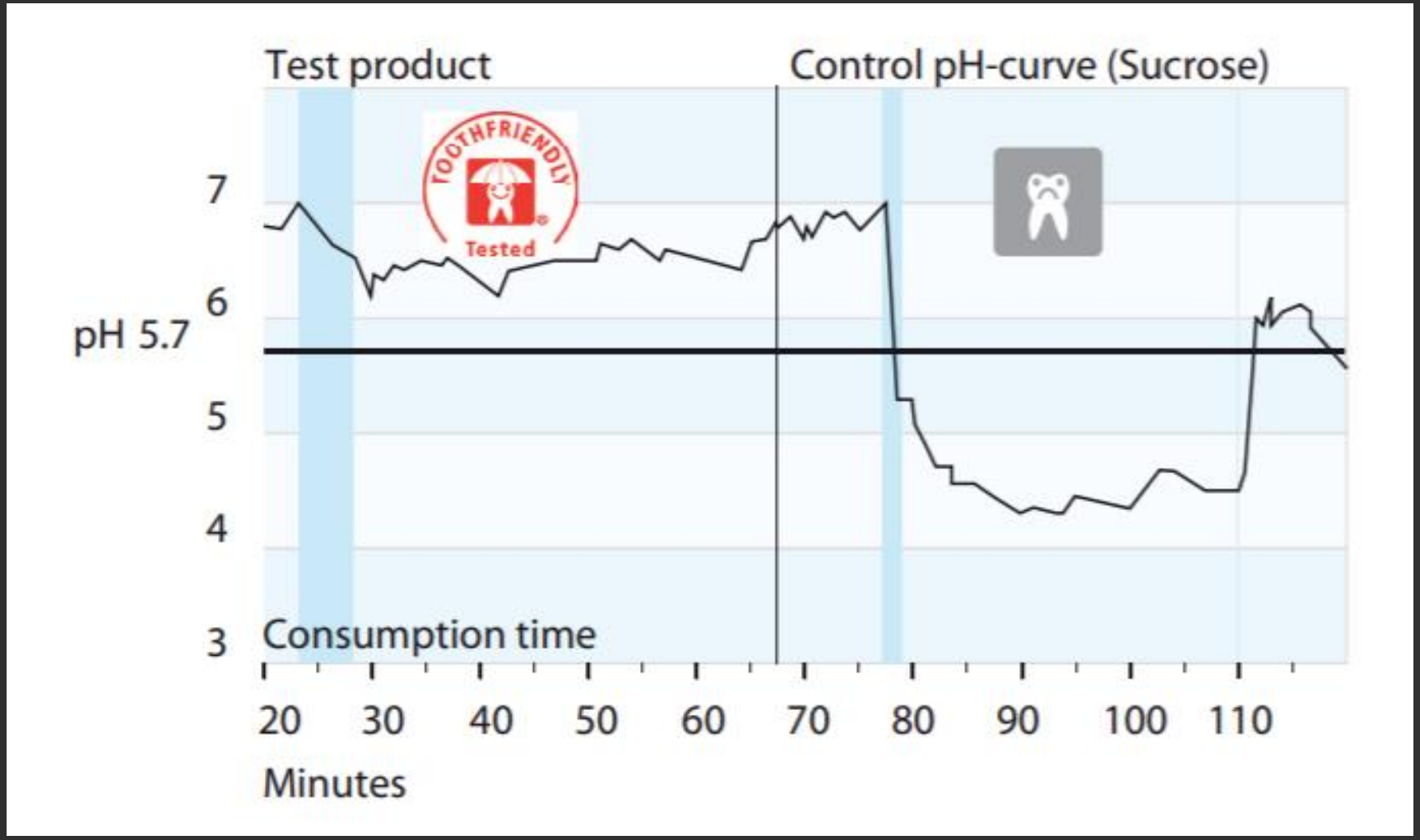
The Stephan Curve

It was determined that the pH value of plaque where demineralisation occurred in the tooth was approximately 5.5 and it was named as **critical pH.**

Products bearing the tooth-friendly logo are determined according to the plaque pH tests.

Dental Friendly logo, which is an international quality brand, shows that the products are reliable in oral and dental health. The logo is used by many different brands in 45 countries today.

Dental Friendly products undergo an in vivo plaque telemetry test performed in only three centers around the world.



Product categories that the logo used today in Turkey:

- Gums
- Toothpastes
- Natural sweeteners

Diş Dostu Derneği, the local provider of Toothfriendly International, was founded in 1997 in Turkey.

The Cariogenic Potential of Foods Is Affected by Many Factors:

1. Retention: The cariogenity of the foods that stick on the teeth for a long time which can not be removed by saliva easily (eg/caramel, cookie, date, raisins, etc) is higher.

2. Frequency of eating: Frequent snacking of foods containing carbohydrates and sugars between meals increases the prevalence of caries.

3. Structural features of food: Fibrous and hard foods that require chewing (apple, carrot, etc), help mechanical cleaning with their sialogenic (saliva increasing) effect.

4. The pH of the food: Low-pH drinks such as cola drinks and citric acid-containing fruit juices can cause demineralization of teeth.

The Role of Sugar in Caries Etiology

Sucrose (saccharose) has been called the chief culprit of dental caries.

There is a significant relationship between total sugar consumption and caries.

It has been shown that there is a decrease in dental caries in societies with reduced sugar availability during the years of the Second World War, then caries values increased when this restriction was removed.

There is evidence to suggest that populations of people who consume high amounts of sugar (for example, children with chronic illnesses who take sugary drugs for a long time) have higher caries levels than the population average.

It has been found that employees in the sugar industry have more dental caries than those working in other industries.

Frequency and amount of sugar consumption

There is a strong relationship between the amount and frequency of sugar consumption and caries.

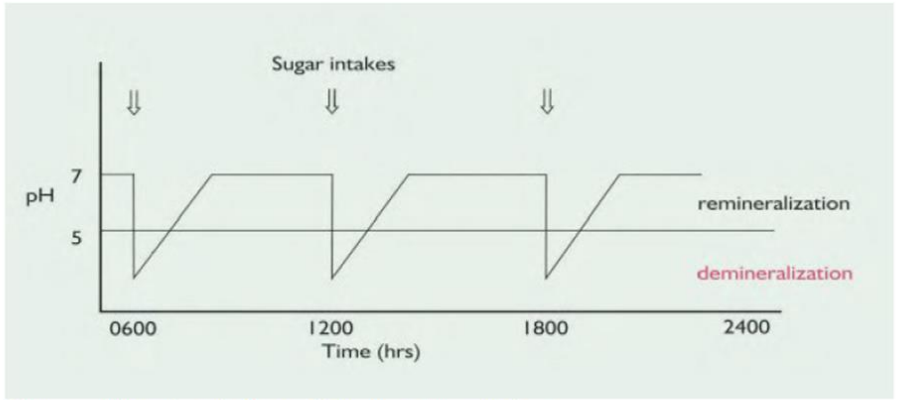


Figure *Illustration of effects of infrequent sugar intakes.*

Sugar intake only in main meals

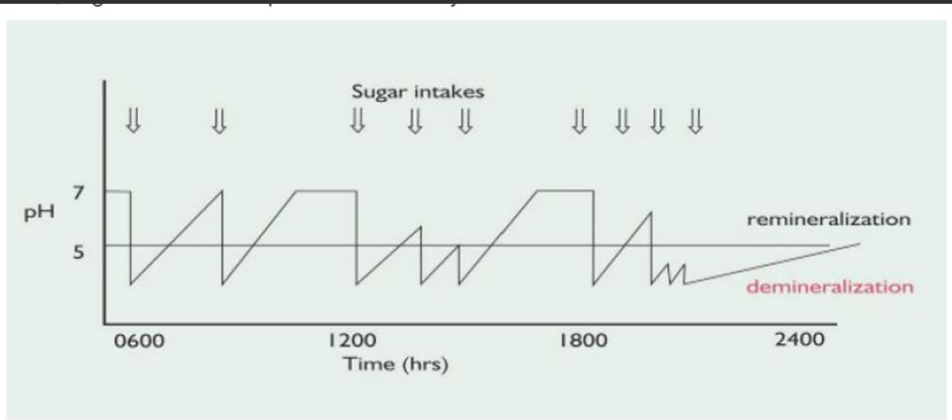


Figure *Illustration of effects of frequent sugar intakes.*

Frequent intake of sugar during the day

Sugar form

It is stated that the cariogenity of sugary food is related to its stickiness. The longer a food takes to be cleared from the mouth by saliva, the lower the pH.

Fruits and Dental caries

Some plaque pH studies have shown that fruit, although less than sucrose, is acidogenic to varying degrees depending on its texture and sugar content. However, plaque pH studies measure acidogenicity, not cariogenity, and do not take into account protective factors in fruits.

In dried fruits, the cellular structure of the fruit is disrupted, free sugars are released and dried fruits are potentially more cariogenic, as they can not be cleaned from the mouth for longer times.

Protective foods and drinks against dental caries

Plaque pH studies have shown that consuming cheese after a sugary snack eliminates the pH drop associated with sugar consumption. Cheese stimulates saliva secretion and increases plaque calcium concentration. The calcium concentration of dental plaque affects the balance between demineralisation and remineralisation of enamel.

Cow's milk contains lactose, as well as calcium, phosphorus and casein, which are thought to inhibit caries. Some studies have shown that the drop in plaque pH following milk consumption is insignificant.

There is no relationship between breast milk and dental caries. A breastfed baby drinks milk of a controlled composition without added free sugars. However, long-term breastfeeding after 1 year of age is a risk factor for early childhood caries.

The main reason fibrous foods protect teeth is that they mechanically stimulate the flow of saliva (eg/carrot, apple). Other foods that are mechanical stimulants that increase saliva flow; peanuts, hard cheeses and gum.

Black tea contains fluoride, polyphenols and flavonoids. It has been determined that it prevents decay thanks to the naturally containing fluoride.

Learning what people eat daily (diet analysis) is useful for reducing cariogenic foods.

DIET ANALYSIS (See notes on other side) * = 2 spoons of sugar.

	THURSDAY		FRIDAY		SATURDAY		SUNDAY	
	Time	Item	Time	Item	Time	Item	Time	Item
BEFORE BREAKFAST	7·45	Tea *	7·00	Tea *	7·00	Tea *		
Breakfast	9·00	Coffee *	8·45	Coffee *	10·00	Tea * 2 pieces of toast		
MORNING	10·00 10·45	Coffee * Roll and butter Coffee *	9·30 10·45 11·45	Coffee * Roll and butter Coffee * Coffee *	11·00 12·00	Coffee * Coffee *	10·45 11·30	Tea * Tea *
Mid-day Meal	12·30 1·30	Coffee * Coffee *	1·45	Cheese & onion sandwich ½ lager	1·0	Coffee * 1 muesli biscuit	2·0	Beef: roast potatoes carrots: greens fresh pear Tea *
AFTERNOON	2·30 3·45 4·15	Coffee * Coffee * Coffee *	2·30 3·15 4·00 5·00	Coffee * Coffee * Coffee * Coffee *	3·00 4·15	Tea * Tea *	3·30	Tea *
Evening Meal	7·30	Country hash Tea *	9·00	Lasagne Tea *	7·00	Spare Ribs, Rice Tea *	5·00 6·30	Tea * Coffee *
EVENING & NIGHT	9·00 10·30	2 Muesli biscuits Tea * Pear	10·00 11·15	Tea * Tea * 2 biscuits	9·30 11·00	Tea * Tea *	8·00 10·00	Coffee * Cheese & biscuit Tea *

Figure 7.2 Diet sheet completed by a middle-aged secretary with a very high incidence of caries. This lady returned to the surgery saying that she now realized that drinking sweetened cups of tea and coffee was the probable cause of her caries.

Sugar Substitudes

Fermentable carbohydrates are not the only products that give sweet taste. Some synthetic and natural sweeteners do not cause caries, although they taste sweet.

It is generally used in diets of diabetic patients.

The most commonly used is xylitol. Xylitol cannot be fermented by oral microorganisms and does not cause a decrease in plaque pH (non-acidogenic). It is a suitable sugar substitute for sucrose due to its non-acidogenic property. It also reduces bacteria in the plaque and saliva. It does not cause caries, in additon it prevents caries.

Xylitol can be used in different forms such as chewing gum, candy, chewable tablet, toothpaste, mouthwash, and dental cleaning wipes.

However, when consumed in large amounts, it has side effects such as diarrhea.

Chewing gums

Chewing gum after meals or snacks has several benefits.

When chewing gum, the rate of saliva flow increases.

It helps mechanical cleaning.

It may be recommended to chew gums with xylitol 3-4 times a day.

However, chewing gum that exceeds 20 minutes harms the joints.

Probiotics

Living microorganisms that positively affect the health of the host, taken with or without food, are called probiotics. Regular consumption of probiotics (yogurt, kefir, etc.) can reduce the number of cariogenic bacteria in saliva.

RECOMMENDATIONS:

•Since it is not possible to prevent sugar consumption, it should be ensured that such foods are taken at main meals, not between meals. Between meals, healthy foods like apple, carrot, yogurt or peanuts can be eaten.

•The consumption of sugary, cola drinks and sticky sugars should be limited.

• Teeth should be brushed after meals, if this is not possible, foods such as carrots that help with mechanical cleaning should be eaten, and the decreased pH should be increased with a piece of cheese or peanuts.

THANK YOU

KAYNAKLAR

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