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Xylitol in Preventing Dental Caries

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Xylitol in Preventing Dental Caries

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Problem

Dental caries:

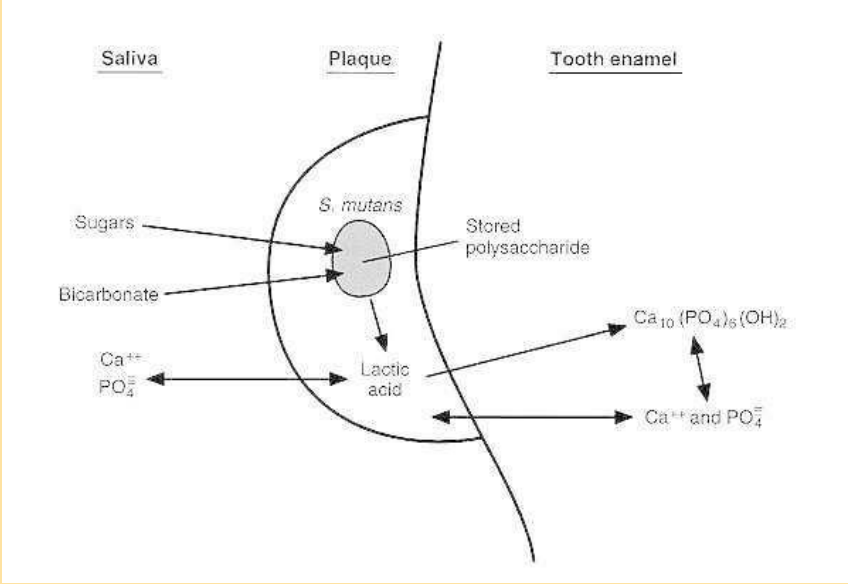
- Tooth infection
- Transmissible

Therefore, a great focus should be put on **prevention** to ensure **proper oral hygiene of the population.**

Xylitol use has been proposed as **an effective preventive intervention** against bacterial growth present in dental caries.

- ***Streptococcus mutans* Presence in Dental Caries**

Xylitol has been shown to be effective in decreasing the presence of Streptococcus mutans (*S. mutans*)

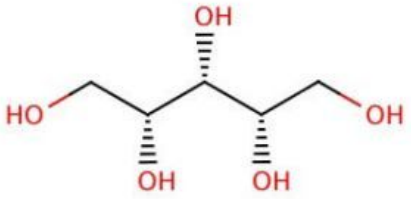


Xylitol ($C_5H_{12}O_5$)

Xylitol is a five-carbon sugar polyol that:

- **limits tooth decay and earlier** processes of dental caries.
- **inhibits the bacteria growth** responsible for the tooth cavities
- **reduces the variety of bacteria in the mouth**, resulting in limited decay-causing bacteria that live on the tooth surfaces.[3]

- Xylitol is commonly found as **a sugar substitute in gum**



Methods and Materials

- The databases includes PubMed, MEDLINE, Cochrane Library and Google Scholar.
- The search terms used included ***dental caries, xylitol, effectiveness, children, and adults.***
- The articles were within the last five years, **between 2016 and 2021.**

Xylitol in Reducing S. mutans

Groups	After 30 days			After 60 days		
	Means±SD	*Z*	*P*	Means±SD	*Z*	*P*
Xylitol (Group 1)	505000±459376	−1.3525	0.1762	685000±440424	−1.8800	0.0601
Polyol (Group 2)	730000±423146			2260000±3347175		
Xylitol (Group 1)	505000±459376	−2.8267	0.0047*	685000±440424	−2.4210	0.0155*
Control (Group 3)	1405000±2033010			2350000±3297128		
Polyol (Group 2)	730000±423146	−1.5419	0.1231	2260000±3347175	−0.4599	0.6456
Control (Group 3)	1405000±2033010			2350000±3297128		

*$P<0.05$, statistically significant

Xylitol in Reducing S. mutans

Chewing the xylitol chewing gum twice a day for 30-days for five minutes in each session reduces the count of the salivary *Streptococcus mutans*.[2] The xylitol chewing gum has shown greater efficiency than polyol chewing gum and the control group in reducing the count of salivary *Streptococcus mutans*.

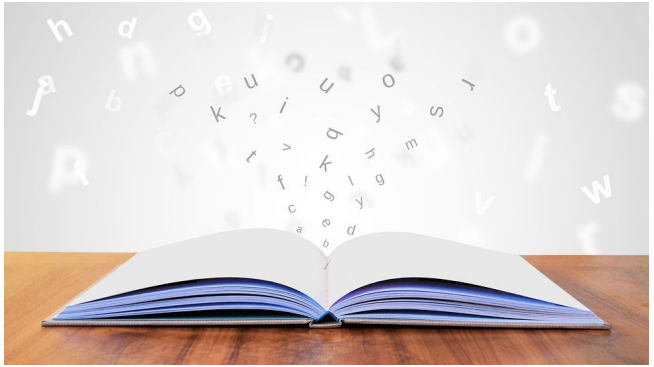
Short-term Xylitol Consumption on S. mutans and Inflammatory Cytokines

A randomized control trial assessed the effect of the short-term xylitol consumption on *Streptococcus mutans* and inflammatory cytokines.

The researchers concluded that even the short-term use of xylitol might play an essential role in maintaining an individual's oral health. It can be associated with the reduction of pro-inflammatory cytokine release and reduce the number of *Streptococcus mutans* present in the mouth.[1]

Literature Review Evaluating Xylitol

Xylitol consumption of between 5-11g over a long period is more likely to prevent dental caries among adults and children. Reduced dosage over a short period does not significantly impact reducing the risk of dental caries.[6]



Xylitol Contained in Oral Hygiene Products

Xylitol shows a significant improvement in:

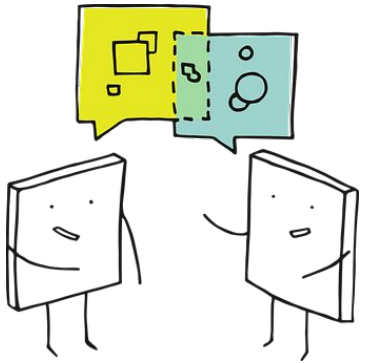
- saliva-stimulated flow rate
- saliva resting flow rate
- saliva buffering capacity
- and micro crystallization index.

Xylitol, Chlorhexidine, or a Combination?

- Resultant variables (salivary Streptococcus mutans, GI, and PI scores) showed a significant decrease from the start of the experiment compared to the post-intervention in all three groups.
- The PI score reduction was found to be much higher in the xylitol group. In contrast, the reduction in salivary *Streptococcus mutans* count was much higher in the combined chlorhexidine and xylitol group.
- The researcher concluded that the three types of mouthwash effectively prevent gingivitis, plaque, and salivary *Streptococcus mutans* count.[8] Researchers stated that further studies should be conducted to develop strategies aimed at the efficient application of the products in dental caries prevention.

Discussion

Maximizing prevention entails using sugar substitutes such as xylitol. Xylitol's consistent use over a long period will change the variety of bacteria in the mouth.[3] Over time, fewer amounts of decay-causing bacteria will survive on the tooth surfaces with xylitol utilization.



Highly Recommended for Children and Young Adults

The importance of prevention should be placed on younger age groups and these ages should have increased accessibility to preventative measures such as xylitol.

The prevention intervention can be applied in conditions where young adults and children have access, for example: schools, universities, healthcare facilities, and other related institutions. Accessibility would allow daily consumption which has shown increased prevention of tooth decay.

Xylitol Products

Xylitol can be found in different products, including oral hygiene products, **chewing tablets, lozenges, and chewing gum.**

For this reason, certain sugar-free chewing gums, with products using sugar alternatives like xylitol, now have a **seal of approval from the ADA.**

- Average: 3-5 times/ day
- Minimum: 5 g
- Duration: 5 minutes
- xylitol products should be consumed for **at least three weeks to have a significant change on Streptococcus mutans counts** in the mouth and improve other salivary parameters.

In Conclusion

•The **bacterial presence on the tooth surfaces** is responsible for **caries that affect the teeth**.

•Dental caries are a **transmissible infectious disease** containing several infectious agents.

•The typical presence of the streptococcal species responsible for dental caries is *Streptococcus mutans* which is cariogenic.

•Prevention of dental caries **requires multiple approaches to achieve positive results**

•Sugar substitutes such as **xylitol** can be essential in **maximizing prevention of the infection**.

In Conclusion

•**Xylitol** works by **preventing the growth of bacteria** responsible for dental caries.

•Using xylitol **consistently over a long duration can** change the variety of bacteria in the mouth.

•Xylitol can be contained in different products, **including oral hygiene products, lozenges, chewing tablets and chewing gums.**

•Additionally, it **reduces acidic levels and plaque formation** that erode the tooth surfaces.

•Trials have significantly found **xylitol to be effective and safe against dental caries in children and adults.**

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THANK YOU!

Any questions or comments?

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