

CHEWING GUM – AN ADJUNCT IN HEALTH

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ABSTRACT

Chewing gums are the mobile drug delivery systems. Previously it contained a gum base, sweetener, flavouring and aromatic agent but now has evolved and consisted of fluorides, minerals, bicarbonates and is used in greater amounts. When administered orally it not only shows the local effects but also shows systemic effects. It is widely used for diabetes, anxiety, smoking cessation, travelling illness and freshening of breath. They have also found to be very useful in children with special health care needs.

KEYWORDS: Chewing gum, Xylitol, Saliva, Medicated gums, Special children.

INTRODUCTION

Saliva known as the “Magical Fluid” plays a very important role in keeping our oral hygiene. It is the protective factor which promotes our oral health and is found to be a useful factor in controlling plaque, maintaining pH, remineralisation of incipient carious lesions, hence the overall oral clearance. Many studies have shown that effects of saliva can be enhanced by chewing of the chewing gum.^[1] Previously chewing gums consisted of a gum base, sweetener, flavouring and aromatic agent but has now evolved and constitutes of fluoride, minerals and bicarbonates. It is available in medicated form and has substances like nicotine, aspirin, antifungal agents, vitamins.^[2,3] Chewing gum are known to enhance salivary flow rate by the factor of 10 thus helping in overall oral clearance^[1] Despite of its local effects it shows important systemic effects; in conditions like motion sickness, diabetes, smoking cessation, etc.^[3]

History

Chewing gum history dates back to some 5000 years, as it was used as confectionary preparation and was enjoyed by people worldwide.^[3] It was used in the era 50AD by Greeks as a sweetening agent for their breath and for cleaning their teeth. They used Mastiche {a resin taken from bark of mastic tree}, it had antiseptic properties and medicinal advantages. During World War II shortage of natural gum was observed then development of synthetic resin which is now currently used was discovered.^[3,4]

The 1st Chewing gum product to be commercially manufactured was known as “STATE OF MAINE PURE SPRUCE GUM.” In Dec.28 1869 Dr. Williams F. Sample a dentist from Mount Vernon, Ohio got 1st

Patent for Chewing gum; this product contains of liquorice and rubber dissolved in alcohol and naphtha was intended to be used as dentifrice.^[3,4] There then came the evolution of “SUGAR FREE” gums in early 1950’s, used sorbital as sugar substitute. Then in 1975, Wm. Wrigley Jr. Company gave “Freedent” especially designed for denture wearers, it didnot stick to most of the dentures as rest gums did.^[3]

Effects of Chewing Gum

Gum chewing stimulates our salivary flow which results in the increase salivary flow by 10². Chewing gums taken after meals causes the salivary secretions to become rich in bicarbonates resulting in increased pH, enhancing acid buffer capacity which further promotes enamel remineralisation. However if sucrose rich gums are taken it causes reverse effects and makes one more susceptible for high caries activity. Sucrose free gums (sugar free gums) with the dental protective substances needed to be taken for improving oral health.^[2]

Types of Chewing Gum**➤ Chewing gum containing fluoride**

They were introduced around 1960s as the alternative for fluoride tablets for caries susceptible individuals, these have 80% bioavailability, reduces demineralisation and enhances remineralisation of enamel. They causes increased reduction in the plaque bacterial and raises the pH of oral cavity. Fluoride is readily released from chewing gum. After 10 min of mastication, 80 to 94% gets dissolved in oral fluid.^[2,5]

➤ Chewing gum containing CHX (chlorhexidine)

It was 1st antimicrobial agent to be introduced against plaque bacteria act as broad spectrum antimicrobial. It

was initially used in mouth rinses to treat gingivitis and other periodontal problems, but due to its regular and continuous use it often results in brown staining of teeth. The introduction of chewing gum containing CHX could be used as antiplaque and antigingivitis agent. It resulted in less bitter taste and less brown staining that was seen with the use of CHX mouth rinse. The daily recommended dose was 4-6 pieces twice or three times daily, each chewed for 20 min. One piece contains 5mg of CHX.^[6]

➤ **Chewing gum containing Xylitol**

It was discovered in late 19th century, it is a white crystalline sugar alcohol. It is naturally found in various fruits and vegetables like strawberries, mushroom etc. It plays an important role when it comes to oral cavity, it cannot be easily metabolised by *S.mutans* (plaque forming bacteria) as a result of which it found a great use in dentifrices, sweets for children. As *S.mutans* are the primary bacteria of oral cavity causing caries, the use of xylitol containing gums significantly reduce caries incidence in high susceptible people and also reduces many periodontal problems.^[7,8]

➤ **Chewing gum containing Minerals (Calcium and Phosphates)**

Use of gums to deliver minerals was introduced in 1960s. Usage of minerals like Calcium and Phosphate results in enhancement of acid buffer capacity and reduction in demineralisation process. Ca shows increase in remineralisation of enamel.^[2]

➤ **Chewing gum containing citric acid**

Gums containing citric acid CPP –ACP significantly greater remineralisation of enamel than the gums which lacks it.^[2]

➤ **Medicated chewing gums**

These chewing gum are mainly available for smoking cessation, pain relief, travel illness and freshening of breath. Medicated gums provide advantages for both local oral effects as well as systemic effects. These are preferred due to easy acceptance by children, no need to take water as in other medications, sublingual used gums have rapid effects and are containing sweeteners and flavouring agents so are easily acceptable by many.^[9]

Uses of Chewing Gum

➤ **Chewing gum used as an adjunct in oral health of special children**

Chewing gum plays an important role in maintaining oral hygiene and for those who need special health care to carry out their oral hygiene practises, it's an adjunct in their oral health.^[4] Oral health needs to be encouraged in children and a special attention to those special children who lacks the manual dexterity to keep a good oral hygiene. These are the people who have physical, mental, sensory, behavioral, cognitive, emotional and chronic medical conditions so extra knowledge is required for their care and it's the job of parents, care

takers to ensure that these children should have supervised oral hygiene with the overall health maintainance.^[10] When it comes to oral health brushing, flossing pose a challenge for them as they lack the manual dexterity and motor skills which are needed in maintaining primary oral hygiene. It was found out in a study conducted in Nigeria that 22% special children had poor oral hygiene who belonged to high and middle class educational families.^[4] There are many caregivers who lack in the requisite knowledge of importance of oral hygiene so they pamper these children by giving high cariogenic diet, not cleaning mouth after these snacks and brushing on irregular basis, resulting making these children at a risk for caries, plaque and other oral health problems. Poor oral hygiene is not only related to poor socio-economic status but also very poor families of those children who needs special health care needs.^[10] So the use of chewing gum as a potential aid helped in maintaining the oral hygiene in special children. The high cariogenic diet taken by these children often results in plaque bacteria produced by fermentable carbohydrates which leads in dental decay. Often disorders like Down's syndrome, cerebral palsy, autism leads to high acid concentration forming more complex form of dental decay.^[4]

➤ **Chewing gum and diabetes**

Insulin is produced by the human body but when we talk about diabetic patients, they cannot produce sufficient insulin to meet the needs of their body. They need an outside source for insulin to maintain their blood sugar levels in the body. Despite of taking oral hypoglycaemic drugs, Scientist has evolved other ways for them to take insulin like subcutaneous insulin injections and newly developed way is chewing gums for diabetic. The introduction of chewing gum for diabetics has many advantages as it is Non invasive and easy way of administration especially in case of small children for whom swallowing medicines is a difficult task, it has fast onset of action, avoids first pass metabolism which thus increases its bioavailability, it reduces the pain one has to go through in cases of subcutaneous insulin injections. Other benefits are; it reduces anxiety and fear and increases memory, concentration, it enhances intestinal motility and salivary flow thus helps in ease at swallowing, it is also considered good for teeth and oral health.^[11]

➤ **Chewing gum used in Smoking Cessation**

Tobacco dependence is one of the deadliest habit, it often causes one's life. Smoking is one such habit which need to be quit so that a person can life a healthy and long life. Scientist has evolved a new way to help those who want to eliminate tobacco dependence. Nicotine gums plays a very important role in smoking cessation. It is noticed that it not only reduces the craving for smoke but also helps in the withdrawal of smoking. Nicotine depended patients don't smoke at all.^[12]

➤ Chewing gum with dental attributes

Chewing gums are the delivery agent for various dental protective agents. Various forms of chewing gum containing fluoride, xylitol, minerals, CHX protects oral cavity and act as anti plaque, anti gingivitis, reduces cariogenic effect of *S.mutans* and enhances the overall oral health of the individual. Chewing gums are effective in patients undergoing ortho treatments as there is malocclusion and presence of retention sites making it more difficult for them to clean as a result they are more prone for plaque accumulation. Fluoride and chlorhexidine containing gum helps in reducing microflora. In Edentulous patients who wear dentures, there are specialised gums that don't stick to dentures and keep it clean. In cases of children who are in habit of intake of high sugary diet like chocolates, toffees etc. Chewing of gums rich in fluoride and minerals play a vital role in lowering the risk of dental decay in them.^[2,10,13]

CONCLUSION

It can be stated that chewing gum can be used as an adjunct in overall health of the individual, with its local as well as systemic effects, it becomes an important delivery system which improves our oral health and prevents many dental problems. As there are various forms of chewing gums available in the market one can easily pick and choose for themselves.

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