FLUORIDE - HOW DOES IT WORK?

Teachers Section

By the end of this lesson the children will be able to:

- Understand how fluoride helps to protect teeth from decay.
- Understand the benefits of dry brushing.
- Know the correct amount of toothpaste to use when toothbrushing.

Background information

What is Fluoride?

Fluoride is a naturally occurring substance which can be found in many water supplies. Studies have shown that it drastically reduces the incidence of dental caries (tooth decay) in all age ranges, but is most beneficial to children. There are two ways in which fluoride works and they are systemically ie in the water supply or by using fluoride supplements like drops and tablets and topically ie in toothpaste, mouthwashes and varnishes.

Systemic fluorides are incorporated into the tooth enamel whilst it is developing, forming a much stronger enamel crystal therefore increasing its resistance to tooth decay.

Topical fluoride act on the tooth surface as it is absorbed into the tooth enamel also increasing its resistance to tooth decay.

Water fluoridation is the preferred option by many Dental Health Professionals as we all know there are many children who, for a number of different reasons, do not regularly brush their teeth, particularly those from areas of social deprivation. Added to this there are those in society who are medically compromised and for whom toothbrushing is extremely difficult or their risk to dental disease is increased as a result of their medical condition. Research has shown that water fluoridation can reduce the incidence of dental decay by 40-70%. This public health measure would ensure all had access to fluoride regardless of where they live or what difficulties they face thus reducing inequalities in oral health.

For fluoride in the water to be of any benefit it needs to be at a level of 1 part per million(1ppmf) ie. 1 part of fluoride to 1 million parts of water. Unfortunately, the natural level of fluoride in our local water supply is only one tenth of the recommended level. Strategic Health Authorities and local water companies have the power to top up the level after public consultation, but at present there are no plans to introduce water fluoridation in the Hull and East Riding area. This current situation makes the daily use of fluoride toothpaste even more important. Levels of fluoride in individual brands of toothpaste can be found on the tubes, it may say “Sodium fluoride 1350ppmf”

The current recommendations from the Department of Health are that children under the age of 3 should use a smear of toothpaste with a fluoride level of a minimum of 1000ppmf. Children 3-6 years are advised to use a pea sized amount of toothpaste with a level of 1350-1500ppmf and children from the age of 7 should use a pea sized amount of toothpaste with a fluoride level of 1350ppmf or above.

Children and adults should be encouraged not to rinse out after brushing with water or a mouthwash as this reduces the topical effects of the fluoride and should simply spit out any remaining foam in the mouth at the end of brushing.

In summary the main messages are:

a) Fluoride is natural, it can be found in many foods and drinks including tea and beer and occurs naturally in water supplies around the World.

b) Use the correct amount of fluoride toothpaste at least twice a day.

c) Do not use water when toothbrushing to maximise the benefits of the toothpaste.

Activity/Experiment

Fluoride.....how does it work?

Aim

To understand how fluoride helps to protect the teeth from acid attacks.

Objective

To demonstrate with the aid of an egg how fluoride provides a barrier to plaque acid.

Resources required:

- An empty egg carton
- A waterproof marker pen
- Fluoride toothpaste
- A raw egg
- White vinegar
- A glass jar

Method

1) Carefully take the egg and draw a circle around the middle with the waterproof marker. Draw a cross on one half of the egg.
2) Fill one of the spaces in the egg carton with toothpaste.
3) Gently place the half that has the cross on in the toothpaste up to the line of the circle and leave for approximately 7-10 days.
4) Gently remove the egg from the carton and wipe off excess toothpaste.
5) Fill the glass jar half way with the vinegar.
6) Carefully lower the egg into the jar and see what happens!

The egg shell represents the tooth enamel, it's very similar in composition. The vinegar is obviously an acid and therefore this experiment mirrors what happens when we have an acid attack on our teeth.

You will notice the half of the egg which has not been in the toothpaste will be covered with bubbles. This represents the acid attacking the enamel when sugar is consumed. The other half will have very few bubbles showing how fluoride provides a protective coating to the teeth making them more resistant to decay.