

Dubai Smiles Healthy Manual

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The authors of this Program Manual have endeavored to ensure that it reflects relevant guidance and evidence, which is current at the time of the publication. All trainers and health care providers are advised to keep up to date with updates of the program. Websites are a source of references and also are the directives from Dubai Smiles Healthy program

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Forward

This manual describes the first preventive or community based program implemented in the Emirate of Dubai. It was based on the screening program conducted in 2012 in Dubai and is developed to support all staff that work within the scope of the program. “Dubai smiles Healthy” (DSH) includes national and international requirements for better preventive care and overall wellbeing and happiness of the community. Periodic evaluation and development will be conducted for the program.

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Dubai Smiles Healthy Program Manual-

Purpose and Use

The main purpose of this manual is to provide information and support to the staff who are involved in the implementation and delivery of Dubai Smiles Healthy Program, which is aimed at improving the oral health of children from 6 months to 17 years of age in Dubai.

Future versions of this manual will be further developed and amended due to the continuous feedback from staff involved in the program.

This manual is a tool to support the health regulations and policies of Dubai Health Authority to have a Safe and Happy community.

Dubai Smiles Healthy (DSH)

Following the oral health survey conducted among Dubai school children in 2012, Dubai Smiles Healthy (DSH) was developed. This program was based on the need for oral health promotion and oral diseases prevention to decrease the caries prevalence (dmft) of the young population of Dubai.

Dubai Smiles Healthy (DSH) is a national program designed to improve the oral health of children in Dubai. It is adapted from the Childsmile program of NHS Scotland¹ and follows the World Health Organization recommendations for preventive care.²

It has three main components:

- Dubai Smiles Healthy - School Practice Program
- Dubai Smiles Health - School Nurse Training Program
- Dubai Smiles Healthy - Child Health Program

The program includes all the regions of Dubai (Deira, Bur Dubai and others-Hatta and Lusaily).

Vision:

Based on the vision of Dubai Health Authority – “Health, Safe and Happy community”, Dubai Smiles Healthy provides a comprehensive approach to tackle the dental problems of children through the three component programs (school practice, school nurse training and child health sessions).

It is tailored to the needs of this population and adapts to the resources available within the Dubai Health Authority.

Aim:

The aim of this program is to decrease the caries prevalence (dmft) of the children population by 1 within the next three years.

The target, if met-allows shifting the focus from screening for the dental caries to health promotion and primary prevention and targeting active intervention for the children and their guardians. The decrease of dmft will be revised every three years to allow for adaptation to the community needs and targets achieved.

Every child from 6 months to 17 years of age, should have access to:

- An enhanced program of oral health care within the Public Health Care (PHC).
- Clinical oral diseases preventive programs in nurseries and schools.

Target achievements:

- To achieve a decrease in the dmft by 0.2 for the first year of the program (subject to revision)
- To achieve a decrease in prevalence of caries by 1% (subject to revision)
- To receive two applications of fluoride varnish per year for each child.

Policies and guidelines:

The Dubai Smiles Healthy (DSH) program is under direct supervision of Dubai Health Authority and follows recommendations by the WHO guidelines for preventive intervention.

In addition, the Ministry of education and Knowledge and Human development Authority play an important role.

Follow-up and revision of the program:

- The main focus will be on identification of need and delivery of preventive advice in all forms.
- A 36 month oral health review will be done to allow re-evaluation and development of the previous survey conducted in 2013. Dubai Smiles Healthy pathway. This will be done through a screening survey following the protocol.

- First symposium on Dubai Smiles Healthy (2018):
 - ❖ Poster presentation
 - ❖ Presentation by the head of department and main contributors
 - ❖ Announcement of results.
 - ❖ Involvement of higher management.
 - ❖ Outcomes, lessons and future plans.

Integration of children in DSH program:

Children can join the Dubai Smiles Healthy program through the main channels i.e. Primary Health Care centers and schools and nurseries.

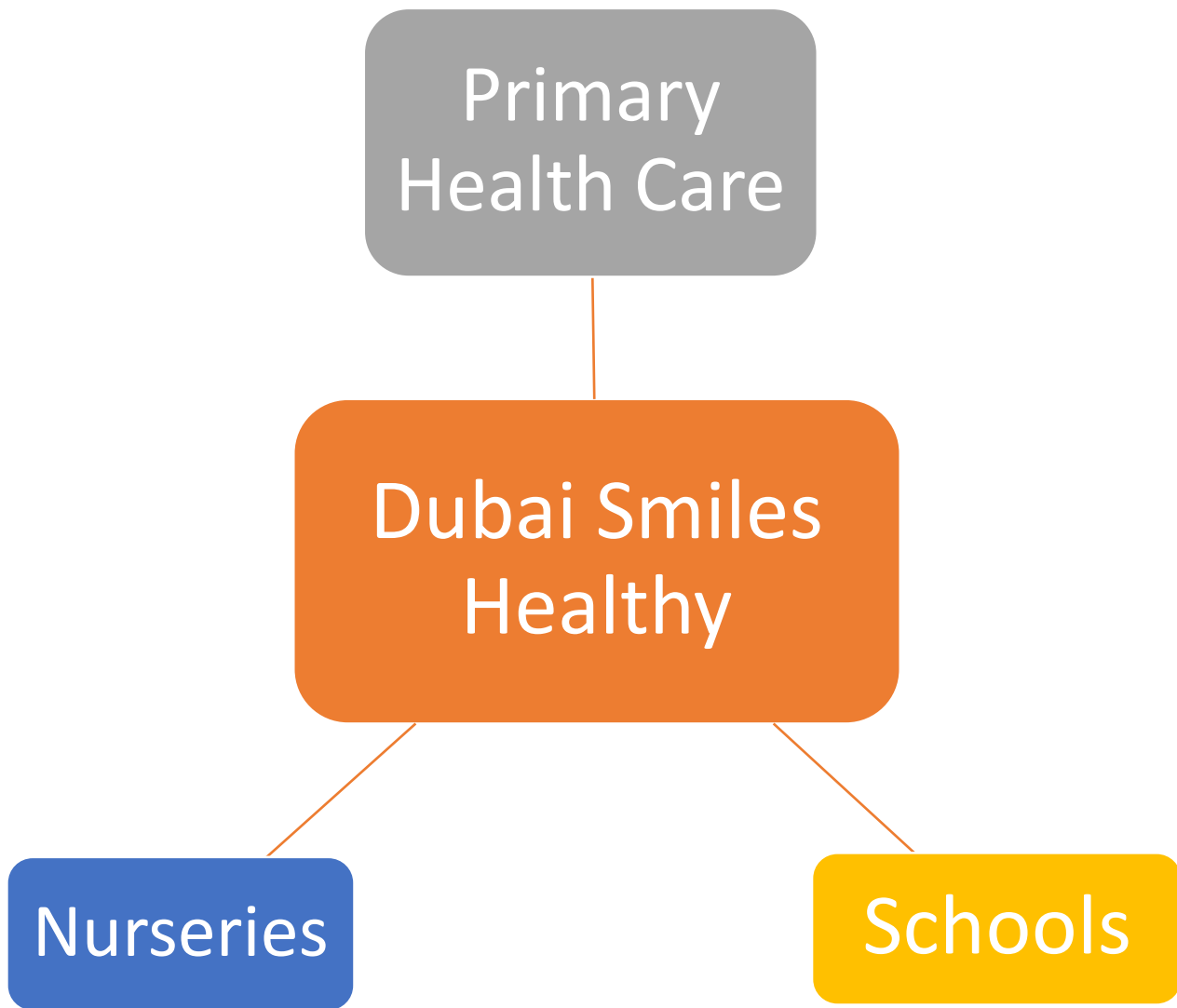


Fig 1: Integration of children in DSH

Who delivers Dubai Smiles Healthy?

Dental Practice Staff: dentists, dental assistants and dental hygienists.

School Health Staff: School nurses, school physicians and teachers

Stakeholders in such a program are:

1-Dubai Health Authority

- Dental department
- School health department

2-Knowledge and Human development Authority

3-Ministry of Education

4-Local school administrations

5-Potential sponsors

Dubai Smiles Healthy - School nurse training

Reaching children through trained School Nurses

The important role of school nurses in the oral health promotion:

After the child's home, school represents the second most influential environment in a child's life. The school nurse is the health care representative on site. The school nurse's participation is essential to ensure coordinated care. Students seek the help of School Nurses in a wide range of oral health issues including dental caries, tooth and oral pain, jaw abscesses, dental injuries and orthodontic concerns. A large percentage of school nurses encounter students who miss school due to oral health related problems.

Schools and school nurses can play a major role in enhancing students' and families' oral health. School nurses can coordinate oral health education for students, parents and school staff. They could be trained to be an important resource for teachers for oral health curricula. School nurses can in the future facilitate oral health screenings and dental caries prevention programs. They could also assist families in locating and accessing treatment for oral diseases or dental injuries, therefore the role of the school nurse encompasses both health and educational goals.

There have been seven core roles identified that the school nurse fulfills to foster child and adolescent health and educational success. Five of these roles are adaptive to Dubai school environment. The roles are overarching and are applicable to school nurses at all levels of practice, in all geographic settings, and with all clients.

The five cores are:

- 1- The school nurse provides direct care to students.
The school nurse provides care for injuries and acute illness for all students and long-term management of students with special health care needs.
- 2- The school nurse provides leadership for the provision of health services.
As the health care expert within the school, the school nurse assesses the overall system of care and develops a plan for ensuring that health needs are

met. Responsibilities include development of plans for responding to emergencies and disasters and confidential communication and documentation of student health information.

- 3- The school nurse provides screening and referral for health conditions. Health screenings can decrease the negative effects of health problems on education by identifying students with potential underlying medical problems early and referring them for treatment as appropriate.
- 4- The school nurse promotes a healthy school environment. The school nurse provides for the physical and emotional safety of the school community by monitoring immunizations, ensuring appropriate exclusion for infectious illnesses, and reporting communicable diseases as required by law
- 5- The school nurse is a liaison between school personnel, family, health care professionals, and the community. Since oral health is part of the overall wellbeing of the student, it is essential that the school nurse receives all the necessary education and tools to promote the oral health.

School Nurses Oral Health Education Training Workshop

The Nursing Education training workshop is national initiatives of Dubai Smiles Healthy preventive program. It aims at creating a school nursing workforce with the competencies to prioritize oral disease prevention and oral health promotion. The overarching goal of this chapter is to create an oral health educational infrastructure for the school nursing profession that empowers the nurses in reducing oral diseases across Dubai schools.

The latest dental screening results in Dubai schools show that the prevalence and risk of caries was high. More than 65% are affected in the 5-7 years old children, it decreases (60%) in the mixed dentition group (12-15 years) and raises again (66%) in the permanent age group (15-17 years).

The concentration of high level of caries in all age groups was very obvious. Many reasons were attributed to this result. One of which was improper utilization of dental services offered, as there was a different understanding of perceived and evaluated needs, less exposure to oral health education and promotion, exposure to fluoride supplements and the dietary habits shown by these students.

The above results led to recommendation of the development of a core set of oral health competencies and curricula for School Nurses to enhance their role in oral health promotion and oral disease prevention. In response to this recommendation, school nursing programs will need to prepare candidates with core competencies to identify risk for oral disease, provide oral health information, connect oral health information with diet and lifestyle choices, and make referrals to dental care professionals

School nurses will undergo a comprehensive training session starting by evaluating the present knowledge (Appendix A), going through the many levels of the training sessions and ending with an assessment (Appendix B). With the final assessment the School Nurses will obtain a certificate and CME hours to their credit.

At the completion of the training workshop, participants will be expected to understand and interpret

- (a) The relation between oral and systemic health (b) better understanding of the oral cavity development, (c) understand and describe the four basic steps to proper and effective oral hygiene care, (d) implement a variety of teaching-learning strategies that facilitate promoting Oral health for the young population, (e) understand different forms of caries prevention, (f) bad oral habits(thumb sucking, tongue thrusting, bottle feeding, pacifiers)and their effect on oral cavity development, (g) protection of teeth from injury through use of sport guards.

An oral health chart template (Appendix C) is developed to help guide the School Nurses to prompt best advisory practices in oral health care. The chart system will prompt School Nurses for oral health promotion and make appropriate referrals for students in need. This new system has been pilot tested in selected schools to assess the feasibility and effect of School Nurses to practice in oral health

promotion. Student Referral Forms are used by the Nurses to refer or recommend care for the child who has an complain from their teeth or gums (Appendix D).

Evaluation of the Training Workshop

The training session has been pilot tested at Dental department of the Dubai Health Authority and will be assessed regularly for development and updating. At the end of the workshop participants will complete a program evaluation providing feedback on teaching effectiveness and achievement of learning outcomes. Using a five-point Likert rating scale ranging from “strongly disagree” to “strongly agree,” participants will be asked to rate the following outcomes:

- (1) I am able to understand the importance of my daily practice.
- (2) I believe I can play an important role in the prevention of oral disease
- (3) I am able to understand and implement oral health education practice as a framework for improving oral health outcomes.
- (4) The information provided to me makes me confident to implement oral health promotion in training workshop.

Evaluation data will be analyzed to improve the quality of the workshops in meeting School Nurses learning needs and expectations. Follow-up surveys with workshop participants will be conducted to assess how the training has impacted their practices.

Training program outline for school nurses.

School nurses are required to complete the evaluation form and complete the training session below to qualify for CME hours.

Outline of training sessions:

- 1-Introduction and evaluation questionnaire;
- 2-Eruption time and sequence;
- 3-Exfoliation sequence;

4-Preventive program; The four basics are :

- A)Tooth brushing
 - ❖ Proper brushing techniques and sustainability, using the tooth brushing chart, use of dental floss and chewing gum as a source of cavity prevention.
- B)Diet
 - ❖ Dietary advice and what is yes and what is no.
- C)Dental visits
 - ❖ Introducing children to their first dental visit. What is to expect from a child's perspective.
- D)Fluoride
 - ❖ Fluoride and it's importance, forms of application.

5-How to promote Oral health for the young population;

6- Introduction to sealants as a form of cavity prevention;

7-Bad oral habits (thumb sucking, tongue thrusting, bottle feeding, and pacifiers);

8- Protection of teeth from injury through use of sport guards;

The educational training program in detail:

➤ **Eruption time, sequence and Exfoliation sequence of teeth**

The oral cavity:

The major structures that are visible when looking inside the mouth include:

Soft tissue:

- The mucosal lining of the lips, cheeks, gums, tongue, palate, uvula, tonsils and posterior oropharynx.

Hard tissue:

- The teeth.

In a healthy mouth:

- The mucous membranes (inside of the lips, cheeks, palate and underside of the tongue) should be bright pink, smooth, glistening, uniform and moist;
- The teeth present should be whitish in color and smooth (free of plaque);
- Permanent teeth will appear to have a yellowish appearance compared to plaque-free deciduous teeth;
- The gums should be pink (in dark-skinned children the gums are more deeply colored and a brownish area is often observed along the gum line);
- The tongue should have papillae (small projections that contain several taste buds) which give the tongue its characteristic rough appearance.
- The roof of the mouth consists of the hard palate near the front of the cavity, and the soft palate towards the back of the pharynx, which has a small midline protrusion called the uvula. The arch of the palate should be dome-shaped

Tooth structure:

The portion of the tooth visible in the mouth is called the crown. The crown is made of three layers, the enamel, the dentine and the core pulp or sometimes called the nerve of the tooth (fig 2).

Enamel, is a hard, white, shiny substance. It is the hardest calcified tissue in the human body. It protects the crown from the abrasive actions of chewing and provides protection from decay.

Dentine is the layer found under the enamel. It forms the bulk of the crown and the roots and is yellowish in color. Dentine, while highly calcified, is softer than enamel therefore, decay progresses more rapidly in dentin. It contains some living cells. These cells carry sensations such as temperature and pain to the pulp.

The pulp is the innermost portion of the tooth and is the only soft tissue of the tooth. It is made up of blood vessels, cellular substance and nerves. The pulp supplies nutrients to the tooth and also produces dentin. Its nerve endings transmit sensations such as pain and temperature. When the pulp becomes inflamed due to cavities or trauma, tooth pain can result. When bacteria enter the pulp through cavities or a crown fracture, the pulp tissue begins to die.

Cementum forms a very thin layer over the root of the tooth and is similar to bone. It is yellowish in color and also carries sensations such as temperature and pain to the pulp. The periodontal ligament attaches to the cementum and anchors the tooth to the jawbone.

If the gum recedes from the tooth and the cementum is exposed, there may be a sharp sensation when brushing the teeth or eating food. This is usually an adult condition.

Supporting structures

Alveolar bone encircles the tooth roots and supports the tooth in the jawbone. **Gingiva** is the soft tissue, commonly known as the gum that covers the alveolar bone. **The periodontal ligament** is tiny threads of fibrous tissue that anchor the tooth root to the alveolar bone.

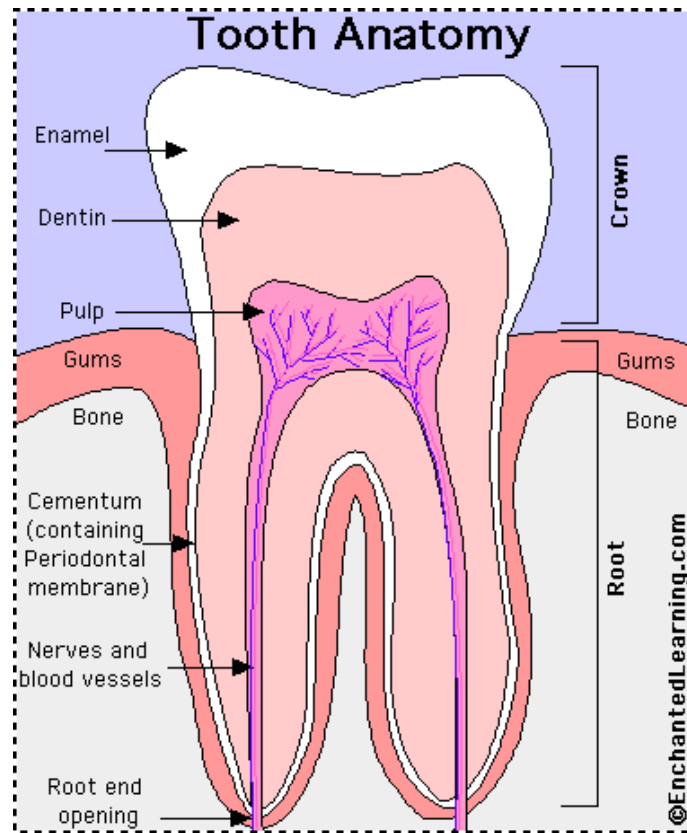


Fig2: Anatomy of the tooth. (<http://www.enchantedlearning.com/subjects/anatomy/teeth/toothanatomy.shtml>)3

Eruption, exfoliation time frame:

Tooth eruption is a process in tooth development in which the teeth enter the mouth and become visible. The first human teeth to appear, the deciduous (primary) teeth (also known as baby or milk teeth), erupt into the mouth from around 6 months until 3 years of age, in a process known as "teething". These teeth are the only ones in the mouth until a person is about 6 years old creating the primary dentition stage. They are shed and replaced by **permanent** teeth; this process is called **exfoliation**. Deciduous teeth are much whiter than permanent teeth and are also softer. Therefore, deciduous teeth can appear much worn due to grinding and normal wear through eating. There are a total of 20 primary teeth.

In the **upper arch** (maxilla) there are ten deciduous teeth:

- Two central incisors
- Two lateral incisors

- Two canines
- Two first molars
- Two second molars

In the **lower arch** (mandible) there are ten deciduous teeth:

- Two central incisors
- Two lateral incisors
- Two canines
- Two first molars
- Two second molars.

Healthy deciduous teeth are important for:

- They serve as guides and space savers so the permanent teeth will erupt in their proper positions.
- Efficient mastication of food. Missing or badly decayed teeth may cause young children to reject foods that are difficult to chew;
- Add symmetry and harmony to the facial appearance
- Formulating/developing clear speech patterns;
- Maintaining space for and guiding the eruption of the permanent teeth;
- Jaw development;
- Important aspect of the expression of emotion and personality

The following describes the pattern of eruption (fig 3):

- Lower teeth usually erupt before the upper teeth;
- Tooth eruption usually occurs in girls before boys;

- The teeth in both jaws usually erupt in pairs - one on the right and one on the left.

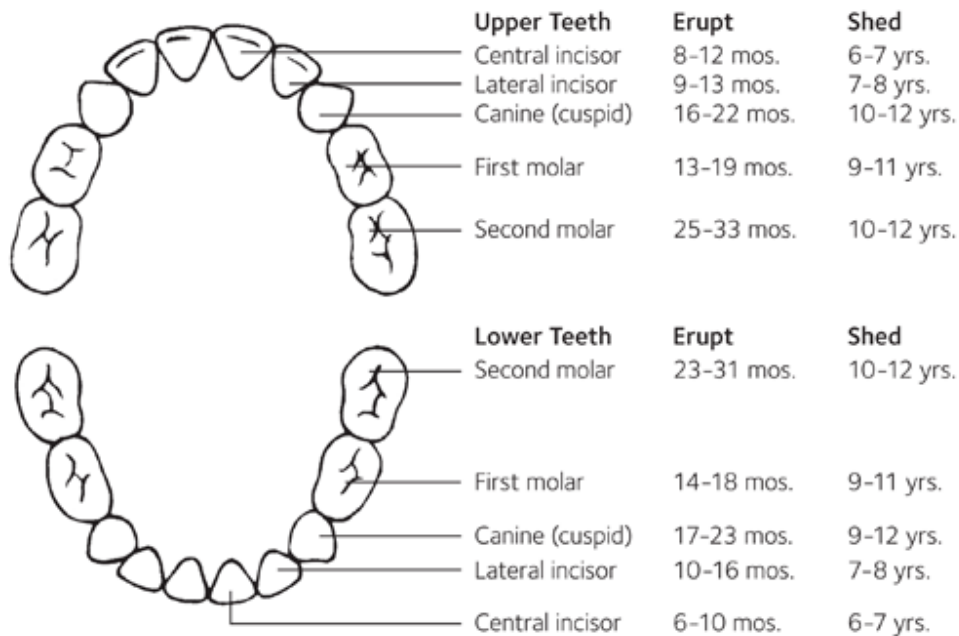


Fig 3: Primary Teeth Eruption Chart (<http://www.mouthhealthy.org/en/az-topics/e/eruption-charts>)4

Permanent Teeth may also be referred to as second or adult teeth. Permanent teeth are more yellow in color than deciduous teeth (fig 4).

1. In the **upper arch** (maxilla) there are 16 permanent teeth:
 - Two central incisors
 - Two lateral incisors
 - Two canines
 - Four premolars
 - Six molars.
2. In the **lower arch** (mandible) there are 16 permanent teeth:
 - Two central incisors
 - Two lateral incisors
 - Two canines
 - Four premolars
 - Six molars.

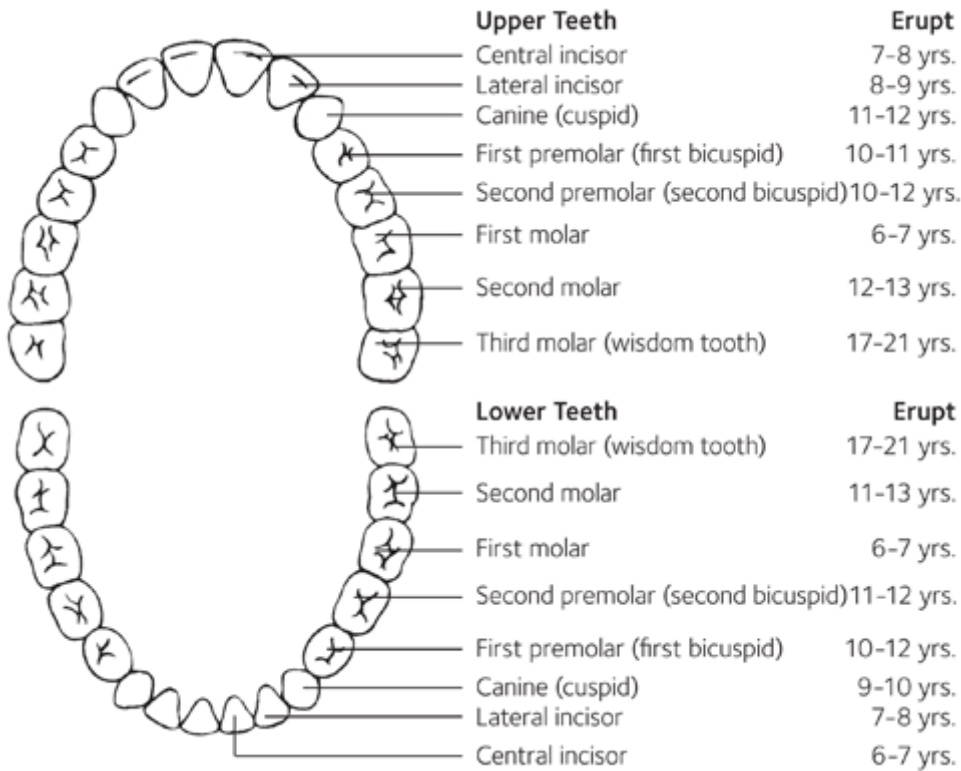


Fig 4: Permanent Teeth Eruption Chart (<http://www.mouthhealthy.org/en/az-topics/e/eruption-charts>)⁴

Mixed dentition stage:

As the first permanent tooth erupts the child passes into a stage known as the mixed dentition stage. It lasts until the last primary tooth is lost. Then, the remaining permanent teeth erupt into the mouth during the permanent dentition stage which is usually at the age of around 12 years.

➤ Dental Caries

Prevalence:

Dental caries is largely preventable. Many children still suffer unnecessarily from the pain and complications of dental caries.

What is dental caries:

Dental caries is a bacterial disease process that creates a cavity in the tooth

Certain bacteria that live in the mouth causes cavities. Dental plaque is colonies of bacteria that build up and stick to the tooth surface. The bacteria in the plaque break down carbohydrates and sugars, which produce acids. These acids demineralize and weaken tooth enamel. They also reduce the buffering action of saliva. Once decay penetrates the enamel it spreads quickly through the less mineralized dentin. If left untreated the decay will progress through the dentin and infect the tooth pulp.

Dental caries is a multifactorial disease (fig 5). The factors involved include:

- tooth/teeth
- bacterial dental plaque
- Diet
- Time

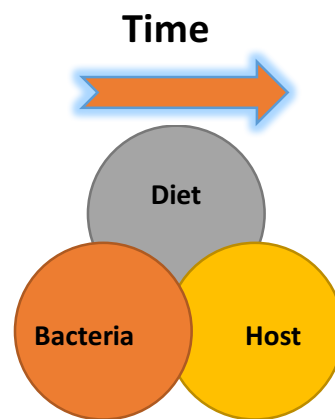


Fig 5: Factors causing caries

Fermentable carbohydrates-

This refers to sugars and starches that can be converted into acids by microorganisms. They are generally simple sugars such as glucose, sucrose, fructose, maltose and lactose. Microorganisms in the mouth can ferment simple sugars to polysaccharides, forming acids as a byproduct. When considering the relationship of the diet and dental decay, the following factors need to be considered.

- **The Frequency of Eating and Drinking –**

The more frequently one eats or drinks, the greater potential there is for acid production in the mouth, leading to decay. This factor is the one that has the greatest potential for damaging teeth.

- **The Consistency of Foods Eaten** – Some foods are cleared more rapidly from the mouth than others. Foods that stay around the mouth longer have more decay-causing potential.
- **Acidic foods and drinks**- Acidic foods and drinks cause the oral environment to become acidic. When acidic foods (such as pickles, salad dressing, oranges, lemons, soft drinks, cordials, syrups and fruit juices) are consumed frequently, they have the potential to dissolve tooth structures – this is known as erosion.

Time taken for decay:

The time it takes for teeth to decay varies and is influenced by many factors such as areas affected on the teeth, positioning of the teeth in the mouth, the length of time the teeth have been in the mouth and individual differences. New baby teeth can decay very rapidly if frequently exposed to sugar as they have not had very long to be strengthened by the topical effect of fluoride in the mouth

Saliva:

The ability of the saliva to neutralize acid and aid in the remineralization of enamel affects the decay process. The rate of flow of the saliva is an important factor in dental decay. A steady flow of saliva assists the pH level to return to normal in a relatively short time, provided oral hygiene is maintained. The saliva buffers the acids and provides minerals necessary for the remineralization of tooth enamel. Diseases and drugs which reduce the flow of saliva also increase the risk of tooth decay. When a child sleeps, the saliva rate slows down.

Dental decay is a process that is preventable by following basic oral health messages. In its early stages, there are effective treatments for preventing the decay from progressing, causing pain and requiring a filling or eventual tooth loss. However, sometimes dental extraction is the only treatment option. Failure to prevent dental decay effectively in the pre-school child, through modifying poor dental related behavior of both child and parent, can mean that affected children may have a lifetime cycle of dental treatment.

The progress of dental caries

Caries is a progressive disease – it starts with a healthy tooth, and progresses through small lesions to large cavities. It is possible to interrupt the process and to repair damage caused by decay. However, other than in the earliest lesions, it is not possible to regain tooth tissue, once it has been lost.

Stages of dental caries:

- 1- demineralization of the enamel
- 2- Enamel decay.
- 3- Dentine involvement
- 4- Outer enamel collapse(cavity formation)
- 5- Pulp involvement
- 6- Abscess formation
- 7- Loss of tooth

Prevention:

The prevention of dental caries requires a holistic approach to the multitude of biological and social factors involved in the causation of the disease. These factors include the appropriate exposure to fluoride, early detection, access to preventive interventions and reduced exposure of an individual to fermentable carbohydrates and sugars

The Four basics:

❖ Tooth brushing:

The Primary School years are when many lifetime habits are established, offering the opportunity to prepare for good health in later years. As children grow and develop, they are constantly exposed to new experiences and they respond by developing new behaviors and skills. Parents and care givers can influence behaviors in early life, with the potential to set patterns which are then carried

into adolescence and adulthood. Establishing these health behaviors early in life is important.

Thorough tooth brushing with the correct technique is necessary for the maintenance of healthy teeth and gums. Good oral hygiene at an early age will reduce the likelihood of dental caries, periodontitis and gum disease. During the course of the day, plaque, forms on the teeth. This needs to be removed each day to prevent tooth decay and gum problems. Regular brushing will prevent the buildup of plaque.

The four main ideas to put through to parents are:

- Information on the appropriate tooth paste to be used (age related, fluoride doses, quantity)
- Information on the appropriate tooth brush to be used (age related, convenient grip, replacement, cross infection)
- Information on the tooth brushing technique (for the child and parent, position)
- Live demonstration for the parent.
- Ideas to encourage both parent and child to perform tooth brushing (tooth brushing charts, use of devices to time the brushing, etc....)

❖ Diet and Nutrition

Eating a wide variety of nutritious foods is important, especially during childhood when growth and development are occurring. The Primary School years are a time when eating and drinking habits are established, so it is important for parents and care givers to encourage healthy eating and drinking behaviors

Examples of foods & drinks to encourage;

- Fruit
- Vegetables.
- Grains, cereals
- Dairy.
- Meat or protein foods
- Spreads and fillings – Hummus dip, tahini spread, peanut butter, cheese spread.
 - Drinks – Children should drink water when they are thirsty. Water is a better choice than fruit juice or sweetened drinks. These are acidic in nature, and may reduce a child’s appetite for nutritious foods. Sweet drinks include all fruit juices and soft drinks.

Frequent consumption of sweet sticky foods can contribute to dental caries.⁵ It is the frequency of consumption rather than the amount of sugary foods that constitutes the risk of dental caries. Foods and drinks containing added sugars should be limited, especially between meals. If consumed, they are best eaten at mealtimes rather than between meals.

Examples of foods to limit:

- sweetened breakfast cereals
- Fruit bars and strips
- Muesli/health bars high in sugar
- Cake and cake icing
- biscuits
- Chocolate and lollies
- Sweet spreads (such as jam, honey, hazelnut spread)
- Hot chips and crisps
- Ice cream, dairy desserts.

❖ Visiting a Dental Professional

Dental examinations for children as young as 12 months may be beneficial to facilitate early identification of oral health problems. While many young children will not experience dental caries at an early age, a significant minority do suffer from early childhood caries (ECC). It should be recognized that children presenting at Primary School may not have experienced a checkup from a dentist.

For many children irrespective of age the first dental visit is about familiarization with the dental setting.

When discussing the first dental visit with parents, the following information may be useful:

- Suggest the child accompanies the parent when they visit the dentist. The dentist may have time to offer the child to sit on the dental chair.
 - Help children to accept that dental visits are part of a regular routine.
 - Make the child's appointment for early in the day so that the child is not tired.
 - Arrive a little before the appointment time, to let the child become familiar with the new surroundings.
 - Suggest the parent talk to the child about the dental visit in a positive way; avoiding language such as 'be brave'. Explain to the child that the dental professional will give them a ride in the chair and count their teeth.
 - Encourage parents to be a 'passive observer' and allow the dental staff to capture the child's full attention.
-
- It is not necessary to 'bribe' children to see the dentist, nor for children or parents to feel anxious.

❖ Role of Fluoride in Oral Health

Fluoride plays a key role in the prevention of dental caries.

Dental caries develops when sugar-containing foods are metabolized by bacteria in the mouth, resulting in acid on the tooth surface. The acid removes the minerals from the tooth enamel into the plaque and saliva surrounding the tooth.

The fluoride in saliva interacts with these minerals and salts at the tooth surface to remineralize the damaged enamel. A constant supply of a low level of fluoride within the saliva is most beneficial for replacement of lost minerals and therefore prevention of dental caries.

Fluoride protects both developing and erupted teeth against caries, and therefore benefits individuals of all ages. The presence of fluoride in the pre-eruptive phase leads to structural improvements that make the tooth more resistant to later acid attack.

In the post-eruption phase, fluoride:

- promotes remineralization of enamel lesions before cavities become permanent, through its presence in plaque and saliva;
- inhibits conversion of sugars into acids by bacteria; and
- is bactericidal in high concentrations, such as topical application by a dental professional.

Fluoride Sources

Fluoride is found in the following forms:

- Naturally occurring in water, plants, rocks, soil and air
- Naturally occurring in foods and drinks:
 - ❖ Present in food and drinks manufactured in fluoridated areas;
 - ❖ present in fluoride toothpaste, gels and mouth rinses;
 - ❖ present in fluoride gel painted on by a dental professional; and
 - ❖ Fluoride supplements – drops and tablets.

While toothpaste has been proven to reduce the incidence of dental caries (DHS, 2000), it is not designed to be ingested. As young children may eat or swallow

toothpaste, low dose fluoride toothpaste has been introduced for children aged between two and six years of age. It is important that children learn to spit out the toothpaste after brushing.

Dental Fluorosis

Dental fluorosis is the defective formation of tooth enamel or dentine resulting from excessive fluoride ingestion during the period of tooth development, usually from birth to approximately six to eight years of age. In its mildest (and most common) form, it may manifest as barely noticeable whitish striations, while more severe forms involve confluent pitting and staining of the dental enamel.

The risk of fluorosis can be reduced by minimizing exposure to fluoride in children with developing teeth, through measures such as:

- discouraging ingestion of toothpaste by children;
- using only a pea – size amount of low fluoride toothpaste smeared onto a child’s toothbrush until six years of age.

Pit and fissure Sealants

Application of dental sealants can play a significant role in protecting teeth against decay.

A dental sealant is a plastic film professionally applied to the pits and fissures of the back teeth. Often this area is difficult to clean efficiently because the toothbrush bristles are too thick to fit into the grooves or fissures of the teeth, allowing plaque to get trapped and create caries. The sealant assists in preventing access of plaque and plaque acids to the enamel surface of the teeth. Dental sealants are of value in the prevention of dental caries.

A good time to apply dental sealants is shortly after the first permanent molars appear at the age of six or seven years and the second molars around the age of 11 or 12 years.

Placement of sealants is not time consuming. It is a painless procedure and there is no need for injection or drilling. Sealants last on average two to seven years.

➤ **Unhealthy oral habits**

Tongue Thrusting

During a normal swallow, the tongue is pushed up against the roof of the mouth. Tongue thrusters will instead push the tongue forward against the front teeth. Most children will develop a normal swallowing pattern by the time they are six. Only about three per cent of children will continue with tongue thrusting by the age of 12 years.

As a result of continued tongue thrusting, the front teeth may be pushed forward causing an open bite where front teeth do not meet. Tongue thrusting can also cause speech problems

Managing Thumb and Finger Sucking:

Thumb sucking is a common behavior among many children. The behavior usually ceases between the ages of two to four. The effects non-nutritive sucking on the developing deciduous teeth are usually reversible up until the permanent teeth start to erupt so dental treatment is not necessary prior to this age.

However, beyond the age of seven years, dental problems may occur due to bony structural changes. Continuous non-nutritive sucking causes the front teeth to protrude. This may alter the growth of the face and cause an open bite.

Parents should encourage children to stop sucking their thumb or fingers.

However, this can be difficult as children need to have an understanding of the habit and want to stop before it will cease. The following strategies can be suggested to help parents assist their child to break the habit.

- **Reward and encourage** the child with a hug or praise, to reinforce their determination to stop the habit. These rewards (surprise outing, a toy or a special privilege) can be given for each period the child does not suck their thumb or

fingers. The younger the child the more frequently the reward may be required. Parents should not lose their determination as some children do not lose the impulse to suck until they have collected as many as three to four rewards, which may take as long as three to four months. It may take several attempts before the habit is completely broken

Other strategies include use of unpleasant tasting nail paint, or a cover up of the thumb such as a glove or mitten to wear. What is effective will depend on each individual child and their particular situation.

➤ **Early Childhood Caries (ECC)**

Early childhood caries (ECC) is a particularly severe form of dental caries affecting the primary dentition of infants and young children (Berkowitz, 2003). A number of terms have been given to this condition including nursing caries, infant feeding caries, baby bottle caries and nursing bottle syndrome.

The upper incisors will be the most severely affected because of their early eruption. The lower incisors, protected by the tongue and washed by saliva from the mandibular salivary glands, usually remain unaffected.

Bottle feeding:

Many mothers use feeding bottles with fluids other than water containing high concentrations of sugar as a pacifier, during sucking; the artificial nipple rests against the palate, while the tongue is extended over the lower incisors. Liquid from the nursing bottle will bathe all of the teeth except the lower incisors, which are protected by the tongue.

If the liquid is consumed frequently and for prolonged periods during the day or night, the liquid will pool around the teeth. If the liquid contains simple sugars it will be converted by the bacteria into acids that demineralize the enamel surface of the teeth. In this stagnant acid environment, early childhood caries can develop quickly.

Signs/Symptoms:

- Initially, the upper incisors develop a dull white band (demineralization) along the gum line that usually goes undetected by the parents/care givers.
- As the condition progresses, these white areas develop into cavities that girdle the necks of the teeth in a yellow, brown or black collar.
- In advanced cases, the crowns of the four upper incisors may be destroyed completely, leaving decayed brownish-black root stumps. The four lower incisors remain relatively unaffected.
- Signs and symptoms include tooth sensitivity, pain, infection/swelling and irritability

Treatment In the early stages of ECC:

The best treatment is to modify behavior and remove the cause. Parents require education and support, and in particular information on feeding, the appropriate use of the bottle and dummies, tooth brushing and flossing, sugar-free medicines and access to dental care.

In severe cases the treatment may be difficult, costly and distressing to both parents and infants. Treatment frequently requires general anesthesia in an operating theatre.

Prevention of ECC:

- The appropriate use of the bottle
- Early detection
- The appropriate use of a pacifier
- Use of sugar-free medications
- Tooth brushing
- Regular dental visits.

Early Detection of ECC is necessary in order to prevent this condition in children. School Nurses play a crucial role in the detection of ECC and in the education of parents and caregivers. It is expected that Primary School Nurses will refer any signs of ECC to a dental professional

➤ **Use of Mouth guards**

Falls which occur during play account for most dental injuries to young permanent teeth. Studies show that one third of accidents occur at school, one third at home and one third elsewhere.

Skateboarding, cycling, diving in swimming pools and falls of various types contribute to dental injury. The most common teeth to suffer are the upper front teeth.

Dental injuries also commonly occur in contact sports such as football, hockey and basketball. Dental trauma can include both soft and hard tissue damage such as injury to the gum, tooth fractures, loss of whole teeth and jaw fractures.

Dental trauma management in schools

Do the following for the child who has lost a tooth due to trauma

1. Have individual sit with head tilted forward to let blood drain out;
2. Wear personal protective clothing;
3. Fold a roll of gauze into a pad and place over the tooth socket;
4. Instruct individual bite down to put pressure on the area for 20 to 30 minutes;
5. Save tooth, which maybe re implanted. Touch only the tooth's crown, rinse it if dirty. Put in a container of milk or cool water;
6. Send the child and the tooth to a dentist immediately.

Appendix A : School Nurse pre-training Evaluation questionnaire

Name (optional)			
Gender	<input type="checkbox"/> Male	<input type="checkbox"/> Female	Date of Birth
Nationality	<input type="checkbox"/> Local	<input type="checkbox"/> Non-Local	
School name:			
Work experience:			
Level of education			

Statement				
A-Pediatric dental knowledge	Yes	No	I don't Know	Others
Do you have any information on tooth eruption timings for children and the sequence of teeth appearing in the oral cavity?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do you have any idea when the children should start brushing their teeth?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When to use floss?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When the child should have sessions of fluoride application?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

B- Nurse attitudes	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
Do you think that caries (tooth decay) and oral disease (in the gums and oral cavity) can be stopped and controlled?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do you think that school nurses should have a role in examining the oral cavity?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
In your opinion can school nurses in general and you specifically can play an important role in preventing dental caries (tooth decay)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Can you deliver oral health care advice and promotion?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do you believe that oral health problems can lead to general health problems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are you willing to implement preventive oral health activities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are you willing to obtain and learn more information about oral health?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments:

Appendix B: School nurse post-training Evaluation form

Please fill in the evaluation form provided your input will be used to further develop the course.

Name			
Gender	<input type="checkbox"/> Male	<input type="checkbox"/> Female	Date of Birth
Nationality	<input type="checkbox"/> Local	<input type="checkbox"/> Non-Local	
School name:			
School Health Education :			
Level of education			

Please rate the level of from 00 to 02 as described below:		
02	01	00
Agree	Disagree	Not sure

Statement			
	02	01	00
I am able to understand the importance of oral health and its effect on the overall wellbeing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I believe I can play an important role in the prevention of oral disease	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am able to understand and implement oral health education practice as a framework for improving oral health outcomes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The information provided to me makes me confident to implement oral health promotion in my daily practice.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comment

Appendix C: Oral health chart template

This chart is developed to help guide the SN to prompt best advisory practices in oral health care. The chart will prompt School Nurses for oral health promotion and make appropriate referrals for students in need.

Examination	School entry	Grade5	Grade9	School leaving
Extra oral assessment				
Skin				
Face				
Around the mouth				
Lips				
Lesions				
Infections				
Intra oral Assessment				
Soft tissue				
Inner cheeks				
Tongue				
Hard tissue				
Change of color of teeth (from yellowish , creamy to brown or black)				

*Adapted from <http://www.health.ri.gov/forms/screening/SchoolDental.pdf>

Appendix D: Referral & Recommendations Form (English/Arabic)

Referral form:

Referral forms are used for the following categories:

- 1- Students who have multiple absence due to dental problems
- 2- Students who have visited the school nurse due to dental pain.
- 3- Students who have been assessed by the school nurse and have obvious dental caries. (Change of color of teeth from the yellowish, creamy appearance to brown or black).

Student Name: -----

Below are the results and recommendations:

_____ Your son/daughter appears to show signs of dental disease which should be consulted by a dentist. Please schedule an appointment at your earliest convenience so that your son/daughter can receive a complete oral examination. Your dentist will determine if treatment is needed.

_____ Your son/daughter shows evidence of dental disease which requires dental care. Visit a dentist as soon as possible for a complete oral examination and treatment.

Date: _____

School nurse Name and Signature: _____

نتائج و توصيات فحص الفم و الأسنان

اسم الطالب: _____

- النتائج و التوصيات:

- _____ ابنك/ ابنتك ليس لديه/ لديها أي من أمراض الأسنان واللثة ولكن نوصي بالمتابعة الدورية (كل ستة أشهر) مع طبيب الأسنان.
- _____ ابنك/ ابنتك تظهر عليه/ عليها علامات أمراض الأسنان واللثة لذلك يرجى التكرم بتسجيل موعد مع طبيب الأسنان لتلقي الفحص الشامل والعلاج عند الحاجة.
- _____ ابنك/ ابنتك يعاني/ تعاني من وجود أمراض الأسنان واللثة مما يستوجب ضرورة العلاج. الرجاء زيارة طبيب الأسنان في أسرع وقت ممكن للحصول على الفحص الشامل والعلاج اللازم.

التاريخ: _____

اسم و توقيع الممرضة: _____

References:

1-www.child-smile.org.uk

2--www.who.int/oral_health/strategies/en

3-<http://enchantedlearning.com/subjects/anatomy/teeth/toothanatomy.shtml>

4-<http://www.mouthhealthy.org/en/az-topics/e/eruption-charts>

5- DSHS School Nurse Oral Health Manual 2006. Texas Department of State Health Services Oral Health Program . www.dshs.state.tx.us/dental

Bibliography

1-A. B. Douglass, R. Maier, M. Deutchman, et al., Smiles for Life: A National Oral Health Curriculum, 3rd edition, 2010, <http://www.smilesforlifeoralhealth.org/>.

2-Delivering Better Oral Health An evidence-based toolkit for prevention 2nd Edition. British Association for the Study of Community Dentistry

3-Delivering better oral health: an evidence-based toolkit for prevention
Third edition British Association for the Study of Community Dentistry

4-Early Childhood Oral Health Guidelines for Child Health Professionals, 3rd Edition.
www.health.nsw.gov.au

5-Harris, Edward F. Craniofacial Growth and Development. In the section titled "Tooth Eruption." 2002. Pp. 1–3.

6-Harris, Edward F. Craniofacial Growth and Development. In the section titled "Tooth Eruption." 2002. P. 5

7-<https://www.dhsv.org.au/professionals/school-nurses>

8-<http://www.hindawi.com/journals/nrp/2012/149673/>

9-<http://www.oralhealthconnections.org/>

10-<http://pediatrics.aappublications.org/content/121/5/1052.full.pdf>

11-M. C. Dolce, "Nurse Faculty enrichment and competency development in oral-systemic health," Nursing Research and Practice, vol. 2012, Article ID 567058, 2012.

12-mchoralhealth.org/materials/.../SchoolScreening/PocketGuide.pdf

13-Mindy Nash, A Guide for Developing and Enhancing Community Oral Health Programs. American Association for Community Dental Programs (AACDP), International Dental Journal (2001) 51, 334-338

14-Ohio's School Nurse TOOLKIT, A GUIDE TO HELP MAKE GOOD DECISIONS FOR YOUR SCHOOL'S ORAL HEALTH PROGRAM *Children's Oral Health Action Team (COHAT)*,

15-R.G. Watt, C. Stillman-Lowe, P. Munday and W. Plimley: The development of a national oral health promotion programme for pre-school children in England
International Dental Journal (2001) Vol. 51/No.5

16-Role of the School Nurse in Providing School Health Services. PEDIATRICS Volume 121, Number 5, May 2008

17-The Mouth: Oral Health Information for Primary School Nurses
(2005).www.dhsv.org.au/psn.pdf