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Infant Oral Health Care

SUMMARY

The family physician/pediatrician who sees a child from birth as part of the well-baby visit program is in the best position to identify early dental problems and to educate the family about early oral preventive health care. Since children under three years of age are not seen routinely by dentists, they are at risk of developing dental disease. This paper briefly covers the areas of infant oral pathology, early preventive care, teething, suckling habits, and dental trauma in the toddler. The physician will then be in a better position to recommend to parents when they should seek dental advice and treatment for their young children. (*Can Fam Physician* 1988; 34:1419-1424.)

Key words: infant dental care, pediatrics

RÉSUMÉ

Le médecin de famille ou le pédiatre qui, dans un programme de surveillance du bébé en bonne santé, suit un enfant depuis la naissance est dans une situation privilégiée pour identifier précocement les problèmes dentaires et éduquer la famille sur l'importance des soins dentaires préventifs. Les dentistes ne voient pas régulièrement les enfants de moins de trois ans; ceux-ci sont donc exposés à développer des problèmes dentaires. Cet article couvre brièvement les domaines de la pathologie orale infantile, la prévention précoce, la poussée des dents, les habitudes de sucer son pouce et les traumatismes dentaires chez les enfants qui commencent à marcher. Le médecin sera donc en meilleure position pour recommander aux parents le meilleur moment de consulter un dentiste.

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THE TRADITIONAL VIEW is that dental care should begin somewhere between the age of two-and-a-half to three-and-a-half years, when children reach a developmental stage at which they will co-operate in the initial dental examination and treatment. However, if sound preventive practices are not already in place by this age, the child may already be suffering

from dental disease. In such instances, the first visit will have been too late to prevent the onset of disease. Moreover, various dental concerns, such as oral lesions, oral trauma, or habits that may require treatment and/or consultation, may arise during the first two years of the child's life. For these reasons, professional dental health care should begin during the infant period and not at the age of three years.¹

The family physician who sees the child from birth for well-baby visits is in the best position to identify early dental problems, to recommend prompt treatment, and to educate the family about early oral preventive health care. This care will give the young child the best possible chance to grow up free of dental disease.

The initial phase in a complete preventive dental program is a prenatal dental discussion incorporated into the prenatal classes that most expectant parents attend. The expectant mother

should be informed that by the end of the first trimester, all of the fetus' primary teeth begin to form, and that at birth all 20 primary-tooth crowns are almost completely formed. To ensure the development of sound enamel and dentin, all that is required is a well-balanced diet. Prenatal calcium or fluoride supplements do not provide any real benefit to the developing teeth, since the period of crown mineralization is mostly postnatal.² Unless it is absolutely necessary, tetracycline should not be prescribed to the mother because it will cross the placental barrier and produce characteristic staining of the primary teeth; the permanent successors, however, will not be affected.³ The prospective mother should be encouraged to receive preventive dental care during the course of her pregnancy.³

In certain women, because of their altered hormonal state, the gingival tissue will over-react to local irritants

such as plaque to produce a condition known as pregnancy gingivitis. This condition is characterized by erythematous, edematous, gingival tissues that bleed easily after brushing or probing. In addition, the local reaction may be more severe, resulting in the formation of a pregnancy tumour that appears clinically like a pyogenic granuloma.⁴ A sound preventive program carried out both at home and in the dentist's office can control the onset and progression of pregnancy gingivitis. If a pregnancy tumour develops, it is usually excised after the child is born, and recurrence is rare if oral hygiene is good. Finally, the prospective mother should be advised to obtain all preventive and restorative dental care, except X-rays, for the treatment of caries during her pregnancy, but to postpone any elective treatment until after the birth of her baby.

At the time of birth and while the baby is still in the nursery, the attending physician should perform a quick oral-facial examination. Certain dento-facial anomalies may be present that require treatment or referral for treatment. A baby may be born with what appears to be a micrognathic mandible, resulting in a retrognathic appearance. Such a mandible may be part of the Pierre Robin syndrome which also includes glossoptosis and a cleft lip/palate.⁴ The immediate concern is one of airway obstruction caused by the tongue assuming a posterior position. The infant is managed by keeping it in a prone position at all times, especially for feeding, and may require tube feeding. If the tongue continues to obstruct the airway, it may be necessary to suture it in place to the lower lip. The long-term prognosis for such children is quite good. There is usually a period of accelerated mandibular growth so that within several months the airway will no longer be at risk, and by age of six years the facial appearance should no longer be retrognathic.

Cleft lip, with or without cleft palate, or isolated cleft palate, is another frequent anomaly that may present at birth; the reported incidence of this anomaly is 1:800 to 1:1000 births.⁴ The initial concerns relate to appearance and feeding. The appearance can be improved simply by placing adhesive tape over the cleft lip and pre-maxilla; the tape will decrease the size of the defect. The mother should be encouraged to feed her baby by whatever

means she had originally planned, whether bottle or breast. The feeding process will be messy, but the baby will be able to take sufficient food to thrive. Once their initial shock has been overcome, the parents should be informed of the CL/P treatment centres to which their baby will be referred for ongoing care.

Initial oral examination may disclose that the baby has a soft-tissue swelling located on the anterior maxilla or on other areas of the alveolar ridges. These lesions are usually a congenital epulis or granular cell myoblastoma; benign lesions thought to be hamartomas rather than other benign neoplasms may also be present.⁵ If a lesion does not interfere with the airway or the feeding process, it may be left *in situ*, and monitored; in this case, surgery will be performed at a later date, when the child is better able to tolerate a general anesthetic and the surgical procedure. If, however, the lesion interferes with feeding or airway, it should be excised. Once excised, these lesions will not recur.

Small, discrete, cyst-like lesions may be noted along the alveolar ridges or along the mid-palatal region. These lesions are called "Bohn's modules" and "Epstein's pearls" respectively and are a result of epithelial remnants from the embryonic period undergoing cystic degeneration in their respective areas. These lesions are asymptomatic and will resolve spontaneously within the first few months of life.⁶

Finally, initial oral examination may disclose natal teeth, usually in the mandibular incisor region (Figure 1).⁷ These teeth are the mandibular primary incisors and not an extra set of teeth. They have emerged in the oral cavity because they developed in a superior position within the body of the mandible. They are usually quite mobile. The presence of such teeth, or even one tooth, may make initial attempts at nursing difficult: during the suckling motion, the dorsal surface of the tongue will pass over the sharp incisal edges of the tooth/teeth and may become lacerated and secondarily infected. Finally, these teeth usually emerge without any root development, and so there is poor attachment. There is a possibility, therefore, that they may be dislodged; if this happens, there is a risk of aspiration. The usual course of treatment is to extract the teeth with a piece of gauze without using any local anesthetic.

Prior to extraction, the physician should make sure that the baby has received a Vitamin K injection at birth; if this injection has not been given, extraction should be postponed for three weeks until the child's own hemostatic mechanism is functioning. On removal, bleeding should be minimal, and the baby should resume a normal feeding/sleeping pattern almost immediately. If the tooth is not mobile, it may be left *in situ*, provided that the incisal edges feel smooth to the touch.

Intra-oral infections are rare in the newborn child, though neonatal candidiasis producing thrush does occur occasionally.⁴ This disorder will present as a white plaque-like lesion, that when rubbed with a piece of gauze sponge, will leave a raw bleeding surface. Definitive diagnosis is made by obtaining a cytology smear, which will demonstrate an active candida infection. The cause of this infection is the baby's exposure to the candida organism in the mother's vaginal canal during the birthing process. The lesions respond well to treatment with nystatin, which can be taken orally to achieve a systemic effect or applied directly to the lesions with gauze.

In babies from birth to six months of age, the normal gum pads are firm to touch and covered by keratinized mucosa. The ridges may have a segmented appearance that reflects the position of the developing primary teeth, but there is no real occlusion at this time. Oral health care should begin at this time, before the eruption of the primary teeth. After each feeding, the ridges should be wiped clean with a piece of gauze to remove any remaining food material and to familiarize the baby with someone doing something in his or her mouth to promote oral hygiene. Tooth decay is still one of the most common bacterial diseases of childhood, and it can easily begin before the baby reaches the age of one-and-a-half years. If a preventive dental program is begun early in life, the onset of decay can be prevented, and a "cavity-free" condition maintained.⁸

The most important aspect of caries prevention that must be established by the time the child is six months old is the provision for systemic fluoride supplements. The optimum level of fluoride in the systemic water supply is 1 ppm, or 1 mg fluor/day for a child of three years. The breast-fed infant will receive a trace amount of fluoride

(<0.05 ppm) in its mother's milk; cow's milk contains <0.1 ppm of fluoride. In a region where there is no fluoride in the water supply, supplements at a level of 0.25 mg fluoride ion per day should be given from six months of age. Multi-vitamin preparations that contain fluoride are currently available and can be used if the physician considers that the correct level of fluoride is dispensed.^{2,9}

The first primary teeth emerge into the oral cavity when a baby is about six months old; their emergence is usually preceded by the symptoms of teething. At this age the baby is no longer protected by the circulating maternal antibodies, and thus may be prone to the development of teething. Moreover, as the teeth emerge into the oral cavity, oral bacteria may enter the systemic circulation via the gingival crevice and so give rise to an inflammatory reaction that results in teething.

The signs and symptoms of teething may be any of the following: painful gingiva, increased chewing, increased drooling, restlessness, irritability, disruption of eating/sleeping patterns, low-grade fever, and loose stools. However, high fever and serious illness are not a result of teething.

Treatment is primarily supportive and symptomatic. The baby may be allowed to chew on a chilled teething ring or a cool damp washcloth, be given an acetamenaphen product, and encouraged to drink.¹⁰ The physician should not recommend the use of teething gels. In some instances, infants have been admitted to emergency wards of hospitals appearing cyanotic and with a pro-

visional diagnosis of foreign-body aspiration. Examination failed to establish the presence of any obstruction, but it was discovered that all children had been given several applications of teething gels that contained benzocaine. The benzocaine, once ingested, can produce methemoglobinemia which results in cyanosis. These babies were all treated with O₂ and intravenous methylene-blue 1% 0.1-0.2 mg/kg; they recovered uneventfully.¹¹ In addition, the use of a teething gel prior to a feeding may serve to anesthetize the epiglottal region, which could predispose a baby to aspirate part of a meal, with associated untoward sequelae. If parents wish to use a teething gel, the physician should stress the dangers and insist that if they are to be used at all, it must be in moderation.

During the period of tooth eruption, a blue-coloured, elevated, cyst-like lesion may be noted over the alveolar ridge in the region of a tooth that will evidently erupt soon (Figure 2). This lesion is called an "eruption hematoma" or "bruise". It is caused by the breakdown of small non-resorbed blood vessels that are positioned on top of the erupting tooth, resulting in the accumulation of blood within the tissue spaces. This lesion is not painful, and no treatment is required, as it will break down spontaneously as the tooth erupts through it.⁴

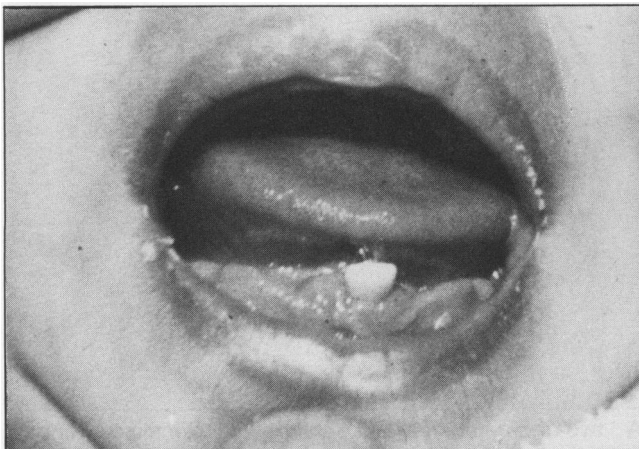
Delayed eruption of primary teeth sometimes characterize several conditions such as Down syndrome, cleidocranial dysostosis, hypothyroid-

ism, hypopituitarism, and a local obstruction such as dilantin-induced gingival hyperplasia or an odontoma or supernumerary tooth.⁴ By the age of two-and-a-half to three years, however, most children have complete primary dentition.

At this stage, parents must be made aware of the importance of the child's primary teeth. These teeth are used for mastication, which helps to develop the craniofacial complex, as well as aiding proper nutrition. A healthy dentition improves a child's appearance and promotes social acceptance which, in turn, promotes psycho-social development. The teeth have a part in the development of speech. The primary teeth also determine and maintain the space that will be required for the eruption of the permanent teeth and the permanent occlusion that will develop. If these teeth are not properly cared for, the child may suffer the development of caries and its sequelae.

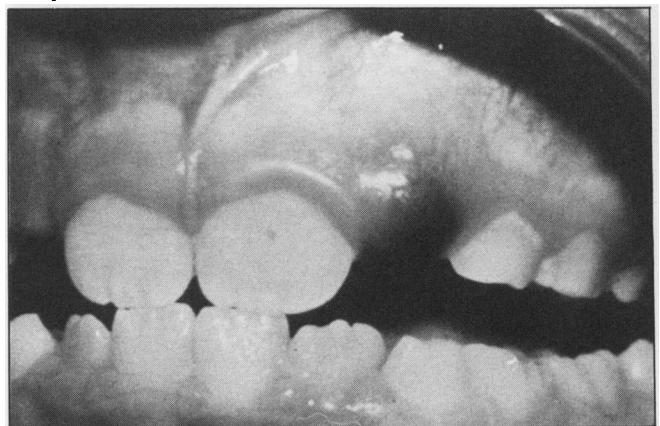
Again, the importance of prevention must be stressed to the parents of the young child aged from one-and-a-half to two-and-a-half years. Using a fluoridated toothpaste in an amount no larger than a pea, the parent should brush the child's teeth well at least once a day. Since most children will swallow the toothpaste, it is important to keep their systemic exposure to a minimum, to prevent acute toxicity, evidenced by nausea and vomiting, or chronic toxicity which would produce enamel fluorosis. The parents should also be given nutrition counselling in the matter of those foods which are dentally

Figure 1
Natal Tooth



This natal tooth is evident on the crest of the mandibular alveolar ridge of a one-day-old infant.

Figure 2
Eruption Hematoma



This eruption hematoma is located between the maxillary central incisor and cuspid, where it appears as a raised blue lesion.

preferable to other foods, such as sweets, which will predispose the child to develop caries.⁹

For the young baby (of six months to one-and-a-half years) the most important aspect of nutrition counselling is to inform the parents of the dangers of putting a child to bed with a bottle of any liquid containing a natural or refined sugar, or of demand breast-feeding all through the night. Either of these practices will produce nursing caries.^{12, 13} The characteristic pattern of the caries attack is that the primary maxillary incisors are severely involved, while the mandibular incisors are caries-free (Figure 3). The reason is that during the suckling process, the tongue will lie over the mandibular incisors and thus protect them. Then, while the baby is sleeping, the last amount of formula, juice, or breast milk will be held against the maxillary incisors by the upper lip. The local bacteria will then have sufficient substrate to metabolize and thus produce the acid which results in a localized caries attack. Once caries has developed, the teeth can be restored, usually under general anesthesia, or extracted. If a mother insists that her child requires a bottle in bed at night, recommend that it contain only plain water.

With the combination of proper diet, early oral hygiene, and systemic and topical fluorides, we can promote a generation of caries-free children, provided that the dental-care program be initiated at or before the eruption of the first primary teeth.

Once present in the oral cavity, the dentition may exhibit anomalies in

morphology, colour, or number. Three of the more common conditions illustrating this are:

- ectodermal dysplasia. There may be complete or partial absence of primary teeth. Any teeth that are present are usually quite conical in shape; typically, they have been termed "witches' teeth". Children with this anomaly are usually characterized by complete or relative alopecia, lack of sweat glands, exhibiting as an intolerance to heat, and absence of or malformed finger/toe nails. The condition is inherited as a sex-linked recessive trait.¹⁴

- amelogenesis imperfecta. All the teeth may have an irregular, rough, pitted surface consistent with amelogenesis imperfecta, an autosomal dominant/recessive disorder resulting in improperly formed enamel.⁴

- dentinogenesis imperfecta. All the teeth may have a gray, opulent appearance caused by the early loss of enamel. The appearance is consistent with the autosomal dominant disorder of dentinogenesis imperfecta, which may be associated with osteogenesis imperfecta.⁴

In general, if all a child's teeth appear abnormal in some way, the cause is likely to be a genetic problem, and he or she should be referred for dental assessment and management.

Two other common enamel defects may present in the young child. One is linear enamel hypoplasia/hypocalcification, a condition in which only a localized area of several teeth appears affected, while the remainder of the crown appears normal (Figure 4). This

pattern of enamel defect is caused by a localized/temporary disruption of the ameloblast function that is related to an intra-uterine metabolic disturbance possibly caused by a maternal fever or toxemia. Secondly, if the mother was given tetracycline during the second or third trimester of her pregnancy, the dentine of the child's primary teeth will be stained brown to black to a degree that reflects the period of mineralization during which tetracycline was present. The permanent teeth, however, will not be stained as a result of the child's intra-uterine exposure to the drug.

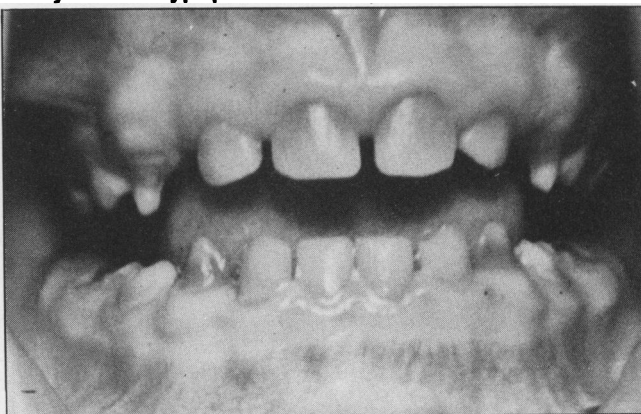
Children under three years of age may present to the physician's office with a variety of soft-tissue lesions. One of the most common lesions is primary herpetic gingivostomatitis, which is caused by the herpes type I virus. It is rare to have a baby present with this disease prior to the age of six months because of the protection provided by circulating maternal antibodies. On examination, the child is found to be irritable, febrile, in oral pain, and usually showing evidence of cervical lymphadenopathy. Intra-orally, there will be large, irregularly shaped, ulcerated regions on all the mucosal surfaces, which may be covered with a necrotic slough layer. The initial stage is vesicular, but this is rarely seen. The gingiva are acutely inflamed and erythemic. The lesions heal spontaneously and without scar formation in 10-14 days. Treatment is primarily supportive and symptomatic. Acyclovir is used only if more severe systemic involvement ap-

Figure 3
Early Caries



A two-year-old child with nursing-bottle caries, involving the maxillary four incisors.

Figure 4
Early Linear Hypoplasia



A two-and-a-half-year-old child with localized linear hypoplasia primarily involving the middle region of the primary cuspids (eye teeth).

pears to be developing. In the following years, the child is susceptible to recurrent herpetic infections that may take the form of recurrent herpes labialis, characterized by a large irregularly-shaped ulcer on the lips, or of recurrent intra-oral herpes, characterized by lesions on the keratinized tightly-bound mucoperiosteum of the hard palate or attached gingiva. In all cases, the lesions will resolve spontaneously.⁴

The other common ulcerative lesion is the aphthous ulcer. It is still not clear whether this ulcer is caused by an auto-immune type of response or by a reaction to a form of oral streptococci. Aphthous ulcers are usually singular or occur in small groups that do not coalesce to form a larger lesion-like herpes. Intra-orally, they occur primarily in the non-keratinized loose alveolar mucosa (buccal mucosa, lip, soft palate, tongue, floor of mouth). Unlike herpes, the lesions lack a vesicular stage. Once formed, the ulcers are quite painful. Again, they heal spontaneously and without scar formation in seven to 14 days. As with herpes, treatment is primarily supportive and symptomatic. In extensive episodes, topical steroid ointment may be applied; alternatively, rinsing with tetracycline has been shown to resolve the lesions.¹⁵

Finally, examination of the tongue may disclose what appears to be an ulcerated lesion that is asymptomatic. This lesion may change its shape and position with time, or it may resolve spontaneously. It is called "geographic tongue" or "benign migratory glossitis". Its etiology is unknown, and no treatment is required.

Gingival hyperplasia may be identified on routine medical examination. This condition, which is characterized by edematous, boggy-appearing gingiva that bleeds easily, could be the initial presentation of leukemia in a young child.¹⁶ Gingival hyperplasia, which appears pink and is of firm consistency, is usually drug-induced by dilantin or cyclosporin. In either drug-induced case, initial treatment consists of improving the level of oral hygiene, which will reduce the rate of hyperplastic growth, and then of excising the excess tissue as required to maintain dental function and esthetics.¹⁷

The final two dental concerns of which a medical practitioner should be aware in the child of one to three years are sucking habits and dental trauma.

All non-nutritive sucking habits, be it of the thumb or a pacifier, will have a similar effect on the development of the occlusion if done to excess.¹⁸ Sucking is a normal part of the growth and development of a baby and should not be discouraged or even commented on. If it is done to excess, however, it will eventually result in an anterior open-type bite of malocclusion (Figure 5). The parents should be told that as children grow older (3-5 years) and are exposed to more peer pressures, they usually drop the habit spontaneously. When the habit is discontinued, the malocclusion will self-correct, and there will be no need for immediate orthodontic treatment. In general, parents need not feel guilty that their child has a sucking habit.

Finally, during the course of the well-baby visits or annual assessments,

the physician should examine the toddler's teeth and soft oral tissues for any signs of trauma. As children learn to crawl or walk, it is quite common for them to fall, and many of them hit their teeth. If a tooth appears to be chipped or discoloured, the physician should examine the soft tissues in the area for any evidence of an abscess, gum boil, or draining fistula (Figure 6). If any of these disorders is present, the child should be referred for a dental evaluation. If a child totally avulses a primary tooth after a fall or blow to the mouth, the tooth should *never* be re-implanted into the socket, as is done with permanent teeth, because such treatment may damage the developing permanent tooth.¹⁹

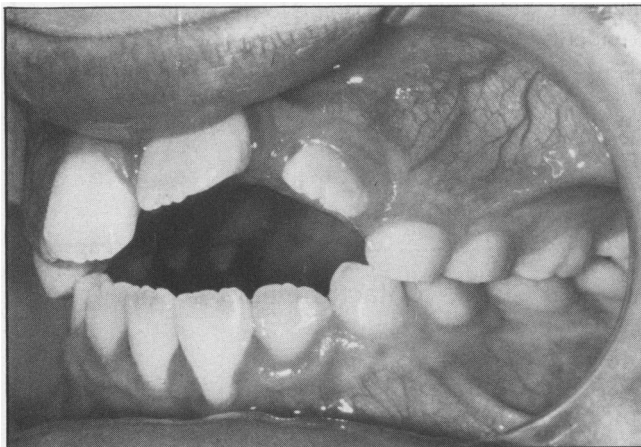
Overview

This paper has presented a case for establishing a preventive dental assessment and treatment program that can be incorporated into the well-baby visits provided by family physicians. By examining the infant for oral problems and by providing early preventive counselling, it is possible for the physician to prevent many forms of dental disease and thus promote the total health of child patients. ■

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Figure 5
Anterior Open-Bite Malocclusion



Anterior open-bite malocclusion resulting from a sucking habit.

Figure 6
Fractured Lateral Incisor



An eight-month-old toddler with a fractured lateral incisor that has caused a buccal abscess (gum boil).

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