have non-nutritive sucking habits at some time (Bishara et al. 2006; Duncan et al. 2008). There is no detrimental effect on the dentition if the use of the dummy or digit lasts less than 12 months. Prolonged non-nutritive sucking habits may result in detrimental effects on the occlusion on late deciduous dentition with anterior open bite when used for 36 months or more, with a Class II canine relationship being more common than in ‘non-suckers’. In contrast, a posterior cross bite was more common where a dummy was used for 36 months or more, and an excess overjet more common with a digit habit of 60 months or more (Warren et al. 2005).

Most children cease the sucking habit by 4 years of age. Breaking the habit is easier with a dummy than with a digit. If a dummy is used it should not be dipped in anything sweet.

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Conclusions
Awareness about the importance of oral health during pregnancy is fundamental in the protection of the mother’s and the child’s oral health. A mother’s access to dental care, especially before and during pregnancy, and her dental care habits influence not only her own oral and general health but the health of her child as well.

Recent studies suggest that periodontitis could be an independent risk factor for pre-term birth. However, association does not necessarily mean causation. The mechanism by which maternal infection and immune protection mediate pregnancy risk is not fully understood (Offenbacher & Beck 2007). All authors call for more studies with larger cohorts of subjects and better designs.

Dental treatment during pregnancy is safe, improves periodontal health and prevents progression of periodontal disease. In some cases it has reduced the rate of pre-term delivery by decreasing both the periodontal pathogen load and the inflammatory serum markers.

Pregnancy in general is a period of increased perception and motivation towards health information, including the preventive aspects. To equip the expectant mother with the knowledge of how to improve or at least maintain her own oral health will benefit both mother and child.

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Further information can be obtained from the Dental Practice Education Research Unit ARCPGH, School of Dentistry The University of Adelaide, Australia 5005 Phone (08) 8303 1800 Fax (08) 8303 4858 email dperu@dentistry.adelaide.edu.au www.adelaide.edu.au/dperu

Pregnancy

Pregnancy, the period from conception to birth, is characterised by profound hormonal changes. Fluctuation in hormones, particularly female steroid hormones (oestrogens and progesterone), influences many tissues in the body. The tissues supporting the teeth, including the periodontium and especially the gingiva, are also affected. There are several reasons why dental professionals should focus on oral health in pregnant women.

The United States Surgeon General suggested (US Department of Health and Human Services 2000) that oral health during pregnancy was an important strategy to:

- maintain good oral health
- prevent the development of inflammatory diseases (gingivitis and periodontitis) and thus minimise any possible link to pre-term low birthweight infants, pre-eclampsia and gestational diabetes
- decrease oral bacteria colonisation, thus minimising transmission of bacteria to the child and decreasing the prevalence of Early Childhood Caries.

Oral physiological changes in pregnancy

Folk wisdom has linked oral health with pregnancy for years, perceiving in the proveb ‘a tooth for a child’ that otherwise as ‘maternal depletion theory’. This idea reflected the belief that pregnancy causes the loss of calcium from the teeth and bones. While this myth of weakening of teeth and subsequent dental caries has been put to rest, there is new evidence about the influence of pregnancy on oral health.

Pregnancy is not infrequently associated with nausea and vomiting (usually during the 4th to 12th week). Adaptation to the physiological changes of pregnancy can include dietary changes such as increased craving for particular foods and a higher frequency of snacks between meals. To maintain good oral health during pregnancy, dental care and special home management is required.

References


Common oral problems in pregnancy

There is much debate about whether the risk for dental caries is increased in pregnancy. Some changes in caries risk behaviour may occur but they would need to be substantial and maintained over a long period to have an impact on dental caries rates. Behaviours that may occur and may impact on caries risk are craving for and eating sugary foods and frequent ingestion or use of carbonated drinks to alleviate nausea.

Gingivitis

Clinical studies have shown that the accumulation of hormones in gingival tissues (Vittek et al. 1982; Christoffers et al. 2003) affects gingival vasculature, the local immune system and its reaction to dental plaque. Increased gingival swelling and bleeding is associated with decreased neutrophil chemotaxis and phagocytosis, altered lymphocyte response and depressed antibody production (Zeeman et al. 2001). The accumulation of dental plaque may result in gingivitis, characteristically beginning in the 2nd month of pregnancy and increasing up to the 8th month, after which it declines (Lii 1965).

The prevalence of gingivitis during pregnancy varies among studies from 30% to 100% (Leff et al. 2004). The effect of these changes on the periodontal tissues results in increased gingival swelling. Increased bleeding on probing may be seen in clinical examinations during pregnancy (Laine 2002).

Periodontitis

Periodontitis is a multifactorial disease, with microbial dental plaque being the initiator (Kiran et al. 2008). The initiation and progress of periodontal disease depend on the immunological response of the individual to the infection.

The most important risk factors for development of periodontal disease are cigarette smoking (Do et al. 2008), cannabis smoking (Thomson et al. 2008), age, stress (Genco et al. 1999; Ng et al. 2006), diabetes mellitus (Taylor et al. 1996) and high plaque levels (Pihlstrom et al. 2005).
**Progression of periodontal disease**

There is some evidence that periodontal disease may progress during pregnancy. Moss et al. (2005, 2007) found that about one-quarter (26%, 2005; 34%, 2007) of a population of pregnant women demonstrated periodontal progression (defined as an increase of at least 2 mm in sites with a probing depth of 4 mm or more). A US study of a cohort of women (Lief et al. 2004) during pregnancy found an increase in the proportion of women with periodontal pocketing of 4 mm or more, and an increase in the number of sites with attachment loss. Among the pregnant women, about 23% developed new periodontal disease (new sites or worsening of existing sites) during their pregnancy. Those most at risk were African-American, smokers and those on public assistance. However, whether the disease improved after delivery is not known. One encouraging factor is that oral hygiene practices and the number of people with healthy gums increased during pregnancy.

**Pyogenic granuloma**

Occasionally, localised gingival inflammatory enlargement, known as the pregnancy tumour, or pyogenic granuloma, can be found in up to 5% of pregnant women (Silk et al. 2008). Pyogenic granulomas bleed easily due to their highly vascular nature, and may be painful. Smaller lesions sometimes regress with extra oral hygiene measures such as scaling and meticulous cleaning. However, if the lesion is causing problems (pain or discomfort, as long as there is no medical contraindication it can be excised. However, the patient would need to be warned of the risk of recurrence during the rest of the pregnancy – again, meticulous oral hygiene would reduce the risk.

**Erosion**

Nausea and vomiting are the commonest symptoms consistently experienced by pregnant women. Surveys report that nausea with or without vomiting affects about two-thirds of pregnant women (Louik et al. 2006), with up to 80% of these experiencing some nausea, 2.2% experiencing nausea and vomiting for most of the pregnancy, and 2.4% being hospitalised for vomiting (Power et al. 2001). Persistent vomiting may have an erosive effect on tooth structure, and pregnant women should be advised to have a dry mouth or water following a vomiting episode and not to brush their teeth immediately after vomiting.

**Oral health and general health in pregnancy: emerging issues**

**Pre-term birth and/or low birthweight babies**

Pregnant women with severe periodontal disease may have an increased risk for having low birthweight or pre-term (born before 37 weeks) babies. Periodontal disease results in the presence of inflammatory markers in the bloodstream which are also thought to have a role in the onset of labour. (Jeffcoat et al. 2001; Offenbacher et al. 2006). However, some studies have found no association (Holbrook et al. 2004; Moore et al. 2004), and the ‘strength’ of the association varies across studies based on study design and outcome. Some explanations for the different findings are that there is no standard definition of periodontal disease, the studies were conducted among different populations, and control of potential confounders varied among studies (Boggess 2008). Agueda (2008) suggests that more studies with better methodological quality will be necessary to confirm that periodontitis in pregnant women is an independent risk factor for adverse pregnancy outcomes.

To complicate the story further, some studies have found that treating periodontal disease in pregnancy can reduce the likelihood of pre-term birth (Lopez et al. 2002; Jeffcoat et al. 2003; Offenbacher et al. 2006), while others have not found any such reduction for births at less than 37 weeks but have suggested that there is evidence of a benefit for births before 34 weeks (Michalowicz et al. 2006). To date there is not sufficient evidence that treating periodontal disease decreases the rate of adverse pregnancy outcomes (Kiname et al. 2008) – larger and better designed clinical trials are needed (Offenbacher & Beck 2007).

**Pre-eclampsia**

Pre-eclampsia is a set of symptoms including hypertension and proteinuria that affects 5–10% of pregnant women. There are multiple risk factors for pre-eclampsia including pre-existing diabetes and first pregnancy. However, damage to the endothelium seems to be present frequently. Studies by Boggess et al. (2003), Contreras et al. (2006) and Ruma et al. (2008) found that women were at higher risk of pre-eclampsia if they had severe periodontal disease or progression of periodontal disease during pregnancy. It was hypothesised that periodontal disease contributes to placental inflammation. It is unclear whether the relationship between periodontal disease and pre-eclampsia is an association that is due to factors related to both conditions independently, or whether there is a causal linkage. Other studies have not found this relationship (Khadir et al. 2006).

**Gestational diabetes**

Recent studies by Xiong et al. (2006) and Dasanayake et al. (2008) have found an association between periodontal disease and gestational diabetes. Their work also suggested that those with gestational diabetes had a greater risk of developing more severe periodontal disease during pregnancy than those without gestational diabetes.

**Neonatal health**

A recent study (Jared et al. 2009) suggests that in-utero exposure to oral pathogens increases the risk for admission to a neonatal intensive care unit. This is a single study and further research is awaited. These associations between oral health and general health in pregnant women support the notion that pregnant women should undergo full dental examinations to detect periodontal disease, as periodontal disease varies across studies based on study design and outcome. Some explanations for the different findings are that there is no standard definition of periodontal disease, the studies were conducted among different populations, and control of potential confounders varied among studies (Boggess 2008). Agueda (2008) suggests that more studies with better methodological quality will be necessary to confirm that periodontitis in pregnant women is an independent risk factor for adverse pregnancy outcomes.

To the patient would need to be warned of the risk of recurrence during the rest of the pregnancy – again, meticulous oral hygiene would reduce the risk.

**Radiography in pregnancy**

The NHMRC (1987) stated that if collimation and appropriate shielding is used, including the use of a lead apron, there is no need to defer the use of radiographs for pregnant women. Certainly, with appropriate precautions, the taking of a radiograph in an emergency situation at any stage during pregnancy is indicated (Abbott 2000).

**Oral issues of newborn babies**

**Natal teeth, cysts**

Occasionally, infants are born with tooth-like structures or develop them soon after birth (natal or neonatal teeth). These are usually in the mandible and are rare, occurring in 1 in 1,000 births (da Silva et al. 2008). Gingival cysts may also be present at birth and may occur in the midpalatal raphé (Epstein pearls), above the gum pads and especially in the maxilla (Bohn nodules), or on the alveolar crest (dental lamina cysts).

**Prevention of transmission of Streptococcus mutans to the young baby**

Early colonisation of the oral cavity with strep mutans bacteria has been associated with high rates of dental caries (Harris et al. 2004; Law 2007). Reduction in maternal strep mutans through restorative and preventive regimens has been shown to reduce the caries levels in their young children (Ercan et al. 2007).

This risk can be further reduced with a low-sugar diet, good oral hygiene and appropriate fluoride exposure. However, parents should be advised to minimise the transfer of saliva from parent to child, and to ensure that their own oral care and oral health is as good as possible to reduce this risk factor in young children.

**Use of dummies/pacifiers and finger sucking**

There are general health benefits in the use of dummies, including analgesic effects, shorter hospital stays for pre-term babies and reduced risk of sudden infant death syndrome. However, prolonged use may have negative consequences such as dental malocclusion and otitis media (Sexton et al. 2009).

Non-nutritive sucking on a dummy, finger or thumb either very actively or for a long period can produce changes in the oral cavity. Duncan et al. (2008) have found that dummies are habit-forming and can have an effect on the developing occlusion than that of a finger or thumb. However, a sucking habit with a dummy may be easier to break than with a finger or thumb. The majority of children...