# Align Technology Position on the Oral Health of Mothers and Children

## I. Early Action to Secure Maternal and Infant Oral Health

Prenatal health checks are an essential element of care to ensure that both mother and baby stay healthy during pregnancy. These checks naturally focus on general and gynecological health.

However, there is growing global consensus among doctors and health experts that maintaining oral health during pregnancy is critical for both mothers and their babies. This recognition is accompanied by strong recommendations, such as that made by the Brazilian Ministry of Health, that pregnant women should visit their dentists at least once during pregnancy as part of prenatal care.[1] Similar recommendations have been made in many other countries, including in the United States by the American Academy of Pediatrics through its Protect Tiny Teeth project,[2] which integrates oral health screening into maternal prenatal care; Canadian government advice[3] that women visit an oral health care professional in the first trimester; a German policy guideline to include education on the significance of oral health during pregnancy in prenatal care[4]; and South African guidelines, which recommend examination of the mother's teeth and gums as part of the first prenatal visit.[5] Most recently, the World Federation of Public Health Associations recommended the integration of oral health services into existing maternal health care systems.[6]

## II. Maternal Oral Health and Adverse Pregnancy Outcomes

Physiological changes during pregnancy increase susceptibility to oral infections such as gingivitis, periodontitis, and oral pyogenic granuloma.[7] According to the American Dental Association, the symptoms that women experience because of these changes can include tooth mobility, tooth erosion, dental caries, and benign gum lesions. Around 40% of women experience some form of periodontal disease during pregnancy, and pregnant women have a 50% higher risk of developing gingivitis than the general population. 51% of pregnant women have caries.[8]

In recent decades, a wealth of studies has demonstrated connections between poor oral health in mothers and adverse pregnancy outcomes: Studies have found that periodontal diseases in mothers significantly increase the risk of preterm birth and low birth weight,[9] preterm pre-eclampsia[10] (a serious pregnancy complication characterized by high maternal blood pressure), and restricted fetal growth.[11]

However, pregnant women and their healthcare professionals are frequently unaware that the oral health of the mother contributes to these risks. In addition, many pregnant women face specific barriers, including geographic challenges such as the unequal distribution of dental care facilities and professionals, limited transportation options, affordability, as well as issues related to health literacy and awareness, that prevent them from accessing and utilizing oral health services. This contributes to an underappreciation by healthcare providers and mothers of the critical role that good oral health plays in a baby's in utero

development.[12] New technologies and telehealth services can help address these challenges and reduce adverse outcomes.

## III. Challenges to Maintaining Maternal Oral Health

Poor oral health and lack of oral care are exacerbated by socioeconomic disparities and marginalization. A large population of women does not have access to safe, effective and affordable quality dental services or receive adequate education on dental health. Inequalities in the geographic distribution of oral healthcare professionals versus the patient population and lack of transportation constitute one of the greatest barriers to accessing prenatal oral health care, with lower-income women least likely to receive dental care. Other contributors to poor maternal oral health include tobacco, alcohol, illicit drugs, and poor diets.[13]

Sociocultural barriers also contribute significantly to the lack of oral health care. These include pregnant women's fears that they or their fetus may be harmed by dental treatments, the incorrect assumption that poor oral health is a normal side effect of pregnancy, as well as decisions not to seek dental care due to fear, cultural factors, or other beliefs.[14]

A key fear among pregnant women regarding dental treatment is the mistaken belief that radiation exposure in dental clinics is harmful to the fetus or may lead to miscarriage.[15] This is simply not the case, although the prevalence of this misunderstanding is widespread. For instance, a 2019 study conducted among 18+ year old women in Saudi Arabia showed that participants had poor knowledge regarding radiation safety during pregnancy. 91% of the study respondents had poor knowledge of dental imaging during pregnancy, and only 11% were aware that the risk of fetal malformation due to radiation exposure is very low.[16] Dentists themselves often prefer to delay treatment until after pregnancy because of these same mistaken concerns.[17] A study conducted among gynecologists in the United Arab Emirates found that while by and large the doctors were aware of the connection between oral health and pregnancy, 73 percent regarded dental radiographs to be unsafe during pregnancy.[18]

But the ramifications of delaying diagnosis and necessary treatment during pregnancy are well known and can negatively impact the health of both the mother and fetus. New technologies are available that can help to address these concerns. Today, digital intraoral scanners using Near Infrared Imaging (NIRI), are being used as an adjunct to physical dental exams, allowing clinicians to assess the mother's dental condition and treatment needs, including interproximal caries between teeth or under the gum line, without exposure to X-rays. These advanced imaging techniques could be used by dentists and patients as the basis for undertaking treatment or used as a primary screening technology that is followed by highly focused radiographs when necessary to confirm a diagnosis and need for treatment. Enabling diagnostic dental imaging without X-ray radiation exposure, intraoral scanners can alleviate concerns of mothers and their doctors while significantly contributing to the maintenance of maternal oral health and the prenatal oral care of young children.

## IV. Relationship between Prenatal Oral Care and Children's Health

The link between maternal oral health, prenatal oral care and children's health has been well established in the literature. Studies have shown that children whose mothers have poor oral health are five times more likely to contract oral health conditions than those whose mothers have good oral health.[19] Mothers are the main source of transmissible cavity-causing bacteria to their children,[20] and children of mothers with high levels of untreated caries are more than three times as likely to have untreated caries themselves.[21] A history of active caries in mothers is a predictor of early childhood caries (ECC)– the single most prevalent chronic childhood disease that affects about 514 children worldwide with a global average prevalence of 43 percent.[22] Early childhood caries can spread from primary to permanent teeth, making the situation worse and causing long-term damage.[23]

Yet many oral health conditions are preventable and treatable when caught early.[24] Prenatal dental care has been shown to lead to reduced incidence of infant caries,[25] so that early intervention to promote maternal oral health is crucial to promote healthy natural dentition for life. It is therefore essential for expectant mothers to seek out prenatal oral health care, to improve their own health and safeguard that of their children. Education for pregnant women on good oral health can help spread the message to the rest of the family,[26] as well as help prevent poor oral health among their children.

## V. Meeting the Challenge with New Technology

Technology can play an integral role in improving access to and uptake of oral health checks among pregnant women. While X-ray radiation has been found to be safe throughout pregnancy, practitioners in many countries are nonetheless expected to be able to justify examination and to comply with the "as low as diagnostically acceptable, being indication-oriented and patient-specific" (ALADAIP) principle of radioprotection.[27]

iTero scanners by Align Technology can detect interproximal caries lesions and record high-definition images over time – allowing dentists to diagnose and track oral health issues throughout the course of pregnancy and beyond. In a recent clinical study, the iTero NIRI technology of the iTero Element 5D imaging system was found to be 66% more sensitive than bitewing X-rays in detecting early enamel lesions.[28] iTero scanners thus constitute a valuable alternative to the use of dental X-rays, helping to ease common fears of radiation exposure and potential harm to the fetus among doctors and patients.[29] In this way, iTero scanners can contribute to breaking down barriers that deter pregnant women from accessing prenatal care – ensuring their children get a healthy start in life.

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