

Treatment Considerations in the Pregnant Patient

Dentists are often cautious and mistakenly avoid treatment of oral health issues during pregnancy. It's been recorded that pregnancy is a time when women may be more motivated to make healthy changes. Dentists can therefore use this as a chance to address maternal oral health issues and instill positive oral hygiene habits that can be passed on to their children. Pregnancy presents an alteration in systemic maternal hormone levels that have been found to produce various multi-organ changes as well as influence on the progression of periodontal disease. Before pregnancy and its effect on the oral cavity can be properly reviewed a summary of systemic changes that are of clinical interest for any health care provider will be reiterated.

Findings in the pregnant patient include a forty percent increase in blood volume and cardiac output, as well as an increased red cell volume. The pregnant patient will often present with a decreased blood pressure of 100/70 mmHg or lower, creating a tendency for syncope or postural hypotension during the first trimester particularly. The presence of nausea and vomiting, tachycardia with shortness of breath, and physiologic heart murmurs are significant findings as well. It is of significance to identify the trimester the pregnant patient is currently in as the first trimester presents a stage of significant fetal formation and organogenesis, while the second and third trimesters provide time for growth and maturation of a developing fetus. The second and early third trimester are the safest to provide treatment for a pregnant patient, however each patient should be involved in any decision involving treatment after they have been explained the risks and benefits of treatment.

Throughout pregnancy, the incidence of the oral cavity becoming exposed to gastric acid is increased. Nausea and vomiting, also referred to as morning sickness is a common occurrence during the initial stages of pregnancy. Later in pregnancy, a lax esophageal sphincter and the upward pressure from the gravid uterus can exacerbate gastric reflux. The increased enamel exposure to gastric acid typically leads to erosion. Management strategies that can be suggested to patients can include reducing acidic foods in diet, the use of antiemetics and antacids. There have been studies that suggest rinsing the mouth with a teaspoon of baking soda in water helps reduce the incidence of erosion following vomiting. Pregnant patients should also be advised to avoid brushing their teeth immediately following vomiting to reduce the risk of enamel damage. Using a soft bristled toothbrush is also advised. Fluoride mouth rinse can be used in attempt to reinforce eroded teeth. In addition to the increased acidity in the oral cavity, sugary dietary cravings contribute to the increased risk of caries in pregnant women.

The host response to plaque seems to be heightened and exaggerated due to pregnancy. Pregnancy has been described as a clinical inflammatory periodontal stressor. This has been confirmed in studies through the finding of increased gingivitis scores as well as the presence of increased probing depths with minor changes in attachment levels of the associated teeth. Regarding plaque levels, it does not seem that there is a significant difference in the accumulation of plaque in pregnancy, however it does seem that the microbial composition of accumulated plaque becomes an aggregation of more pathogenic bacteria. Specifically, studies have seen a

significant relative overgrowth of orange complex bacteria and a non-significant, however noted, increase in red complex bacteria.

Along with microbial changes in plaque, there are also molecular changes in the content of GCF, congruent with the clinical inflammatory state of pregnancy. During pregnancy, there is a significant increase in inflammatory markers IL-1b, and IL-6. Specifically, IL-1b is an acute innate immune response mediator. This increases in the presence of increased lipopolysaccharide (LPS) endotoxin from pathogenic bacteria. Interaction between IL-1b and LPS leads to a promoted neutrophil recruitment, vascular changes, as well as hard and soft tissue destruction. The significance of pregnancy presenting with chronic inflammation has been shown by the increased levels of IL-6. Unlike IL-1b, an increase of IL-6 is not associated with interaction of pathogenic bacteria. Rather an increased IL-6 is due to increased periodontal levels of IL-1b and TNF-a. IL-6 is a chronic innate immune response factor, and signals to recruit macrophages as well as activate the acquired immune response. In a chronic inflammatory situation, it is IL-6 that enhances osteoblast differentiation and activation, along with matrix metalloproteinase expression from activated local fibroblasts. This results in periodontium breakdown and deep pockets which can in turn become infected. Tooth mobility can precipitate from the above process and recurrent bacteremia can result, reinitiating the above cascade of inflammatory markers. Other inflammatory factors seen to be involved in pregnancy is an increased C-reactive protein (CRP), signaling increased oxidative and maternal stress during pregnancy. Elevated prostaglandins (PGE2) have been found in the amniotic fluid in pregnant mothers with periodontitis. When these factors have been found chronically during pregnancy there is significant evidence of an increased risk of preterm birth and low infant birth weight. It is thought that PGE2 release restricts placental blood flow and causes placental necrosis and resultant growth restriction. Serious developmental delays related to motor skills, social growth and learning disabilities, along with respiratory problems, vision and hearing loss, and digestive problems have been related to the above. This strengthens the importance of maintaining periodontal health to support both overall health but also a safe pregnancy and healthy baby. There may also be a racial correlation to the above finding, as studies including more African American patients had found a greater amount of periodontal-related preterm labour. Many studies show that treating periodontitis during pregnancy is too late to achieve a positive result, and the focus should be on improving the periodontal status prior to pregnancy.

A common finding in pregnant women is pregnancy gingivitis, found in around 60-75% of pregnancies. This has been related to the increased levels of estrogen and progesterone systemically and their proliferatory effect locally on the periodontal tissues and local bacteria. This is mostly found during the second trimester. It has been noted that both an increase in host inflammatory response and an increase in bacterial response to these increased hormone levels contributes to this finding. Preexisting gingivitis can be significantly exacerbated during pregnancy, again reinforcing the importance of pre-pregnancy oral hygiene intervention. In those with severe gingivitis regular cleanings (~2-3 months) and use of chlorhexidine rinses can be used. Xylitol and chlorhexidine rinses lower oral bacterial load and reduce transmission to infants when used in late pregnancy or post-partum. Both are safe for use in pregnancy, FDA pregnancy category B.

Another common finding during pregnancy is the presence of pyogenic granuloma, also known as a pregnancy tumor, found in around 5% of all pregnancies. It is visualized intraorally as a localized erythematous, lobulated growth isolated to the attached gingival tissues. Plaque and calculus can be the initiatory causes leading to gingival irritation and a fibrovascular proliferatory response in the gingival tissues that is exaggerated by the elevated level of pregnancy hormones, particularly progesterone. These can bleed easily when irritated. Management is usually observational, and usually resolve post-partum. If these tumors bleed, interfere with mastication or do not resolve after delivery they can be surgically excised, however if done during pregnancy it's important to inform our patients that they are likely to recur.

With the above noted, it is most beneficial to establish optimal oral health prior to pregnancy. Prevention should be stressed to patients that are seen for their annual recall appointments if pregnancy is something that is being considered. Prior to pregnancy, active infection and hopeless teeth should be eliminated and proper oral hygiene instruction should be reiterated. However, if in a situation where a pregnant patient requires treatment proper clinical examination, radiographs and non-surgical periodontal therapy should be implemented without concern. With a combination of periodontal treatment and improved oral hygiene techniques it was seen in various studies that there was a significant reduction in pathogenic bacteria associated plaque levels, probing depths and specifically pockets greater than five mm. Along with a reduction in plaque, it was seen that there was a significant decrease in orange complex bacteria, as well as a significant decrease in total *P. gingivalis* content. A significant reduction in the above noted inflammatory markers are seen with periodontal treatment during pregnancy.

As stated above, treatment during first trimester should be avoided as it involves important processes of fetal development that could become impacted due to a heightened maternal stress level. It has been established that treatment during the second trimester is the safest to provide non-surgical periodontal therapy. There are no contraindications during this time for routine dental scaling, radiographs and emergency treatment. Pain, infection and trauma found in the oral cavity can be treated. Regarding dental infections, it has been showed that periapical and periodontal abscesses should be treated immediately, as they may pose a greater risk if left untreated compared to the risk of performing the required dental procedures. In emergency circumstances, these can be treated in all trimesters along with the required radiographs. Many mothers have a fear of dental radiographs, the corresponding radiation and the effect it will have on their babies. However, animal and human studies have shown that no congenital anomalies have been present with a total exposure of less than five to ten centiGray. For comparisons sake, a full mouth series with lead apron coverage of a pregnant patient transmits a total radiation dose of 0.00001 centiGray. This dose is also much less than an average days' worth of natural background exposure to radiation. Discretion must be taken by the treating dentist to select only radiographs necessary, identified by a proper periodontal exam and charting.

If treatment is required the use of anesthetics, analgesics and antibiotics should be tailored to those regarded as safe in a pregnant patient. Local anesthetics have been found to cross the placenta and dosage should be limited. When selecting anesthetics, it has been found that

xylocaine and prilocaine are the safest – FDA pregnancy category B. Some patients may require both post-treatment analgesic and antibiotic coverage. In the case of analgesic acetaminophen should be the drug of choice – FDA pregnancy category B. Ibuprofen and opioids, specifically oxycodone can be used safely in the first and second trimesters only, as the FDA pregnancy category in the third trimester shifts from B to D for both analgesics. Acetylsalicylic acid should be avoided. In terms of antibiotics, penicillin, amoxicillin and cephalexin should be considered if systemic symptoms of infection or cellulitis are present as a first line therapy. The three previously listed are found in FDA pregnancy category B. If type 1 hypersensitivity allergy is present to penicillins, then erythromycin or clindamycin are reasonable choices as both are FDA pregnancy category B. Classic periodontal adjunctive treatment with tetracyclines should be avoided in pregnancy, as these agents have an affinity for hydroxyapatite leading to intrinsic staining of developing dentition, along with a more serious inhibition of bone growth. Benzodiazepines (midazolam, lorazepam, triazolam) should be avoided. Nitrous oxide use is controversial and should be avoided.

Take Home Message:

Improving the oral hygiene of our patients who are thinking of becoming pregnant is an important step to ensure a healthy pregnancy for both fetus and mother. Identifying those at risk for periodontal disease and treating these patients prior to pregnancy should be incorporated into our treatment plans. Emergency treatment for pregnant patients should not be turned down at any stage of pregnancy, as there has been no significance behind stress related to dental procedures and adverse pregnancy events. Elective dental procedures can be postponed to the second trimester ideally, however there have been no studies showing adverse pregnancy events related to dental procedures in any trimester. Dental radiographs pose no significant risk to the fetus, however should be properly prescribed following charting and clinical examination. Local anesthesia with lidocaine and citanest can be administered safely throughout pregnancy. Antibiotics such as penicillin, amoxicillin, cephalexin, clindamycin and erythromycin are all safe choices. Pain management modality should be selected on a patient to patient basis, but can be safely achieved with acetaminophen, and ibuprofen or opioids in the first and second trimesters.

References:

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