

Review Article

Orthodontic care and management in pregnant women

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ABSTRACT

Orthodontic treatment is a lengthy procedure and it requires lots of care towards oral hygiene. Pregnancy brings lot of physiologic changes in patient. Proper management during gestational phase will provide better results. Orthodontist should have proper knowledge about the changes and should plan the treatment accordingly to achieve best outcome. The present article highlights the changes and the essential knowledge of various factors that an orthodontist should take into consideration while treating pregnant patients. This article also focuses on the treatment objectives that should avoid during pregnancy phase and explains the role of the patient during the treatment procedure.

Keywords: Pregnancy, Orthodontic treatment, Gynecologist, Gingivitis, Physiologic changes, Hormonal changes

INTRODUCTION

Orthodontic treatment for adult patients has sparked a lot of attention in the previous several years. Adult orthodontic therapy is beneficial for plenty of reasons, including improved function and occlusion, improved aesthetics, as well as psychological benefits. As the number of adult patients seeking orthodontic treatment rises, so does the number of female patients seeking treatment, owing to aesthetic concerns. This results in increased prevalence of pregnant women seeking orthodontic treatment from an orthodontist. A huge concern for pregnant females is whether to undergo orthodontic treatment during this phase is safe or not. Pregnant women can get orthodontic treatment, but only with caution.¹

It is recommended for pregnant women to visit their dentists thrice during gestational phase as good oral hygiene is an essential benchmark for health of pregnant women and particularly for the ones undergoing orthodontic treatment. Due to the changes in a woman's physique during pregnancy, maintaining oneself becomes

more difficult. Pregnancy-related changes in the immune system and hormonal fluctuations have an impact on the development of oral infections in pregnant women. Thus, it has been established that gum disease (gingivitis) in pregnant women increases the risk of premature birth and the possibility of having a kid with a low birth weight.²

This paper highlights the problems and the measures taken to overcome those issues in pregnant women.

HISTORY TAKING

Before initiating orthodontic therapy, a thorough and detailed medical history is required, especially when the patient is pregnant. However, if you are pregnant, you should consult a gynecologist to see whether any recognized issues are to be expected.³

An orthodontist might learn about the patient's attitude toward dental care and his or her priorities by reviewing the patient's dental history. Gingival and periodontal diseases require orthodontists to be more active and skilled of diagnosing them. If the patient already has evidence of

gingival inflammation and poor dental hygiene, it may be best to begin orthodontic treatment after the pregnancy, as braces make oral hygiene difficult to maintain.⁴

Before beginning orthodontic treatment, it is crucial to be aware of any previous medical issues, such as pregnancy-induced diabetes mellitus or previous pregnancy difficulties. Non-steroidal anti-inflammatory medicines, vitamin D metabolites hormone supplements are all likely to cause tooth mobility to be reduced during orthodontic treatment. Hence, list of medications and related history is also important.^{5,6}

Effect of drugs in pregnancy, hormonal changes and their impact on tooth movement, eating habits in pregnancy and oral hygiene are certain elements to be consider before initiating orthodontic treatment.³

PHYSIOLOGIC CHANGES DURING PREGNANCY

During pregnancy, cardiovascular system goes through lot of changes. The increase in demand by the fetus causes an increase in blood volume and cardiac output. While the patient is in the supine posture, blood pressure and cardiac output can drop during the second and third trimesters. Supine hypotension can be relieved by tilting the patient 5-15 percent to the left side. Further, a full left lateral position may be required if the hypotension persists.⁷

Hormonal changes and fetus enlargement together cause changes in gastric system results in nausea and vomiting. Morning appointments should be avoided for pregnant women with severe nausea and vomiting, who require dental treatment and they should be counselled to avoid citrus drinks and fatty foods, as these may trigger gastric disturbance or delay gastric emptying. Patient should be settled in a semi-supine posture during dental treatment. If the patient vomits, the procedure should be promptly stopped and the patient repositioned upright. Mouthwash should be provided to the patient for rinsing before reinitiating the treatment.^{8,9}

The female sex hormones estrogen, progesterone, and human gonadotrophin are released by the placenta. These hormones are in charge of the physiologic changes that occur during pregnancy. Thyroxin, steroids, and insulin levels rise in tandem with these hormones. Due to an increase in insulin resistance during pregnancy, women with a positive family history of diabetes mellitus Type 2 are at a higher risk of developing gestational diabetes. As a result, before undergoing any dental surgery, a blood sugar level test should be performed.¹⁰

SALIVARY CHANGES IN PREGNANT WOMAN

Innumerable changes salivary content can be detected during late pregnancy, which temporarily persuade teeth erosion and caries. As a result, the orthodontist must encourage the patient to follow strict oral hygiene guidelines.¹¹

EATING HABITS IN PREGNANT WOMAN AND ITS EFFECT ON ORTHODONTIC TREATMENT

During pregnancy, some women experience odd dietary cravings. Tooth decay might be exacerbated by a constant need for sugary treats.³ As a result, individuals receiving orthodontic treatment should be counselled on food, and precautions should be made to ensure that the patient's and the fetus general health is not harmed as a result of any nutritional deficiencies.¹¹

PERIODONTAL HEALTH IN PREGNANCY

Adult periodontal conditions can be approved in variety of situations with orthodontic therapy as in case of crowding it helps in better alignment and hence improve the oral hygiene and cause noticeable esthetic improvement. But the presence of orthodontic appliances, particularly during pregnancy and in cases of pre-existing gingival inflammation, may increase the demand for strict oral hygiene maintenance, and in patients who lack that self-motivation, the periodontal condition may worsen when orthodontic appliances are present in the oral cavity. Fixed appliances are known to behave as plaque-retaining mechanisms. When combined with pre-existing gingival inflammation, which may be present in a pregnant woman, a rapid progression to periodontal disease may occur. Because of the increased risk of periodontal disease, tooth movement should be avoided during active gingival inflammation. As a result, it is critical to raise awareness among dentists and to educate women about the need of oral health care throughout orthodontic treatment, particularly if they are pregnant.^{4,12}

HORMONAL CHANGES IN PREGNANCY

Hormonal changes in pregnant women should be considered before starting orthodontic procedures as hormones like progesterone, estrogen, relaxin mainly increases during pregnancy and can affect orthodontic tooth movement. According to the study conducted by Helsing and Hammarstrom, hormones can affect the tooth movement rate in pregnant rats. When compared to non-pregnant rats, OTM is faster in pregnant rats.¹³

During pregnancy, the level of estrogen rises continuously and influence RANKL/RANK/osteoprotegerin pathway. It results in decreased number of osteoclasts, thus, lowers the velocity of tooth movement.¹⁴

Poosti and Basafa did a study on rabbits and concluded that long term administration of progesterone can reduce the rate of tooth movement.¹⁵

The use of relaxin may help to speed up the early phases of orthodontic tooth movement. Relaxin may be administered as an adjuvant to orthodontic treatment, either during or after tooth movement, to promote stability and fast gingival remodelling. Study done by Madan MS et al revealed that it can reduce the level of PDL

organization, reduce PDL mechanical strength, and increase tooth mobility at early time points.¹⁶

DRUGS TAKEN DURING PREGNANCY

Analgesic

Analgesic drugs relieve pain by acting on the central nervous system (CNS) or peripheral pain mechanisms. The most frequently prescribed drugs in orthodontics are for the relief of pain caused by the application of mechanical force to the teeth. The slowing of tooth movement is caused by the inhibition of the inflammatory reaction caused by PGs. These drugs are used for pain relief caused by the application of mechanical force to the teeth. The slowing of tooth movement is caused by the inhibition of the inflammatory reaction caused by PGs.³

Paracetamol

In contrast to NSAIDs, which act on COX-1 and COX-2 inhibitors, paracetamol, commonly known as acetaminophen, acts on COX-3 inhibitors expressed in the brain and spinal cord. It has a negligible impact on the production of prostaglandins. Study conducted by Roche and colleagues explained no effect of paracetamol on tooth mobility in rabbits.¹⁷

Bisphosphonates

Bisphosphonates (BPNs) are used to treat disorders such as Paget's disease, osteoporosis, and conditions characterized by excessive bone resorption. BPNs stop hematopoietic precursors from turning into osteoclasts. In 1994, Adachi and colleagues published a study showing that topical injection of risedronate, a BPN, can help with orthodontic anchoring and retention in rats.¹⁸ BPNs have been demonstrated in studies to hinder orthodontic tooth mobility and postpone therapy. The use of BPNs as a topical agent could aid in the anchoring and retention of teeth during orthodontic therapy.¹⁹

Vitamin D3

Low-dose vitamin D3 supplementation increases bone resorption by upregulating RANKL expression in osteoblasts, which leads to osteoclast development via the RANK/RANKL pathway. The rate of tooth movement is enhanced by Vitamin D3 in a dose-dependent manner, according to experimental investigations.¹¹

ORTHODONTIC MANAGEMENT IN PREGNANCY

Orthodontic treatment plan

In patients who are pregnant, it is critical to devise a treatment plan that is both basic and reasonable. For optimal results, good communication between the orthodontist and the patient is essential. If the patient only

wants orthodontic treatment for frontal aesthetics and is unwilling to comply with a 2-year treatment plan and full therapy, this must be determined from the start. Only minimal treatment should be given to such people. In certain cases, waiting until after the pregnancy to begin orthodontic treatment may be a better option.²⁰

Timing of treatment

Early morning appointments should be avoided in pregnant patients due to nausea problems and appointment duration should be kept short to avoid any kind of discomfort. Because organogenesis is completed by the first trimester, regular procedures should be performed in the second and third trimesters. Extensive elective operations should be postponed until after the baby is born.¹¹

Implications for orthodontic treatment in pregnancy: keeping a healthy mouth environment will help avoid difficulties in the future; patients should drink plenty of water, and chair treatments should be as brief as feasible; X-rays and medication therapy should be avoided throughout the first trimester; and lengthy procedures or surgical procedures such as exposure of an impacted tooth, should be postponed until after the baby is born.²¹

Role of professionals

The orthodontist will be able to set practical goals for successful treatment based on a detailed history, oral examination, and assessment of patient compliance and expectations. The patient will benefit from good communication among health-care experts, which will improve their quality of life. Steel ligature should be used instead of elastic modules because elastic modules are less sanitary. Radiation should be avoided as much as possible during pregnancy. However, if there is an acute dental infection, it must be treated, and radiographs can be taken because oral radiography emits very little radiation. It is recommended that the orthodontic treatment plan be coordinated with the gynecologist in order to set guidelines that enhance maternal oral health and perinatal outcomes.^{3,22}

Role of patient

Women, especially during pregnancy, should be aware of the importance of dental health care. During treatment, rigorous plaque management and oral hygiene should be maintained. It is patient's duty to maintain proper oral hygiene and communicate well with dentist regarding all the dos and don'ts and the problem or issues if occur. During pregnancy, analgesics, antibiotics, local anesthetics, and other medications should be examined for potential fetal harm.¹

TREATMENT PLAN

Planning a straightforward and realistic treatment for pregnant individuals is critical.

Prefer non-extraction over-extraction

Preferably non-extraction approach should be used over extraction, if possible, in pregnant patients as it can reduce the treatment time. However, it needs proper diagnosis and best result outcome should be planned. Non-invasive procedures should be avoided.

Removable versus fixed treatment

Removable treatment if give better results should be recommended as it is easy to maintain proper oral health with removable appliances as compared to fixed one in pregnant patients.

Force

Light and continuous forces should be preferred over heavy forces due to the risk of periodontium breakdown with heavy forces.

Steel ligatures versus elastomeric modules: elastomeric modules are less hygienic and promotes plaque accumulation hence steel ligatures should be used.¹¹

CONCLUSION

For successful treatment outcome in pregnant women, it is essential that the orthodontist must have thorough knowledge of the changes, the precautions and the risks associated while planning the treatment for the patient. Proper history, diagnosis and proper communication between patient and dentist are the key factors for the quality results. The orthodontist will be able to provide successful treatment with these practical goals.

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