



PERIODONTAL CHANGES PERTAINING TO WOMEN FROM PUBERTY TO POSTMENOPAUSAL STAGE

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ABSTRACT

A woman from when she attains her puberty till she reaches her menopause is under constant hormonal fluctuation. Changes in Progesterone and estrogen not only bring changes in general health, but also in the oral health. Women when she passes through the different stages, puberty, pregnancy, while on oral contraceptives and menopausal stage, the gingiva tends to get inflamed and leads into gingivitis. This situation if left untreated becomes Periodontitis- inflammation of the gums and tissues surrounding the tooth. The main causative agent of periodontitis is Aerobic and anaerobic bacteria. Women are more prone to periodontitis when compared to men. Hence, oral hygiene and oral health needs to be monitored simultaneously, for a healthier life.

KEYWORDS:Periodontitis, Gingivitis, Periodontal pathogens, hormonal changes.



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INTRODUCTION

Periodontitis refers to the infection of gingival tissues around a tooth. The term Periodontitis is derived from the word Periodontium (tooth supporting tissues).¹ Various studies show that women are more prone to periodontal infections when compared to men. The main reason for this difference is due to the gradual hormonal change from when a female reaches puberty till she reaches her post menopausal state. The current article attempts to throw a light on the various bacteria that are involved in Periodontitis and the effect they have on a women's life.

PERIODONTITIS

The term 'Periodontitis' is defined as " an apical extension of gingival inflammation to involve the tissues supporting the tooth, including periodontal ligament and bone". A periodontal pocket is being formed when there is a destruction of the fiber attachment.² Gingivitis is a milder type of periodontitis. At this stage it can be completely cured by professional dental treatment. The gums tend to become red and swollen. If left untreated it will lead to Periodontitis. The supra gingival plaque will grow into the sub gingival area leading to multiplication of bacteria. The bacterial flora which is being formed produces various toxins that lead to the destruction of the bones and tissues supporting the tooth. As a result a pocket is being formed between the tooth and the gum. Gradually the periodontal pocket will deepen and will spread into more tissues and bones. As a result the tooth will become loose and will have to be removed.³

TYPES OF PERIODONTITIS

The most common forms of periodontitis are

- 1. Aggressive periodontitis-** This type of periodontitis is seen in clinically healthy patients. There is rapid detachment of the gums and destruction of the bones
- 2. Chronic periodontitis-** This is the most frequently occurring type of periodontitis. The disease progresses into the deeper

tissues. Chronic periodontitis is always associated with periodontal pockets and gingival recession. It is most commonly seen in adults but can occur at any age. Reports shows that Periodontitis is seen as a manifestation of some systemic diseases such as Heart disease, Diabetes and Respiratory diseases.

- 3. Necrotizing periodontitis-** There is necrosis of gingival tissues, ligaments and the alveolar bone. This type of periodontitis is usually seen in Immuno suppressed patients such as HIV patients and in conditions of Malnourishment.³

HORMONAL CHANGES AND ORAL HEALTH STATUS OF WOMEN

Hormonal changes not only bring changes in the reproductive system of women, but also in the oral health and oral micro flora. Puberty, Menopause, Pregnancy and Oral Contraceptives have influence in the oral health status of women. Even though many women do not notice the change, reports show that during menstrual cycle some women experience swelling of gingiva and gingival bleeding.

PUBERTY

Studies show that during puberty there is change in the oral microbial environment. The female sex hormones Progesterone and oestrogen are seen in increased level during puberty. Some bacteria are able to colonize well at high concentrations of these hormones. In another study microbial change is attributed to a high blood circulation to the gums during Puberty, which leads to gums sensitivity. As a result the gums become tender and show greater irritation to food debris and plaque, leading to gingivitis.^{4,5}

MENOPAUSE

Menopause is usually accompanied by some physical and microbial changes in the oral cavity. There is a rapid decline in the level of

estrogen when a woman reaches menopause, which in turn leads to bone loss.⁶ According to Mine Tezal et al the relation between decline in level of estrogen and bone loss is best explained by the severity of periodontitis and lower bone density level in Post menopausal women. In a cohort study conducted by Mine Tezal et al., he concluded that periodontal disease due to bone loss is a predictor for tooth loss in Post Menopausal women.⁷

PREGNANCY

“A tooth for every pregnancy” is a very popular notion. The most common oral manifestation associated with pregnancy is gingivitis. Calcium is drawn in large amounts from the maternal bones and teeth to meet the fetal requirements. Though calcium is present in the teeth as a stable crystalline form it is mobilized easily to meet the demands of the fetus. There is exaggerated inflammatory response to local irritants due to change in hormones and blood circulation to the gums during pregnancy. The fiery red marginal gingiva and formation of interdental papillae is characteristic of inflamed gingiva. There is an increase in the depth of periodontal pocket. From the second month of pregnancy gingival changes can be noticed and increases till the eighth month of gestation. There is a reversal of gingivitis after childbirth, but need not return to a healthy condition. If pregnancy gingivitis is left untreated it may progress with lower severity. Pregnancy granuloma or pregnancy tumour is also seen, in addition to generalized gingivitis. The tumor grows fast and reaches a maximum size of 2 cm. Postpartum the tumor is removed surgically for complete recovery.⁵ Studies have revealed that Periodontitis during pregnancy is related to Pre term delivery (37 weeks of gestation) and Lower birth weight of the baby. In a study conducted by Carrillo-de Albornoz et al. they found that in pregnant women there is a high microbial flora in the oral cavity when compared to post partum women. Gingival inflammation was found to be more severe in pregnant women with high periodontal pathogens. The study also shows that in the case of non-pregnant women there is no

observable difference between the two check ups made at a 6 month interval. But in the case of pregnant women they showed significant difference during the first trimester.⁸ Evidences from researches shows that about 36-100% pregnant women suffer from pregnancy periodontitis. Gingival inflammation is initially caused by plaque and advanced by endogenous sex steroid hormones. Pregnancy gingivitis does not have much difference from other gingival inflammation, but only that there is no change in the plaque levels.⁹

ORAL CONTRACEPTIVES

A major oral manifestation among Oral contraceptive users is found to be gingival inflammation. Long time users of oral contraceptives showed Aggressive periodontitis. The gingiva becomes fiery red and the patients suffer from hemorrhagic gingiva. Drastic change in the saliva has been observed in Oral contraceptive users. There is a decrease in sialic acid, hydrogen and other electrolytes. Studies also show that there is a decreased flow in saliva.¹⁰ Brian H. Mullay et al reports that there is poor periodontal health among Oral contraceptive users. Aggressive periodontitis was prevalent among the group of young females who were on Oral contraceptives. They also had deeper periodontal pockets, gingival bleeding and there was a severe case of periodontal attachment loss when compared with those who were not on the pills.¹¹ According to Kornman and Loesche¹² periodontal pockets shows the presence of progesterone and estrogen hormones and that these hormones influenced the bacterial colonization of the oral cavity. Vittek *et al*¹³ was able to demonstrate the presence of receptors within the gingiva for the female sex hormones. Kalkwarf¹⁴ reported that though there are low levels of plaque formation, there is an increased level of gingival inflammation. Advanced formulations of the pills which contain lower levels of progestins and estrogen have lower risks, but long term usage may lead to periodontitis.¹¹

PERIODONTAL PATHOGENS

The oral cavity harbors a wide range of microbiota. The diverse microbiota encompasses Gram positive and Gram negative bacteria, aerobic and anaerobic bacteria, facultative and obligate anaerobes and also yeasts. Over 500 bacterial strains have been reported from the periodontal pockets. Although most of the strains are the normal flora, they can cause opportunistic

periodontal infections. In periodontal pockets and gingivitis, a large proportion of bacterial species belong to strict anaerobes.¹⁵ Table 1 shows the commonly isolated periodontal pathogens. The predominant bacterial species that are seen in periodontal pockets are facultative anaerobic bacteria and obligate anaerobic bacteria, when compared to aerobic bacteria.

Table 1
List of Periodontal pathogens. The table gives a list of important Aerobic bacteria and anaerobic bacteria that are frequently isolated from periodontal pockets and the sub gingival plaque.²

AEROBIC BACTERIA	ANAEROBIC BACTERIA
GRAM POSITIVE COCCI	GRAM POSITIVE COCCI
<i>Staphylococcus sp.</i>	<i>Stomatococcus sp.</i>
<i>Staphylococcus aureus</i>	<i>Gemella sp.</i>
<i>Streptococcus mutans</i>	<i>Peptostreptococcus sp.</i>
<i>Streptococcus sp.</i>	<i>Peptococcus sp.</i>
<i>Enterococcus sp.</i>	
GRAM POSITIVE BACILLI	GRAM POSITIVE BACILLI
<i>Lactobacilli sp.</i>	<i>Bifidobacterium</i>
<i>Actinomycetes</i>	<i>Eubacterium</i>
	<i>Propionibacterium</i>
	<i>Aggregatibacter sp.</i>
	<i>Actinomycetes</i>
GRAM NEGATIVE COCCI	GRAM NEGATIVE COCCI
<i>Neisseria catrhallis</i>	<i>Vellionella sp.</i>
GRAM NEGATIVE BACILLI	GRAM NEGATIVE BACILLI
<i>Escherichia coli</i>	<i>Bacteroides, Prevotella sp.</i>
<i>Haemophilus sp.</i>	<i>Porphyromonas sp.</i>
	<i>Fusobacterium</i>
	<i>Leptotricha</i>
	<i>Eikenella sp.</i>
	<i>Capnocytophagea sp.</i>

According to Socransky et al, the bacteria which are present in the Subgingival plaque exists in complexes based on cluster analysis and classified the microflora into 5 complexes. The 5 complexes as told by Socransky are Purple complex, Yellow complex, Green complex Orange complex and the Red complex. Each complex is comprised of a set of bacteria. According to Socransky the bacterial species present in the Red complex showed more prevalence in the pocket depths and that Red complex is closely associated with Orange complex.¹⁶

Figure 1

This diagrammatic representation shows the 5 complexes of Socransky based on the relationship of bacterial species within in a microbial complex. This was based on multiple cluster and community ordination analyses.¹⁶

Purple complex	Yellow complex	Green complex	Orange complex	Red Complex
<i>Vellionella parvulla</i> <i>Actinomycetes odontolyticus</i>	<i>Streptococcus mitis</i> <i>Streptococcus oralis</i> <i>streptococcus sanguis</i>	<i>Eikenella corrodens</i> <i>Capnocytophagea sps.</i> <i>Campylobacter</i>	<i>Prevotella</i> <i>Peptostreptococcus</i> <i>Eubacterium</i> <i>Fusobacterium sps</i> <i>Prevotella sp.</i>	<i>Treponema denticola</i> <i>Bacteroides</i> <i>Porphyromonas</i>

CONCLUSION

Oral health plays a pivotal role in general health of a woman. When compared to men, women need special dental care as there is a gradual hormonal fluctuation through out a woman's life. Women should be encouraged to go for regular health check up. General awareness among the women population of the oral health and the

significance of oral hygiene in general health should be taken into consideration. Pregnant women's oral health check up should also be taken into consideration. We hope that this article emphasis for the fact that oral health and oral hygiene needs to be monitored simultaneously.

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