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Periodontal Disease in Women and Conception - A possible Reflective Consideration

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Abstract

Periodontal disease (PD) is a group of complex chronic inflammatory conditions initiated by specific bacteria producing inflammatory mediators leading to the destruction of the supporting tissues of the teeth like gingiva, periodontal ligament, and alveolar bone which further can lead to the loss of tooth. Although the association of PD with many systemic illness-like cardiovascular diseases, diabetes mellitus, adverse pregnancy outcomes including preterm birth, low birth weight, early pregnancy loss, gestational diabetes mellitus and preeclampsia have been studied extensively, very few studies conducted to examine the possible relationship between infertility and periodontal diseases in women. Thus we aimed to review the possible link between the presence of periodontal disease and the duration to conceive in women.

Keywords: Periodontal disease, Pregnancy, Concieve

Introduction

Periodontal diseases are multifactorial in origin, having several risk factors such as age, socioeconomic status, genetic profile, oral biofilm composition, smoking, diabetes, cardiovascular disease, stress, obesity, osteoporosis, hematological disorders, female hormonal alterations, and pregnancy[1]. The periodontal pathogens and their virulence products not only damage the periodontal tissues, activating a local inflammatory response, but also trigger the systematic inflammatory response and ectopic infections through hematogenous dissemination[2].

This downstream effect by bacterial substances and host-derived inflammatory mediators is capable of initiating and promoting systemic diseases including adverse pregnancy outcomes. Levels of inflammatory mediators such as interleukin-1β (IL-1β), IL-6 and tumor necrosis factor alpha (TNF-α) in gingival crevicular fluid, saliva or serum are usually regarded as a reflection of host's local and systemic inflammatory response[3].

Initial intervention studies for periodontal disease in pregnancy suggested that either it is not the periodontal disease that is causing the adverse pregnancy outcome, i.e. it is some other systemic associated factor that is present in women with periodontal disease, or that the intervention to treat periodontal disease was initiated too late in pregnancy, and should be initiated prior to conception to prevent the adverse pregnancy consequences[4]. Till date, only few studies describe the effect of periodontal disease on a woman's chance of conceiving. The purpose of this review is to know whether women with periodontal disease need more time to conceive.

Pre-conception women were invited to detect the periodontal disease in a study[3], salivary and serum samples were collected at the time of examination. Results have shown increased concentrations of inflammatory mediators of IL-1β, IL-6, TNF-α and β-glucuronidase in saliva and IL-1β, β-glucuronidase and TNF-α in serum among pre-conception women with moderate/ severe periodontal disease, compared with women without periodontal disease.

A cross-sectional study[5], was conducted in Nigeria, in a total of 128 (70 pregnant and 58 non-pregnant) women. The non-pregnant group showed significantly more calculus deposits than the pregnant one. Good oral hygiene correlated with shorter TTC (<1 year) than fair oral hygiene, but not statistically significant.

Age group 38-42-year-old showed significant periodontitis risk for the non-pregnant group, evaluated with the chair-side MMP-8 immunoassay kit. There were significant associations between time to Concieve and age ($P < 0.01$), periodontitis ($P < 0.01$) assessed with a MMP-8 chair-side oral rinse. The authors recommend that women in child bearing age should be encouraged to have regular preventive dental checkups to maintain good oral health.

In Australia Pregnant women having periodontal disease with the presence of periodontal pockets ≥ 4 mm in depth at 12 or more probing sites in fully erupted teeth were asked to participate in a randomized controlled trial of treatment for periodontal disease in mid-pregnancy to know the possible association between the oral infection and the time taken to conceive. Out of 3737 pregnant women recruited to the study[4], information was available from 3416 spontaneous conceptions, including 1014 cases with PD. Those women, whose pregnancy was planned, were stratified by duration until pregnancy (12 months). The prevalence of periodontal disease was significantly higher in the group in which time to conceive was > 12 months. A multivariable logistic regression pointed that non-Caucasian woman with periodontal disease had an increased risk of having time to conception > 12 months.

The first randomized controlled trial (RCT)[6] was conducted to test whether treating periodontal disease among pre-conception women reduces periodontal disease during pregnancy and prevents adverse birth outcomes. Women were followed throughout their pregnancy and then to childbirth. All participants were randomly allocated to the intervention or control group. The intervention group received free therapy including dental scaling and root planning (the standard therapy), supragingival prophylaxis, and oral hygiene education.

The control group received only supragingival prophylaxis and oral hygiene education. The outcomes will be compared between the intervention and control groups, and between pregnancy and pre-conception groups. Furthermore, the study will help develop a model of preconception oral health care to improve both oral health and maternal and child health nationally and internationally. The pre-conception periodontal treatment strategy may be applicable to many low-or middle-income countries.

Possible mechanism linking the association of periodontal disease with the extended time to conceive in women.

1.As periodontitis causes a systemic inflammation resulting in the rise of pro-inflammatory cytokines and decrease of anti-inflammatory cytokines that could interfere with fertility, possibly due to: a) preventing ovulation; b) preventing implantation of the embryo or not sustaining its implantation, in case of medical conditions like endometriosis, polycystic ovarian syndrome and presence of hydrosalpinges.[7,8,9] .

2.Patients treated by non-surgical periodontal therapy have shown to display a significant increase in plasma TNF-alpha, CRP and IL-6 levels immediately after intervention, suggestive of a substantial bacterial inoculation in conjunction with the mechanical instrumentation of the periodontal tissues[10] (Kebschull et al., 2010).

3. Few of the studies have indicated a strong genetic basis for interindividual differences in infectious disease manifestations[11](Segal and Hill, 2003). Upon recognition of the presence of invading microorganisms, the innate immune system mounts a response aimed at controlling infection. Activation of macrophages, dendritic cells and neutrophils is key to this process,[12, 13] while their deactivation is central to preserve homeostasis[14]. A balanced and appropriate response is beneficial to clear infectious agents; however, individuals differ in their ability to mount an inflammatory response[15].

Conclusion

As periodontal disease appears to be connected with increased time to Concieve, it would be important to consider maternal periodontal health from the moment of conception and should be advised to have a dental health checkup prior to attempting to conceive. Further prospective interventional studies are needed to reduce the effect of increased hormonal levels which can act as a source to periodontal diseases and treatment for infertility further.

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