Periodontal disease and infertility

Case report. Periodontitis is not merely a dental issue, but can also have far-reaching effects on general health. In recent years, numerous studies have identified a possible link between general illnesses and oral diseases, and vice versa.[4,5,6,7] Such links have also been discussed with regard to infertility in females. This paper describes a single case study seen in the practice together with a review of the literature.

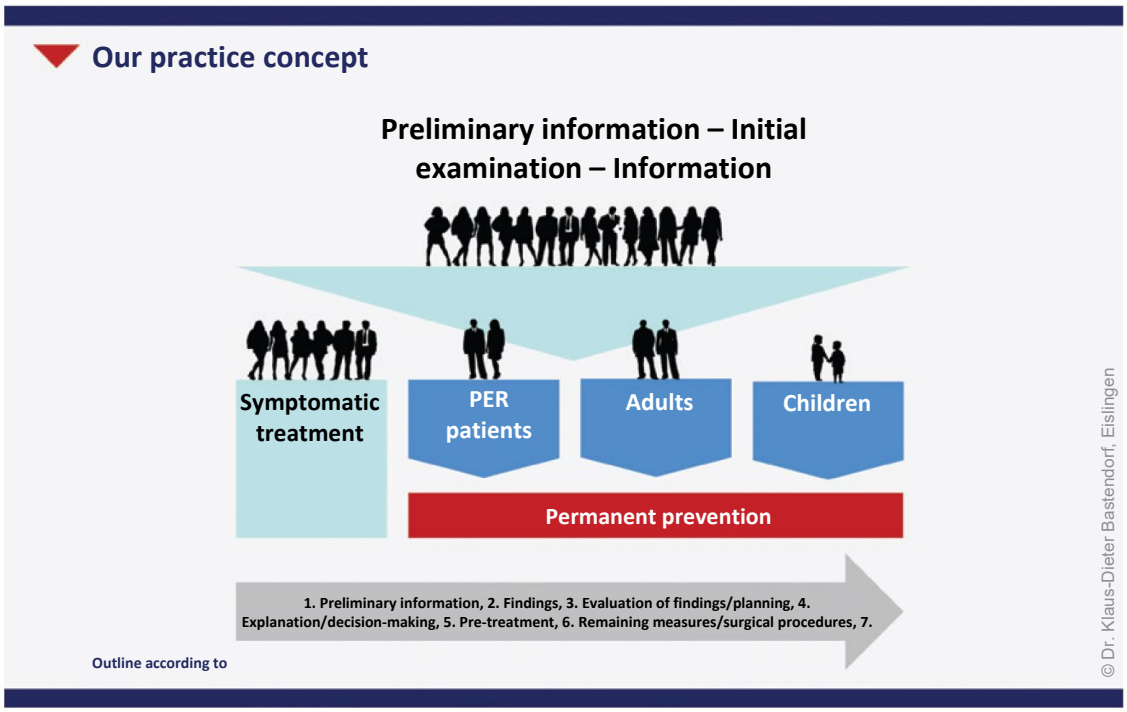
Authors: Dr. Nadine Strafela-Bastendorf, Dr. Klaus-Dieter Bastendorf, DH Julia Fähnrich

Periodontitis is an inflammatory disease of the periodontium. These days, Marsh's[1] "Ecological plaque hypothesis" is at the forefront of periodontitis etiology. An ecological shift from symbiosis to dysbiosis takes place in the vital sub- and supragingival dysbiotic biofilm, which in turn leads to a disturbance of homeostasis. Recent findings point to the influence of the host's immune system as a further driving force behind dysbiosis. The Keystone pathogen hypothesis[2] states that specific microbial pathogens cause inflammation by impairing the host's immune response. The Inflammation-Mediated-Polymicrobial-Emergence and Dysbiotic-Exacerbation ("IMPEDE model") of 2020 proposes inflammation as the factor responsible for dysbiosis leading to periodontitis, rather than the pathogenic microbes themselves.

Case protocol

On December 2, 2019, Ms. S. S., born on November 7, 1987, was admitted to our practice as an emergency. She presented with pain in the upper and lower front teeth with severe inflammation of the gingiva due to massive plaque. Pain, as well as bleeding, increased at the slightest touch. The patient was briefly explained the causes of gingivitis. Under local anesthesia, the supragingival and accessible subgingival dental calculus was removed from the anterior maxillary and mandibular dentition using ultrasound (PIEZONNOPAIN/ PS). At the patient's request, an appointment was immediately made for a thorough initial examination.

The initial examination at our practice is always guided by the motto: “Listen, familiarize, examine, plan, advise, treat, and preserve.”



1. Taking the patient's medical history and conducting a detailed initial assessment.
2. Evaluation of the medical history and the findings. Development of a treatment plan including alternative therapies
3. Detailed discussion of the causes and diagnoses (old nomenclature: chronic periodontitis; new nomenclature: periodontitis Stage II, Grade A; multiple carious defects) of the treatment options or treatment plan (composite fillings 17, 25; 27 composite fillings after endodontic treatment; extraction 28; systematic non-surgical periodontal treatment) and the professional fees.
   After explaining the causes and treatment of periodontitis and mentioning the links between periodontitis and general illnesses, the patient asked whether there was also a link between infertility and periodontitis. The patient and her husband had exhausted all conservative options for a natural pregnancy (including various hormone therapies) and had given up hope of a natural conception. The patient was informed that studies have shown that women with periodontitis could have a higher risk of infertility, as the inflammatory markers in the body can impair reproductive function. The patient was also informed that the current scientific literature on this topic is still not very conclusive.
4. The planned treatments were performed according to best practices, as were establishing oral hygiene capabilities, providing information, instruction, and motivation for homecare; caries and endodontic treatment; non-surgical periodontal anti-infective therapy.
5. The patient was enrolled in supportive periodontal therapy (SPT). All steps of periodontal therapy were performed applying the modular concept of the systematic prophylaxis protocol of Guided Biofilm Therapy (GBT).[8,9]
   In mid-December 2020, the patient proudly called the practice to announce that she had given birth to healthy twins naturally on December 6, 2020.

Periodontitis and fertility in the literature

As gratifying as the success of periodontitis treatment may be in this case, no scientific evidence can be derived from a single case. There is only little scientific literature that directly or indirectly addresses the problem and the possible links between female infertility and periodontitis.[10,11,12,13,14,15,16]

D'Aiuto F et al (2004) found that treatment of periodontitis leads to a decrease in the concentration of C-reactive proteins as well as interleukins. Consequently, periodontitis is a variable that can be influenced or changed, which can lead to an improvement in overall health.[12]

In a controlled, randomized, multicenter study, Hart R et al (2012) showed that periodontitis affects conception in women. In female test subjects with periodontal lesions, the study showed that it took longer to achieve the desired pregnancy than in women without periodontal complaints.[13]

Nwhator S et al (2014) corroborated the findings of Hart R et al in their study. However, the prevailing data are still insufficient and further studies are needed to investigate the precise mechanism by which periodontal inflammation influences conception in women. However, an association between the two areas can already be established.[14]

The results of a systematic review by Machado et al (2020) can be summarized as follows: the objective of this review was to present the available evidence on the association between periodontitis and female infertility and to discuss the steps required for future research. Hormones and inflammatory mechanisms play a role in female reproduction, including follicular maturation, ovulation, embryo nidation, and pregnancy. Periodontitis is a chronic inflammation caused by a polymicrobial disturbance of homeostasis and can be considered to be a potential risk factor for female fertility. The role of periodontitis is becoming increasingly important, as it is significantly associated with the polycystic ovary syndrome, endometriosis, and bacterial vaginosis.[10]

In their review, Ricci E et al (2022) compared results from prospective randomized studies which compared the treatment of periodontal disease versus no treatment in women who were attempting to conceive. It was intended to clarify the actual effectiveness of treatment in improving the conception rate. According to the limited published literature, oral health could influence fertility in women.[15]

Marquez-Arrico CF et al (2024) suggest a link between infertility and periodontitis in their systematic review. Further investigations are necessary to determine causal factors. A comprehensive and multidisciplinary examination of the patient could help in the treatment and therapy of idiopathic infertility.[16]

Conclusions

The importance of oral health for general health, and vice versa, is gaining increasing recognition. Links have been proven for several diseases. For example, periodontal disease is a proven risk factor for heart disease and diabetes. In recent years, periodontitis has been found to influence reproduction and possibly affect the ability to conceive. In the analysis of a limited number of studies available on the link between periodontal disease and female infertility, it was found that periodontitis can be equated with the presence of an infectious outbreak and therefore exerts its influence not only through bacterial translocation in the bloodstream, which causes the systemic spread of pathogens, but also through the production of cytokines and immunoglobulins.

In summary, women with periodontitis have a higher risk of infertility, as the inflammatory markers in the body can impair reproductive function. One of the causes of female infertility can be inflammatory reactions. Inflammation can cause hormonal imbalances that affect the menstrual cycle and ovulation. Further research is needed to clarify this causal relationship as well as the underlying mechanisms.

Review for patients

In recent years, interest in the influence of gum diseases on conception has increased. As gum disease (periodontitis) can be compared to an infectious outbreak, studies suggest that the bacteria that cause inflammation are not limited to the gum tissue, but can enter the bloodstream and proliferate, thus spreading the infection and affecting the entire body. This situation could damage the reproductive system and hinder attempts to conceive. Dentists and their prophylaxis teams can not only advise pregnant women, but also women who are planning pregnancy, on proper oral homecare and professional oral hygiene and treat them accordingly.

Outlook

Hormones and inflammatory mechanisms play a role in female reproduction, including follicular maturation, ovulation, embryo nidation, and pregnancy. Periodontitis is a chronic inflammation caused by a polymicrobial disturbance of homeostasis and can be considered to be a potential risk factor for female fertility. The role of periodontitis is becoming increasingly important, as it is significantly associated with the polycystic ovary syndrome, endometriosis, and bacterial vaginosis. In addition, periodontitis is associated with known risk factors for female infertility such as age, obesity, and chronic kidney diseases. The aim of this review paper is to summarize the available evidence on the link between periodontitis and female infertility disorders and to discuss which steps are needed in future research. Correlations between periodontitis and fertility.■

Literature

Dr. Nadine Strafela-Bastendorf
Dr. Klaus-Dieter Bastendorf
Gairenstraße 6
73054 Eislingen
info@bastendorf.de
www.strafela-bastendorf.de

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