**Connection between Oral and Sexual Health**

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**Introduction**

 The key to a fulfilling life is having a healthy mouth. The mouth is a major gateway for various infectious diseases that can weaken or even destroy the immune system. There could be about 600 different bacterial species residing in the oral cavity, with over 150 of those being harmless.1 Individuals who suffer from advanced and complex disorders such as diabetes, cardiovascular conditions, some infections like HIV/AIDS and HPV, respiratory disease, chronic kidney disease, erectile dysfunction, metabolic syndrome, rheumatoid arthritis, and certain types of cancers, often face a decline in their overall physical and mental well-being due to oral lesions. These lesions can have a significant impact on their quality of life.2. Researchers have been investigating the relationship between chronic periodontitis (CP) and erectile dysfunction (ED). They have found that periodontal diseases can contribute to endothelial dysfunction in various organs. It is important to consider periodontal diseases in the etiology of ED in young adults.3 Additionally, the periodontal pathogen (Fusobacterium) might interfere with conception in females.4 This study shows how oral and reproductive health are interconnected and suggests ways to improve oral health, which can positively impact sexual health.

**Correlation between Chronic periodontitis and erectile dysfunction**

 Erectile dysfunction (ED) is defined as a man's continuous inability to achieve and maintain an erection strong enough for satisfying sexual activity for a period of time longer than three months.5 The prevalence of ED is alarming, and the frequency of ED rises with advancing years. In the US, the prevalence is 9.1% for men 40–49 years old, rising to 15.2% for men 50–59, 29.4% for men 60–69, and 54.9% for men over 70.3.5 It has the ability to cause conflict, damage to self-esteem, and marital problems. The pathogenesis of this disease is now recognized to be multifaceted; it is estimated that additional comorbidities affect 80% of people with ED, indicating that this condition is not only related to psychological and hormonal variables.5. Studies have found that there is a link between Erectile Dysfunction (ED) and Chronic periodontitis (CP), a condition that affects the tissues that support the teeth, such as the periodontal ligament, gingiva, alveolar bone, and cementum. The research showed that the chance of ED patients having concomitant periodontitis was three times higher than those without ED.5 This association was also significant for different age groups. An increased risk of endothelial dysfunction may be associated with elevated levels of inflammatory mediators such as interleukin (IL)-6, IL-8, tumor necrosis factor-alpha (TNF-), and IL-1. Certain endothelial dysfunctions can be induced by tumor necrosis factor (TNF). Upregulation of several proinflammatory cytokines, including TNF-, IL-1, and IL-6, occurs both locally and systemically as a result of CP.5 In addition, vascular inflammation, atherosclerosis, and direct impacts on endothelial function can be caused when periodontal microbes like Porphyromonas gingivitis or their toxin reach the bloodstream.5

A statistically significant link between the presence of CP and ED (P = .0415) was found in a study conducted by Matsumoto et al. (2014), which involved 300 adult men with erectile dysfunction who underwent a comprehensive dental examination.6 Another investigation conducted by Huang et al. (2022) aimed to assess the relationship between CPD and ED further using the Community Periodontal Index of Treatment Need (CPITN) and the International Index of Erectile Function (IIEF).7 Total 202 adult men were included, with 100 subjects with ED in the case group and 102 subjects without ED undergoing routine dental examinations in the control group. The IIEF questionnaire was used to assess the severity of ED, and CPD was assessed through the Community Periodontal Index (CPI) score. Periodontal assessments and logistic regression analysis were performed for the association between CPD and ED. After adjusting for age, smoking status, tooth brushing time, education level, monthly income, tooth brushing frequency, and gum bleeding, it was found that a higher CPI score is linked to a greater risk of ED. The odds ratio for this association was 2.755 with a 95% confidence interval of [1.400, 5.423] and a p-value of .003. This indicates that the likelihood of experiencing ED increases with the severity of CPD.7

**Preventive Measures**

Men with ED could be encouraged to receive routine dental examinations and appropriate preventive dental measures to maintain oral and periodontal health. Also, individuals can potentially benefit from periodontal treatment if they receive it at the right time.

Periodontitis treatment primarily involves scaling and root planning. These procedures focus on removing bacteria from deep periodontal pockets and tooth roots while also eliminating bacterial toxins and smoothing out the root surface.8 After treatment, it's important to continue maintenance therapy to ensure long-term health. This conservative approach is easy to understand and affordable, making it an effective option for 80% of adult periodontal cases.11

**Association between oral health and Male infertility**

Male Factor Infertility (MFI) is a condition characterized by differences in morphology, concentration, and/or motility in a single sample of sperm tested between one and four weeks.9 According to reports, nearly 31 million males worldwide are unable to conceive. Infertility is defined by the International Committee for Monitoring Assisted Reproductive Technology and the World Health Organization (WHO) as a reproductive system disease when a clinical pregnancy cannot be achieved after 12 months or more of regular undisclosed sexual activity. Approximately 40–50% of infertility cases are linked to male factors, and over 48.5 million couples globally are unable to conceive.9

Research has shown that periodontal characteristics like probing depth (PD) and clinical attachment loss (CAL) have a link with sperm motility.10 A study conducted by Práger et al. involved male patients with infertility issues from the Andrology Outpatient Clinic at the University of Szeged and Pécs in Hungary. The semen analysis was done according to World Health Organization standards, and dental exams were carried out based on the same guidelines. The study found that dental conditions like cavities, missing teeth, and fillings, as well as periodontal parameters like gingival bleeding, attachment loss, and the number of calculi, could affect sperm quality and quantity. Men with pathospermic subgroups like oligozoospermia, asthenozoospermia, and cryptozoospermia were compared to those with normozoospermia (the control group) to conduct statistical analyses using SPSS for Windows.10 The study concluded that gingival bleeding could increase the likelihood of future attachment loss and serve as an independent predictor of low sperm quality and quantity in cases of unexplained male infertility. There are two reasons why individuals with oral diseases (OD) are more likely to develop MFI than those without it. Firstly, OD can cause chronic infections which may increase the bacterial load, resulting in bacteriospermia and impairment of sperm mobility. Secondly, pro-inflammatory cytokines such as TNF-alpha, which are associated with OD, could lead to chronic systemic inflammation, leading to sperm apoptosis and reducing sperm count.9

**Prevention**

It is important to remember that oral health can have an impact on overall health, particularly on men's reproductive health. This is something that both general practitioners and dentists should be aware of. Therefore, a regular oral evaluation is necessary for patients undergoing andrological examination and trying to conceive, every 3-6 months.9 If any oral diseases are detected, primary care physicians should consult dental professionals for further guidance.

**Relationship between periodontitis and premature birth and low birth weight**

There is a correlation between poor periodontal health during pregnancy and negative labor outcomes like preterm birth (PB) or low birth weight (LBW), which contribute to the six million perinatal fatalities that happen annually on a global scale, according to scientific research.11 Delivery occurring prior to 259 days of gestation is referred to as preterm birth. All neonates with a birth weight of less than 2500 g are included in the LBW definition, which does not include chronological considerations. PB is responsible for the majority of neonatal respiratory and neurological problems, as well as for 75% to 80% of perinatal death and over 25% of long-term morbidity.11According to the Offenbacher et al study, there is a strong association between periodontitis in women and a seven-fold increase in the risk of preterm birth compared to controls, indicating the significant impact of periodontitis on pregnancy outcomes.12

**Preventive Measures**

It is recommended that women begin periodontal treatment, which includes scaling and root planning, using antimicrobial agents, and undergoing periodontal surgery, if necessary, before or at the beginning stages of pregnancy. During pregnancy, the percentage index of bacterial plaque and inflammation (bleeding) should be recorded twice to ensure that the treatment is effective. Supportive periodontal therapy should also be used to maintain the treatment.

It is important for women to know that periodontal problems can have an impact on their pregnancy's outcome. Therefore, they should be informed of this during their initial treatment. Additionally, a pregnant woman's dental health can be checked by conducting a basic oral exam to identify any swelling or bleeding in the gums. This information can be included in her obstetric care record.

**Halitosis affects intimacy**

Halitosis is a condition that causes bad breath. It can be caused by either an oral or non-oral source and may be due to pathological or nonpathological factors. Halitosis is common, affecting over 50% of people in general.13 Although the condition has complex roots, the oral cavity is the source of 90% of cases of halitosis.13 This may be caused by various factors such as food impaction, periodontal disease, food coat, dirty dentures, faulty restorations, oral carcinomas, and throat infections.

Temperatures in the mouth can rise to 37 degrees Celsius (and fluctuate between 34 and 37 degrees Celsius. Additionally, during oral exhalations, humidity can fluctuate between 91% and 96% and reach up to 96% during exhalation.13 These circumstances could offer an environment that is conducive to the growth of germs. The mouth is home to more than 500 different kinds of bacteria, the majority of which are able to create halitosis-causing odorous chemicals. In many cases, the accumulation of bacteria that produce bad breath is a direct result of inadequate oral hygiene. Bacteria, particularly Gr-negative species and proteolytic obligate anaerobes are typically found in the coating of the tongue and periodontal pockets. A retrospective qualitative study was conducted by L. McKeown to review 55 client records of the breath odor. The study revealed that in 75% of the cases reviewed, clients sought treatment at the specialized breath odor clinic due to decreased self-confidence and insecurity in social and intimate relations.14

**Temporary remedies:**

Individuals who suffer from halitosis often make use of various self-care items to avoid bad breath. These items, including mints, gum, toothpaste, mouthwash, and sprays, aim to disguise bad breath by reducing bad odor and adding pleasant odors, but they cannot treat bad breath directly. Chewing gum may reduce bad breath, particularly because it increases saliva production. By preventing the volatilization of the foul odor, mouth rinses containing zinc salts and chlorine dioxide effectively mask halitosis. These methods can hide the odor of foods like onion, garlic, or cigarettes that induce bad breath.

**Treatment**

In order to treat halitosis, it is necessary to identify its cause. Consequently, identifying the cause or origin of halitosis by a thorough clinical evaluation is the most critical aspect of halitosis treatment. If bad breath is a symptom of halitosis, it is of utmost importance to prioritize the elimination of bacteria in the oral cavity. The primary stage is to implement a periodontal treatment plan. The quantity of halitosis generated by bacteria can be controlled by maintaining good periodontal health, which is especially important in cases of necrotizing ulcerative gingivitis, gingivitis, adult and advanced periodontitis, or periodontal pockets. As a first step in periodontal treatment, scaling and root planing can remove germs that cause bad breath and reduce the depth of periodontal pockets as well as the intensity of gingival inflammation. Using an antimicrobial mouthwash can help reduce the bacterial burden during periodontal therapy. Although chlorhexidine is an effective antibacterial, it can discolor teeth and mucosal surfaces if used for an extended period of time.

Another critical concern for oral-caused halitosis is the importance of good oral hygiene teaching. Using the right toothbrush, floss, and interdental brush correctly is crucial. Even in cases where periodontal health is ideal, halitosis can still be caused by tongue coating. The dorsum of the tongue can provide a suitable habitat for these microbes. Coating thickness increases in patients with geographic or fissure tongue. This is why it's crucial to clean the underside of your tongue regularly using a brush, scraper, or cleaner. It is important to assess a patient's existing and necessary restorative conditions; Bacterial reservoirs can be created by conservative restorations and inappropriate prosthetics, which can lead to food impactions, an uncleanable region, or food retention. These reservoir areas can be prevented by replacing or rebuilding previous restorations with good repair. Proper restoration is essential for treating and preventing the spread of bacteria in areas where cavities, nonvital teeth with fistulas, or exposed pulps may be present.

**Interconnection between Oral sex and Oral Health**

The state of a person's oral hygiene can directly impact their risk of infection. Cuts, bleeding gums, lip sores, and damaged skin can all increase the likelihood of infection. 15 If the mouth cavity has lesions or is poor periodontal, infections can spread into the bloodstream more quickly. Due to the potentially serious consequences that can arise from an unhealthy oral cavity, it is important to prioritize good oral hygiene practices, especially if engaging in oral sex.15

People of all gender identities and expressions are free to engage in oral sex. This dangerous misconception persists among young people, who believe that oral sex is significantly "safer" than vaginal sex. Oral intercourse does not normally lead to pregnancy, although it can result in sexually transmitted infections (STIs). There are several STIs, including HIV, Syphilis, gonorrhea, herpes, Chlamydia, and HPV, which are all easily transmitted by oral sex, and adults and teens who engage in oral sex should be aware.15 Saliva, pre-cum, semen, vaginal secretions, and menstrual blood can all enter the mouth during oral intercourse, increasing the risk of infection.

The CDC reports that among sexually active adults (18–44 years old) and adolescents (15–17 years old), 85% have had oral sex at least once, while 33% have done so.16 Additionally, between fourteen percent and fifty percent of young people engage in oral sex as a first sexual experience. However, research shows that protection is not used by more than 7–10% of young people when engaging in oral sex.16

**Preventive Measure**

When engaging in oral sex, it is best to keep all bodily fluids, including vaginal and sperm, out of the mouth as much as possible to reduce the likelihood of infections. Most doctors will tell individuals to use a condom or dental dam if they are having oral intercourse with someone whose sexually transmitted disease status is unknown.15 In response to a survey concerning what they believed may encourage adolescents to use protection more during oral sex, more than half (459/855; 53.7%) said that increased educational opportunities could encourage youths to use protection more often.16 A greater emphasis on "awareness" and "more actual sex education" were among the suggestions made in these replies, along with a shift in educational tactics toward "talking about safe sex vs saying do not have sex.16

**Conclusion**

Researchers have analyzed studies that indicate that oral diseases, particularly Periodontitis, can have a significant impact on the reproductive systems of men and women, affecting fertility and pregnancy outcomes. Therefore, health professionals such as Andrologists, Gynecologists, General Practitioners, and Midwives should consider oral health as an important factor in their investigations and include oral health screenings and dental referrals. Maintaining optimal oral health before planning a pregnancy can positively impact the health of individuals and their offspring, thus avoiding unfavorable conditions. Additionally, oral health can provide clues to systemic disorders and affect the health of our entire body. In summary, daily oral hygiene practices and proper utilization of dental services are essential components that play a crucial role in the sexual health of individuals.

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