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Is Oral Health a Risk Factor for Sexual Health?

Abstract: New evidence suggests that the extent and severity of periodontal disease may be a significant risk factor for erectile dysfunction, sperm motility and time to conception. This paper reviews the evidence and informs members of the dental team when dealing with this sensitive issue. As more research is forthcoming the topic of oral and sexual health is likely to be part of regular routine medical screening. Any issue concerning oral health as a risk factor for sexual health is likely to be a sensitive subject, rarely discussed in the dental setting. However, as new evidence emerges, this topic is likely to get into the public domain. All members of the dental team should be aware of such an association.

Clinical Relevance: Furthermore, the information in this paper may provide further incentive for certain patients to improve their oral health. *Dent Update 2015; 42: 160–165*

Over the past 25 years there has been considerable interest in the relationship between oral health, especially the extent and severity of periodontal disease, with a variety of systemic conditions and diseases. Most have focused upon whether poor oral health is a significant risk factor for atherosclerotic vascular disease and an adverse pregnancy outcome. For many of the systemic conditions cited, the underlying co-factor has been plaque-induced inflammation in the periodontal tissues and the impact of these inflammatory changes on the vasculature. It is against this background that evidence is now emerging that periodontal disease may be a risk factor for two important aspects of sexual health: erectile

dysfunction and conception. This article reviews the evidence that raises the question whether poor oral health can be a risk factor for aspects of sexual health.

Erectile dysfunction (ED)

Erectile dysfunction is defined as the inability to attain or maintain an erection sufficient for satisfactory sexual performance.¹ It has been estimated that ED affects 150 million men worldwide.² The causes of ED are multifactorial and these are listed in Table 1. Within this group of risk factors, it should be recognized that both diabetes and smoking are risk factors for periodontal disease.

ED and periodontal disease

The possible relationship between ED and periodontal disease was first recognized in 2009.³ In this study, 305 men completed a Sexual Health Inventory to assess ED and also had bitewing radiographs taken. The latter were assessed for alveolar bone loss. For those patients who exhibited alveolar

bone loss >6 mm, there was a higher incidence of ED ($P = 0.007$). The authors suggested that the association between bone loss and ED may be mediated via endothelial dysfunction.

In a further study,⁴ 70 males who had been diagnosed with ED and who had no other confounding systemic condition, underwent a periodontal examination. Whilst the results of this study did not reach levels of statistical significance, the findings did show a trend, with 80% of patients suffering from severe ED exhibiting the most significant levels of periodontal destruction.

Three further studies of different design have also been completed which have investigated the relationship between chronic periodontitis and ED. The first of these was a population-based study completed in Taiwan.⁵ This control study involved 32,856 patients suffering from ED and 162,480 control patients. In the analysis, adjustments were made for confounding variables, such as diabetes and smoking. The results showed that patients suffering from ED were more likely to

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Vasculogenic conditions	Cardiovascular disease Hypertension Diabetes
Neurogenic conditions	Multiple sclerosis Parkinson's disease Stroke
Hormonal conditions	Hypogonadism Hyperthyroidism Hypothyroidism Cushing's syndrome
Anatomical conditions	Peyronie's disease
Psychological causes	Depression Stress Anxiety
Medicinal causes	Diuretics Antihypertensives Fibrates Antipsychotics Antidepressants Corticosteroids H2-Antagonists Anticonvulsants Antihistamines Anti-Androgens Cytotoxics
Other causes	Excessive alcohol intake Tiredness Using illegal drugs
Increased risk of ED	Lack of exercise or physical activity Obesity Smoking High cholesterol

Table 1. Causes of erectile dysfunction (ED).

have been diagnosed with chronic periodontitis than the control patients (OR = 3.35, 95% CI = 3.25–3.45, p<0.001).

The second study⁶ compared the extent and severity of periodontal destruction in a cohort of patients suffering from ED with a control group. Their findings indicated that chronic periodontitis had a high association with ED, especially in men aged 30–40 years.

The final study⁷ utilized interview sheets for 300 men who had

recently received a comprehensive dental examination. The outcome showed that there was a significant correlation between chronic periodontitis scores and the presence of ED (p = 0.0415). However, the response rate for completing the questionnaires was only 30%.

To date five studies have shown a positive correlation between aspects of periodontal destruction and ED. Thus evidence is fast emerging that

the extent and severity of periodontal disease could be a real risk factor for ED.

ED and periodontal disease – causation

The three studies reported above would suggest an association between ED and the extent and severity of periodontal disease. However, in order to determine causation, it needs to be established whether any improvement in a patient's periodontal condition will improve his ED. Such an investigation has recently been undertaken.⁸ It involved 120 patients suffering from ED and diagnosed with chronic periodontitis. Half of these patients underwent a course of non-surgical periodontal therapy and the remaining 60 had no periodontal interventions, and thus served as controls. All patients were reviewed one and three months after intervention. The authors reported a significant improvement (p<0.05) in their ED when compared to the control group. The difference was most obvious at 3 months after treatment. Whilst this timeframe may be short, it does suggest a potential benefit of periodontal screening and treatment for those patients suffering from ED.

Mechanisms

The association between ED and chronic periodontitis may be mediated via endothelial dysfunction.⁹ This condition refers to various pathological conditions, including altered anti-coagulant and anti-inflammatory features of the endothelium, impaired modulation of vascular growth and dysregulation of vascular remodelling. It is widely recognized that endothelial dysfunction is an underlying pathophysiological feature of ED.^{10,11}

Chronic periodontitis has also been shown to impair endothelial function.^{12,13} Furthermore, when the underlying periodontal disease is treated there is an associated improvement in endothelial dysfunction.¹⁴

Endothelial dysfunction will be affected by many aspects of the inflammatory response that can arise from plaque-induced inflammation of the periodontal tissues. These include

an increase in reactive oxygen species, which leads to an increase in nitric oxide (NO) inactivation. This inactivation impairs the anti-oxidant system. The plaque-induced inflammation also causes an increased production of various inflammatory cytokines, such as tumour necrosis factor alpha (TNF-α) and interleukins 6, 8, 18. All these cytokines can cause an impairment of endothelial function.

Possible implications for the dental team

The sensitivity that can surround ED may make it a difficult topic to be mentioned in the dental setting. Sometimes the only indication that a patient is suffering from ED would be from his drug history, with the patient declaring that he was taking a phosphodiesterase type-5 inhibitor (eg Viagra or Cialis). If this information is forthcoming then it will provide an opportunity to discuss the relationship between ED and periodontal disease. Despite any sensitivity, the possible relationship between ED and periodontal disease will get into the public domain and relevant parties may question their dentist or hygienist about the risk. ED is a common problem, but rarely addressed as part of any medical screening in the dental setting. As further evidence emerges, this issue may well form part of any routine medical history.

Oral health and fertility

A variety of systemic and local factors can affect conception and these are listed in Table 2. However, from the oral health perspective, there is evidence that the extent and severity of periodontal disease may impact upon sperm counts and on time to conception. Both factors could, of course, be interrelated.

Periodontal disease and spermatogenesis

Conception is dependent upon sufficient sperm numbers and their motility reaching the ovum. Whilst infertility in males can be related to a variety of factors, including infection, hormonal imbalance and immunological

A. Factors affecting a woman's ability to conceive
Obesity – body fat 10–15% above normal
Underweight – body fat 10–15% below normal
Women >35 years
No previous history of pregnancy
More than 3 years trying to conceive
Incorrect timing of intercourse
Hormonal imbalance
Autoimmune disorder – lupus, diabetes, thyroid disease
Smoking
Drinking >3–4 units alcohol a day
Drinking >2 cups of coffee daily
Certain medications
Regular use of recreational drugs
Sexually transmitted diseases
Pelvic surgery
Endometriosis

B. Men's issues
Smoking
Drinking >3–4 units alcohol a day
Regular use of recreational drugs
Certain medications
Exposure to toxic substances/hazards, eg lead, mercury/X-rays
Exposing genitals to heat, eg frequent use of saunas
Having certain conditions or illnesses, eg prostatitis, genital infection, undescended testicles

Table 2. Factors affecting conception.

problems, about half the cases have no explained aetiology. A recent study from Israel¹⁵ has demonstrated that the extent and severity of periodontal disease may have an impact upon sperm motility (oligozoospermia) and sperm count (azoospermia). The findings showed that those patients who exhibited a high number of sites with deep periodontal

pockets tended to associate positively with oligozoospermia. The cause of this finding is difficult to elucidate, but may be related to the periodontopathogens found in deep periodontal pockets, infecting seminal fluid (bacteriospermia). Other suggestions include a periodontitis-induced increase in cytokine levels, especially

IL-6 and TNF- α , or a periodontitis rise in heat shock proteins. Whilst this finding is of interest, causality needs to be confirmed. It does need to be ascertained whether an improvement in the periodontal condition in infertile men leads to an improvement in sperm motility.

Periodontal disease and conception

The extent and severity of periodontal disease has now been recognized as a modifiable risk factor affecting time to conception.¹⁶ Essentially, this study showed that women with periodontal disease took on average a further 2 months to conceive when compared to those with otherwise healthy periodontal tissues. A variety of hypotheses have been suggested to account for this finding, including a periodontitis-induced increase in inflammatory cytokines and a periodontitis-induced hyper-responsive immune response. A short fall of this study is that no information is provided in terms of the pregnant mothers' partners. Given the finding that periodontitis may cause oligozoospermia, this aspect needs to be considered in the time to conception argument.

Implications for the dental team

Again, as with ED, fertility and conception are not topics readily discussed in the dental setting. However, as more evidence becomes available, and the findings get more into the public domain, then members of the dental team can expect enquiries from respective patients. It will provide yet a further avenue for emphasizing the importance of oral health, especially the relevance of periodontal screening and treatment.

Summary

The focus of this article is on whether oral health is a significant risk factor for aspects of sexual health. We have not considered the converse, of whether aspects of sexual practice can affect oral health, in particular the

risk of transmitting the human papilloma virus (HPV) through oral sex. This has been discussed recently in an Editorial¹⁷ in the *British Dental Journal* and readers are referred to this for more information.

New research has indicated that poor oral health, especially the extent and severity of periodontal disease, could have a significant impact upon aspects of sexual health. These aspects include ED, sperm motility and time to conception. Up until now, these issues would be very rarely discussed at the time of dental consultation and treatments. It would be foolhardy to ignore these topics getting into the media and all members of the dental team should be prepared to discuss them if raised by the appropriate patient. Whilst sexual health adds to the list of risk factors arising from poor oral health, it does further the argument to persuade patients of the need for regular dental check-ups, together with periodontal screening and treatment.

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