Plaque, sugar, obesity, diabetes and smoking

Reassessing risk factors for periodontal disease

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Traditionally, dentists have been taught that both dental caries and periodontal disease develop and progress as a direct result of patients’ over-frequent consumption of refined sugars and patients’ failure to remove bacterial plaque effectively. Miller’s acidogenic theory of caries development and the non-specific plaque hypothesis based on Lees’ work in the 1960s allow dentists to present a simple cause-and-effect explanation to patients.

Since then, the dental profession has blamed patients’ poor oral hygiene for periodontal breakdown and dental caries while often failing to diagnose and treat other contributing causative factors. Unfortunately, while plaque is generally a necessary ingredient of common dental diseases, the explanation contained in these theories of its pivotal role is simplistic given current knowledge. This brief article will attempt to put the more significant risk factors in context.

Plaque

Gingivitis is a naturally bodily response to bacteral accumulation and as such is non-specific. Effective plaque removal will generally reverse gingivitis. The concept of inevitable progression from gingivitis to destructive periodontitis if oral hygiene is not good is, however, flawed.

Figure 1 shows a 46-year old patient with non-existent oral hygiene over several years. Figure 2 shows the same patient one month later after around 90 minutes of scaling and polishing by a student dental hygienist. He had no active caries and no more than ten per cent bone loss.

It has become increasingly evident that while some patients are “susceptible” to periodontal breakdown, others are more “resistant”. Common among these host-based factors leading to greater breakdown are the presence of diabetes and a smoking habit.

Diabetes

Several authors have demonstrated a clear relationship between degree of hyperglycaemia and severity of periodontitis, and the risk of cardio-renal mortality (both diabetes and periodontal disease and diabetic nephropathy combined) is far higher than “how often” with regard to plaque control has around a 15 per cent risk of progressing to destructive periodontitis whereas a patient with poor plaque control is 600 times more likely to lose teeth owing to periodontal disease, whereas a patient with poor plaque control has around a 9 per cent risk of progressing to destructive periodontitis. Why then do we refer to hygiene phase therapy when smoking is a much greater risk factor than poor oral hygiene? How many dentists spend much time on smoking cessation counselling as an oral hygiene instruction?

Smoking

We have known for over 20 years that smoking increases the risk of periodontal breakdown. Odds ratios for developing periodontal disease as a result of smoking constitute a range: 2.5–3.97 for current smokers and 1.68 for former smokers,7.28 for heavy smokers.8 A smoker shows the same patient one month after scaling and polishing (he asked he could maintain the teeth in this condition).

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They don’t, however, discuss potential costs of this surgery, which can vary from £3,000 to £11,505. According to NHS England, Assuming £3,000 per procedure, this would total £120 million per year receive the treatment on average and 14,000 additional deaths. It is likely that comprehensive periodontal treatment of all obese/prediabetic patients would be significantly less costly and, hopefully, result in few if any fatalities.

Conclusion

It is clear that the simple story of plaque control preventing progression of common dental diseases is largely fiction rather than evidence-based fact. While effective oral hygiene will always be significant part of the management of dental diseases, the modern dental professional must be equally aware of the other common risk factors outlined in this article.