Evidence on the Impact of Weight Gain on the Incidence of Periodontitis

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Original study being reviewed:
Is weight gain associated with the incidence of periodontitis? A systematic review and meta-analysis. Nascimento GG, Leite FRM, Do LG. J Clin Periodontol 2015;42:495–505.

Background
The rise of overweight and obesity has been a great concern in many countries among different professionals in medical and dental fields. This article critically appraises a 2015 systematic review with meta-analysis that investigates an association between overweight or obesity and the prevalence of periodontitis.

Clinical question
Is weight gain leading to overweight or obesity associated with the incidence of periodontitis in adults?

Summary of methods
Four databases were searched for eligible studies up to and including February 2015. After the screening, quality assessment and data extraction of evidence was done in duplicate. The authors conducted meta-analysis of five cohort studies.

Critical appraisal
Based on current research standards, this was a well-conducted systematic review with meta-analysis. Assessment using the AMSTAR critical appraisal tool indicated that most of the necessary qualities of a credible review were present. However, the search strategy did not include hand-searched journals or gray literature.

Practical implications
Although the study results are statistically significant, they lack the magnitude to show a strong association between overweight or obesity and the incidence of periodontitis.

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Evidence summary

Background

The prevalence of overweight and obesity is on the rise in many countries, including the United States. There is adequate evidence that indicates the adverse effects of obesity on an individual's overall health. *Obesity* is defined as "systemic disease characterized by excessive body fat accumulation that can lead to adverse impact on health conditions"[1] and may be related to periodontitis because "periodontitis as a manifestation of systemic disease is the disease category used when systemic condition is the major predisposing factor and the bacterial infection is considered as a secondary feature of the disease."[1] This systematic review attempts to identify overweight or obesity as a risk factor for periodontal disease.

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Clinical question

Is weight gain leading to overweight or obesity associated with the incidence of periodontitis in adults?

Methods

The authors conducted the systematic review that addresses the clinical question. Four databases were searched without initial date restriction up to and including February 2015: *(1)* PubMed, *(2)* Embase, *(3)* Web of Knowledge, and *(4)* Scopus were used to identify the studies. No language restrictions were applied in any search. Inclusion criteria were the following: original observational studies that assessed the association between weight gain and incidence of periodontitis in adults aged 18 or older, including a clear description of nutritional status, such as body mass index or waist circumference, and the case definition of periodontitis. Exclusion criteria were the following: case-control cross-sectional studies, longitudinal retrospective studies, animal studies, in vitro studies, letters to the editor, and reviews. EndNote X7 software was used to manage the references. Inclusion and exclusion criteria were screened by two reviewers independently and then compared. In the case of disagreements, consensus was reached by a mutual discussion.

Results

Five cohort studies were identified for this review and meta-analysis, with a summary estimate performed on a sample size of 42,198 participants. Out of the five, the Morita et al[2] study was included twice due to the presence of stratification of gender. The Newcastle-Ottawa scale measured four out of five studies to have a high methodologic quality, while Ekuni et al[3] was scored at a moderate methodologic quality. Overall methodologic quality for applied evidence was determined to be of a moderate quality. All studies were conducted in high-income countries. Jimenez et al[4] used self-reported data for periodontal disease, whereas the others used probe depths. For nutritional status assessment, the body mass index was used in all except Jimenez et al,[4] which used self-reported measures.

Conclusion

Based on the meta-analysis, the authors concluded that "subjects who became overweight had greater risk to develop new cases of periodontitis (RR 1.13; 95% CI 1.06–1.20) as well as those who became obese (RR 1.33; 95% CI 1.21–1.47) compared with counterparts who stayed normal weight for the same period."

Critical appraisal

The AMSTAR measurement tool was used to assess the quality of this systematic review.[5]

Strengths

One of the strengths of the study is that it was developed following the PRISMA guidelines. It included an a priori protocol, and a comprehensive literature search was performed using four different databases. The review included duplicate assessments for screening, and two reviewers performed independent evaluation of bias and data extractions. Search terms used for the literature review were disclosed. The Newcastle-Ottawa scale was used to evaluate the quality of the studies meeting the inclusion criteria for the review. The meta-analysis presented a summary estimate with a good precision (width of confidence intervals) due to a large sample size of 42,198 patients.

Weaknesses

The authors excluded the case-controlled studies from the inclusion criteria without providing any specific details. All five studies included were cohort studies. A comprehensive literature search was done; however, the authors did not search the gray literature databases for studies. In addition, no hand-searching of journals was performed, and no experts were contacted regarding the review topic.

The quality of the inclusive studies was moderate, which is questionable for the observational studies. Five studies were included; however, the majority of the sample size came from one study, which positively impacted the overall precision. In addition, several studies had a wide confidence interval, causing overlap between studies. This lowered the apparent heterogeneity between the included studies, making the overall consistency of the study look good.

Practical implications

The data extracted from meta-analysis indicates that the risk of incidence of periodontitis is increased by 13% in patients who were overweight (RR 1.13; 95% CI 1.06–1.20) and by 33% in patients with obesity (RR 1.33; 95% CI 1.21–1.47). Results for observational studies like these should have a risk ratio (RR) > 3.0 to be considered clinically significant.[6] Therefore, although the study is statistically significant and the

summary estimate provides reasonable precision, it does not have the magnitude to show a strong association between overweight or obesity and the incidence of periodontitis.

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