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Salivary Biomarkers Associated with Alveolar Bone Loss

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Abstract

A longitudinal case–control study was performed to measure the association of salivary biomarkers with alveolar bone loss from a sub-sample of 1,256 post-menopausal women enrolled in the Buffalo Women's Health Initiative. From this cohort, 40 subjects with significant alveolar bone loss over a 5-year period were compared to 40 age-matched control subjects having no alveolar bone loss. Several biomarkers were quantitated in saliva collected at baseline by immunoassay. A positive association was noted between alveolar bone loss and salivary concentrations of hepatocyte growth factor, and interleukin-1 beta, while a negative association was noted for alveolar bone loss and salivary osteonectin. This study provides preliminary evidence that several salivary biomarkers measured at baseline may serve to predict future alveolar bone loss.

Keywords

saliva; cytokines; periodontitis

OBJECTIVES

The goal of this longitudinal, case–control study was to evaluate the association, if any, between alveolar bone loss and the presence of host-derived bone resorptive factors and/or markers of bone turnover in saliva collected at baseline from a cohort of women followed for 5 years.

METHODS

Subjects were selected from 1,256 postmenopausal women who enrolled in the Buffalo Women's Health Initiative "Risk Factors for Osteoporosis and Oral Bone Loss in Postmenopausal Women" study. From these, 40 subjects with the most significant alveolar bone loss over a 5-year follow-up period, as judged from intra-oral X-rays, and a control group of 40 age-matched subjects having no alveolar bone loss, were studied. Whole saliva, collected from each subject at baseline, was assessed by immunobioassay for IFN-γ , IL-1-β, TNF-α, hepatocyte growth factor, IL-6, IL-4, IL-8, osteonectin, and ICTP.

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RESULTS

Conditional logistic regression analysis compared dichotomous saliva biomarker data cut at the median to alveolar bone loss in matched cases and controls. A positive association was noted between alveolar bone loss and salivary concentrations of hepatocyte growth factor [OR = 7.27, 95% CI 2.09–25.26; $P = 0.0018$] and IL-1β 4.06 [OR = 4.06, 95% CI 1.19–13.86, $P = 0.0254$], after adjustment for age and baseline number of teeth. A negative association was noted for alveolar bone loss and salivary concentration of osteonectin [OR = 0.30 95% CI 0.11–0.83, $P = 0.0198$], adjusted for age and baseline mean alveolar crestal height.

CONCLUSIONS

This study provides preliminary evidence that the salivary biomarkers HGF, IL-1β, and osteonectin measured at baseline may serve to predict future alveolar bone loss.

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