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A systematic review and meta-analysis about the association between single nucleotide polymorphisms (SNPs) in interleukin-6 gene and periodontal disease

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Introduction: There has been much discussion recently about the influence of single nucleotide polymorphisms in interleukin-6 (IL-6) gene on periodontal disease in young healthy patients. The aim of the present work is to review the results of each case-control study which fulfills the inclusion criteria, and to perform a meta-analysis to make clear the association between SNPs in interleukin-6 gene and periodontal disease.

Materials and Methods: The search process was performed in the main databases in order to find the case-control studies published until August 2014 that matched inclusion criteria. The Cochrane Library, MEDLINE-PubMed, ISI Web of Knowledge, EMBASE, VHL (Virtual Health Library), and gray literature (SIGLE) databases were searched for articles published in English by two independent reviewers. The main meSH headings and key words used were: "periodontitis" or "periodontal disease" or "aggressive periodontitis" or "chronic periodontitis" combined with "SNP" or "interleukin-6" or "genotype" or "cytokines". Data were collected and odds ratio was calculated. Overall statistics was obtained with STATA.

Results: 15 studies met the inclusion criteria. There was a lack of data for a proper comprehensive analysis for IL-6(-373) An/Tm polymorphism and IL-6(-597) G/A polymorphism. Meta-analysis showed no association between IL-6 (174) GG polymorphism and periodontitis. Similar results were obtained between the IL-6 (-572) SNPs genotype and periodontitis in all patients. A positive association was found when homozygote genotypes were investigated in within studies analysis and in Asian population.

Discussion: Meta-analysis cannot correct all the biases of individual studies but it generates a statistical conclusion with larger power and precision. The analysis confirmed a low heterogeneity (I2) among the studies, mainly when IL-6 (-572) G/C polymorphism was investigated. Modest evidence of association has been found between interleukin-6 gene polymorphisms and periodontal disease. In particular we did not find an association between IL-6 (174) G/C polymorphism and periodontitis susceptibility even if stratification for ethnicity was included. On the other hand we found that IL-6 (-572) G/C polymorphism is associated with a modest increase in the probability of developing periodontal disease.

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