

Poster 11

Matrix metalloproteinases in focus: an exploratory epidemiological study in a Northern Portuguese population

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Abstract

Background: Matrix metalloproteinases (MMPs) are zinc-dependent enzymes that regulate extracellular matrix degradation and remodelling. Among them, MMP-8 and MMP-9 are key mediators of inflammation, tissue remodelling, and wound healing. They have been implicated in both type 1 diabetes mellitus (T1DM) and periodontal disease (PD) [1]. The literature indicates a bidirectional association between T1DM and PD: chronic hyperglycemia exacerbates periodontal inflammation, while periodontal disease can impair glycemic control [2,3]. However, the immune mechanisms underlying this association are not yet fully understood. **Objective:** To evaluate the levels of MMP-8 and MMP-9, as mediators of the inflammatory process, in a North Portuguese adult population with T1DM and varying severities of PD. The assessment is carried out in saliva, a fluid that reflects the environment of the oral cavity and the immunological status associated with both clinical conditions. **Methods:** The study included 74 individuals, comprising 44 patients with T1DM and 30 control subjects. Both groups included individuals with healthy periodontal status, gingivitis, or periodontitis. Demographic characteristics, smoking habits, oral hygiene practices and clinical parameters were recorded. Salivary levels of MMP-8 and MMP-9 were quantified using Human MMP-8 ELISA (Abcam) and Human MMP-9 Sandwich ELISA (BioLegend), respectively. Data analysis was conducted using IBM® SPSS® Statistics for Windows, version 29.0. **Results:** Association between periodontal health status and the presence of T1DM revealed significant differences ($p < 0.001$). Periodontal health was seen in 90.5% of controls, but only 9.5% of diabetics. The prevalence of gingivitis and periodontitis was higher in individuals with T1DM (75.0% and 81.8% respectively) compared to controls (25.0% and 18.2%). Stage IV periodontitis was found exclusively in the diabetic group ($p=0.046$). Periodontal indices showed significant differences between T1DM and control groups. T1DM individuals had significantly higher salivary levels of MMP-8 [63.55 ng/mL (23.05–96.80)] and MMP-9 [875.0 ng/mL (320.0–1875.5)] compared to controls ($p < 0.001$). **Conclusion:** This exploratory study shows that T1DM individuals present higher levels of MMP-8 and MMP-9 in saliva, which were also associated with more severe periodontal disease. Further studies should assess HbA1c levels and explore their correlation with MMP expression.

Keywords: periodontal disease; MMP-8; MMP-9; epidemiology

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