EXPRESSION OF CEMENTUM-SPECIFIC BIOMARKERS IN GINGIVAL CREVICULAR FLUID AT DIFFERENT HEALING INTERVALS FOLLOWING PERIODONTAL REGENERATION: A PROSPECTIVE CONTROLLED STUDY.

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Introduction: Cell signaling proteins are known to guide the formation of new periodontal tissues. Thus, detailed knowledge of their timing and quantity is a key aspect in understanding periodontal regeneration. In fact, the association between the concentration of proteins e.g., cytokines, chemokines, and angiogenic biomarkers in the gingival crevicular fluid and the ongoing angiogenesis, connective tissue and bone formation activities during the wound-healing process has been observed in several clinical trial studies. Conversely, the translation of this knowledge to the clinical practice is still ongoing. A promising approach is represented by the analysis of the cementogenesis via crevicular fluid, which evaluates the concentration of tissue-specific protein for cementum i.e., Cementum protein-1 (CEMP-1) and Cementum attachment protein (CAP). This approach is considered to potentially predict the success of periodontal regeneration and indicate the development of further regenerative approaches.

Aim: Therefore, using a clinical prospective controlled design, the aim of this study was to assess if and how the levels of CEMP-1 and CAP in the crevicular fluid were affected by regenerative periodontal surgery, during initial healing, and therefore whether these biomarkers could be of interest in routine clinical practice as indicators of therapeutic success.

Methods: Crevicular fluid sampling was performed before surgery and 2, 3, 4, 6, and 8 weeks after, from 11 intrabony periodontal defects ≥3mm (with periodontal pockets >5mm) of 8 patients, who underwent regenerative periodontal surgery. .
The surgical technique involved a minimally invasive approach with papilla preservation and use of deproteinized bovine bone and amelogenins. Each patient contributed one healthy site as control. Clinical and radiographic data were recorded before surgery and six months after. CEMP-1 and CAP levels were detected by indirect enzyme-linked immunosorbent assay technique.
The difference in the concentrations of CEMP-1 and CAMP at different time points was evaluated via repeated measure analysis of variances (ANOVA). Trend analysis was conducted to describe the nature of these potential differences. Wilcoxon tests was used to assess the difference in the concentrations of CEMP-1 and CAMP between test and control sites (Baseline/Week-8, respectively, vs Control).

Results: All patients were able to participate to each follow-up time point of the study. Similarly, we could analyze all collected samples. We observed a statistically significant difference between the concentrations of CEMP-1 at the different time points ($F[5, 50]=6.50$, $p < .001$), with trend analysis confirming a linear trend ($t = 3.964$, $p = .003$). No statistically significant difference was found between CEMP-1 concentrations in test and control sites ($p = .831$, and $p = .123$, for Baseline vs Control, and Week-8 vs Control, respectively).
Similarly, a statistically significant difference between the concentrations of CAMP at different time points was observable ($F[5, 50]=3.38$, $p = .005$), with trend analysis confirming a linear trend ($t = 5.261$, $p < .001$). Additionally, there was both statistically significant difference in the concentrations of CAP concentrations in test and control sites between BL and W8 ($p = .007$, and $p = .014$ for Baseline vs Control, and Week-8 vs Control, respectively).

Conclusions: The statistically significant difference, which was present for the concentration levels of both CEMP-1 and CAP throughout the different time points of the study, suggests that the concentrations of both these biomarkers, in sites of intrabony periodontal defects treated with regenerative periodontal surgery, might reflect the response to the treatment. Moreover, though the absence of a statistically significant difference between the concentrations of CEMP-1 between the test and control sites might hinder the potential clinical use of CEMP-1 as an indicator of therapeutic success, the statistically significant difference between the concentrations of CAP in test and control sites, together with the clinical data of improvement, supports the original hypothesis of this study, for which CAP can be a reliable indicator of therapeutic efficacy to use in routine clinical practice.