Regenerative periodontal treatment with the single flap approach: evaluation through composite outcome measures

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Aim: To propose novel composite outcome measures (COMs) to evaluate the effectiveness of periodontal regenerative treatment of intraosseous defects. A cohort of patients undergoing the Single Flap Approach (SFA) with and without regenerative devices has been considered for internal validation.
Methods: Two COMs were proposed. COM1 was based on the combination of two parameters: i) 6-month CAL gain for the clinical relevance (clinically relevant if ≥3 mm, clinically not relevant if <3 mm); ii) 6-month PD for the pocket closure (when post-surgery PD≤4mm). Treatment success was obtained when a clinically relevant result was associated with pocket closure, while treatment failure consisted of no clinical relevance in association with a residual pocket greater than 4mm. A different COM (COM2) was also proposed specifically for aesthetically sensitive areas (i.e. maxillary incisors, canines and premolars). COM2 included: i) 6-month CAL gain for the clinical relevance (clinically relevant if ≥3 mm, clinically not relevant if <3 mm); ii) 6-month REC change for the aesthetic impairment (recession not perceivable/absent: ≤ 1 mm; recession perceivable: ≥ 2 mm). According to COM2, treatment success was obtained when a clinically relevant result was associated with a not perceivable/absent recession, while treatment failure consisted of no clinical relevance in association with recession greater than 2 mm. In a cohort of patients undergoing the Single Flap Approach (SFA) for the treatment of intraosseous defects, the performance of the regenerative procedure was evaluated either conventionally (i.e., by considering average CAL change and residual PD individually) or according to the distribution based on the proposed COMs.
Results: Overall, the procedure resulted in significant 6-month CAL gain (3.7±1.9 mm; p<0.001), PD reduction (4.5±1.9 mm; p<0.001) with a residual PD of 3.7±1.1mm. When comparing the clinical performance of different treatment strategies, a significant difference was observed for CAL change between spontaneous healing (SH) (mean CAL gain: 3.0±1.7 mm) and enamel matrix derivative (EMD)+ deproteinized bovine bone mineral (DBBM) (CAL gain: 4.5±1.8 mm) (p=0.029). In contrast, a residual PD at 6-months was similar between groups. The comparison of the two treatments by using COM1 showed a more pronounced, significant difference in the proportion of successful vs failing cases (p=0.006). In particular, complete success was obtained in 77.5% vs 48% of cases in the EMD+DBBM group vs SH group, respectively. Treatment failure occurred less frequently with EMD+DBBM than SH (3% vs 8%, respectively). Also COM2 showed a difference between EMD+DBBM group and SH group in the proportion of successful vs failing cases: a complete success was obtained more frequently in the EMD+DBBM group than SH group (80.5% vs 39%), while treatment failure occurred in 6.5% and 23% of cases in the EMD+DBBM group vs SH group, respectively.
Conclusions: COMs seem to be more accurate than single conventional clinical parameters to assess the clinical performance of a periodontal regenerative procedure.

Fibrin clot adhesion to conditioned root surfaces: an in vitro study with scanning electron microscopy analysis

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Aim: Periodontal regeneration is contingent on the adhesion and maturation of fibrin clot to a root surface exposed to periodontal disease. Root surface demineralization in vitro improves the formation of a stable union between the fibrin clot and the root surface. In scientific literature there are not studies of comparison that stand which demineralizing agent is the best in promoting fibrin clot adhesion. The aim of this study was to evaluate and compare the efficacy of six root conditionings in removing the smear layer and developing the fibrin clot in static and dynamic conditions.
Methods: 36 single-root teeth extracted for periodontal disease were cut with a microtome in order to obtain 72 specimens that were divided in three groups: 24 samples not covered with blood, 24 covered with fresh human whole blood, 24 covered with blood and rinsed in a rotary shaker table (Vortex®). 4 specimens from each group were conditioned for 3 minutes with: physiological saline solution (FISIO) as the control group, saturated solution of citric acid 25% (AC), ethylenediaminetetraacetic acid 24% (EDTA), a solution of tetracycline 200mg/mL (TETRA), a solution of tetracycline and citric acid (TETRA+AC), Prefgel® and successively Emdogain® (EMD). Then the 48

samples from group 2 and 3 were covered with blood, which was allowed to coagulate for 20 minutes in a 37°C chamber. The blocks were rinsed and dehydrated under standardized conditions; specimens of group 3 were vortexed (100rpm). All the blocks were then sputtered with gold and analyzed with SEM. SEM images were evaluated by two blinded examiners, starting from the cementoenamel junction (CEJ), at 5 standardized points 2 mm distant from each other. A statistical analysis was performed.
Results: EMD samples showed a more disorganized smear layer, in which is probably present the residual vehicle (propylene glycol alginate). However, in the 90% of all the specimens smear layer was found. AC treated samples showed a firmly adherent fibrin clot that covered the surfaces for the 70% of the specimens (the data was statistically relevant). Same results were found in TETRA+AC samples. The conditioning with EDTA, TETRA and EMD resulted in a sparsely organized clot worsened by the application of tensile forces, especially in TETRA samples. Only few blood cells without any clot organization were found in the control group, confirming that conditioning root surfaces improves the fibrin clot adhesion.
Conclusion: The best formation of fibrin clot was observed for AC treated samples; this is probably due to the increase of root surface wettability caused by AC. The other root conditioning agents, even if lead to results better than the control group, are more susceptible to external forces and do not promote a stable fibrin clot adhesion.

Rheumatoid arthritis and periodontitis: epidemiological study

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Aim: To assess the prevalence and severity of periodontitis (P) among patients affected by rheumatoid arthritis (RA) and to describe their clinical and serological profile comparing them with a control population affected by RA but not suffering by P.
Methods: medical records of patients affected by RA from the outpatient rheumatology clinic of the University Hospital of Pisa were screened for inclusion and subjects were invited to participate and sign the informed consent. Exclusion criteria were (i) age younger than 18 years, (ii) pregnancy, breastfeeding or oral contraceptives, (iii) edentulism, (iv) reported diagnosis of other autoimmune pathologies or syndromes associated with RA, (v) subjects having changed their RA therapeutic regime within the 3 months before the beginning of the study and (vi) subjects necessitating antibiotic prophylaxis to undergo periodontal clinical examination and treatment. Included subjects underwent a full-mouth periodontal examination including probing depth, gingival recession, plaque index, bleeding on probing and a full rheumatologic visit. An expert rheumatologist recorded the number of tender and swollen joints, the patient's general assessment of his/her condition scored on a visual analog scale (VAS), disease activity score 28 joints (DAS28) and RA medical therapy (biological or disease-modifying anti-rheumatic drugs). All subjects filled in the short health assessment questionnaire (HAQ-DI) to measure disability. Serum analyzes investigated levels of rheumatoid factor (RF), anti-citrullinated protein antibodies (ACPAs), C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), and fibrinogen. Information concerning smoking, body mass index (BMI) were also collected.
Results: The final cohort consists of 120 patients with RA. Seventy-seven subjects (64.2% of the sample), resulted affected by periodontitis (RA-P group), while the remaining 35.8% only had RA (RA group). Both groups are comparable for age, gender distribution and BMI and smoking status. The number of teeth present was statistically lower in the RA-P compared to the RA group ($p < 0.05$). DAS28 mean value (± standard deviation, SD) in the RA-P group was 3.17 (± 1.23), while the respective value in the RA group was 2.81 (± 1.03); these differences were not statistically significant ($p < 0.05$). With regards to RA serological profile, there were statistically more seropositive subjects for ACPAs in the RA-P group (62.3% versus 32.6%, $p < 0.05$) whereas no statistical differences were observed when comparing the seropositivity for RF of the two groups. Furthermore, the concentrations of serum inflammatory biomarkers (CRP, ESR and fibrinogen) in the two groups were comparable. Finally, patients with P and RA had an unadjusted OR = 2.7 (95 %, confidence interval [CI] 1.19 - 6.11) of presenting a moderate-severe DAS28 score (DAS28 ≥ 3.2); after adjusting for RA medication, RF, ACPAs, smoking status and gender the OR is 2.9 (95%, CI 1.16 - 8.23).
Conclusion: The overall prevalence of periodontitis in RA subjects was not significantly different in comparison with the values observed in important epidemiological surveys. Among RA subjects, a considerably higher prevalence of severe P has been observed. Furthermore, the clinical severity of RA appears to be strongly correlated with the clinical periodontal parameters and RA subjects also affected by P seem to have an OR of 2.9 for presenting with a