

### Dynamics of soft tissue healing around implants and teeth after flap surgery. A study in a dog model

Sukekava F, Lima LAPA, Araujo MG, Liljenberg B, Lindhe J.  
*Dynamics of soft tissue healing around implants and teeth after flap surgery. A study in a dog model*

**Aim:** The aim of this study was to describe and to compare some characteristics of the soft tissue healing process around teeth and implants after flap surgery. **Material and Methods:** Five beagle dogs had their mandible third and fourth premolars extracted in both quadrants. After three months, two titanium fixtures (Osseospeed™) were installed and abutments were connected at each side of the mandible. After 3 months, four regions characterized by one implant and the adjacent tooth were identified in each dog. One region was randomly selected and soft tissue resective flap surgery was performed at its buccal aspect. The lingual soft tissues were not elevated and were regarded as control sites. The remaining three regions were randomly treated in an identical manner and the dogs were sacrificed to provide biopsies representing healing intervals of 1, 2, 4 and 12 weeks. The biopsies were prepared for histological and morphological analyses. Mean values and standard deviation was calculated using the dog as a statistical unit. Student's t test was used ( $p < 0.05$ ) **Results:** Morphometric and histometric analyses have shown that the hard and soft tissues surrounding teeth were completely healed in 4-week interval.

However, it took from 4 to 12 weeks for the peri-implant mucosa to heal completely. **Conclusion:** The healing process around teeth and implants follows a similar sequence of events. Nevertheless, the complete process of healing and maturation of the peri-implant tissues takes longer than around teeth.

### Tooth Loss in quitters and continuing smokers

Gomes EF, Corraini P, Pannuti CM, Romito GA, Rosa EF, De Micheli G, Inoue G, Guglielmetti MR, Sanda SR.  
*Tooth loss in quitters and continuing smokers*

**Aim:** The aim of this study was to evaluate tooth loss in quitters and continuing smokers with chronic periodontal disease who attended a smoking cessation clinic. **Material and Methods:** Subjects willing to quit smoking enrolled in the service offered at the Smoking Cessation Clinic at the University Hospital in São Paulo, Brazil. They received non-surgical periodontal treatment and concomitant smoking cessation therapy. Periodontal maintenance was performed every 3 months until 12 months of maintenance. A single, calibrated blinded examiner to smoking status conducted full mouth periodontal examination at the baseline, after 3, 6 and 12 months after periodontal treatment. The same examiner verified tooth loss during maintenance program. Within the 12 months the necessity of tooth extraction was discussed by at least three periodontists after clinical and radiographic analysis. **Results:** Of 201 enrolled

patients, 93 met the eligibility criteria and 52 remained in the study for one year. Of these, 17 quit smoking and 35 continued to smoke or oscillated. After one year, the mean tooth loss was of 0.12 (+0.6) in quitters and 0.51 (+1.0) in continuing smokers ( $p = 0.16$ ). Six quitters lost their teeth (33.3%), while 7 (70%) smokers lost their teeth ( $p = 0.39$ ). Quitters lost 18 teeth and continuing smokers lost 10 teeth. **Conclusion:** There was no significant difference in tooth loss between subjects who quit smoking compared to those who continued to smoke.

### The effectiveness of semilunar technique for the treatment of gingival recessions

*Dias AT, Kahn S, Imperial R, Menezes CCD, Santana RBD.*

*The effectiveness of semilunar technique for the treatment of gingival recessions*

Gingival recession and dental hypersensitivity are constant and daily complaints. More than 90% of the population between the ages of 20 and 40 have at least one root exposure. With this in mind, the object of the present study was to compare the results of root coverage in localized bilateral gingival recession, Miller class I, with semilunar flap technique (Tarnow, 1086) using microsurgery (test side) and macro surgery (control side). Fourteen patients, who were being treated at the Veiga de Almeida University Health Center, between the ages of 25 and 41, non-smokers, without systemic diseases, without any history of periodontal disease and who weren't using any medicines that would compromise their periodontal health or healing, were included in this study. Upper canine and premolars with localized gingival recession up to 3 mm were treated. The study followed the split mouth design and choosing the test side or control side was done randomly. All the surgical procedures were done by the same operator to assure optimum standardization levels. The patients were followed up on for six months, where the percentage of

root coverage was compared between the test side and the control side of each patient, along with assessing the degree of esthetic satisfaction and post operative discomfort. The mean age was 31.36 (45.08) and 57.14% were female. Six canine, 14 first-premolars and eight second premolars were treated. The average root coverage of the control side (macrosurgery) was 42.40% (416.98). The total coverage was reached in 4 of the 28 procedures (14.28%), two on the test side and two on the control side. Regarding the esthetic evaluation, four surgeries reached the maximum permitted degree (10) and the mean was 6.73%. In one site only was there registered average (5) post operative pain and in 19 (67.86%) sites there was no pain.

### Protease-activated receptor-1 expression is increased in chronic periodontitis patients after non-surgical periodontal treatment

*Alves VTE, Eichler R, Silva HAB, Brito CAT, Viera PVA, Carvalho MHC, Holzhausen M. Gingipain from Porphyromonas gingivalis is associated to Protease-activated receptor-2 expression in chronic periodontitis patients*

**Objective:** Protease activated receptor 1 (PAR-1) seems to play a role in vascular matrix deposition after injury, bone repair and homeostasis of periodontal tissues, as well as proliferation of gingival fibroblasts. The objectives of this study were to investigate the PAR-1 mRNA expression in human chronic periodontitis and to evaluate whether periodontal treatment affects its expression. Material and **Methods:** Gingival crevicular fluid (GCF) samples and clinical parameters consisting of measuring probing depths (PD), clinical attachment loss (CAL), bleeding on probing (BOP), and gingival (GI) and plaque index (PI) were collected from periodontally healthy (control) and moderate chronic periodontitis patients before and 45 days after periodontal non-surgical treatment. PAR-1 mRNA at the GCF was evalu-

ated by real time-PCR (qPCR). **Results:** Clinical parameters (PD, CAL, BOP, GI, and PI) were significantly improved after periodontal therapy ( $p < 0.01$ ). The q-PCR analysis showed that before periodontal therapy, PAR-1 mRNA levels in chronic periodontitis were not statistically ( $p < 0.05$ ) different from controls. Periodontal treatment led to a substantially increase of PAR-1 expression in chronic periodontitis ( $p < 0.05$ ). **Conclusion:** PAR-1 mRNA levels in chronic periodontitis are not different from control patients. Non-surgical periodontal treatment resulted in increased expression of PAR-1 in chronic periodontitis patients, therefore suggesting its role in periodontal tissue repair.

### The effect of non-surgical periodontal treatment on C-Reactive Protein (CRP) levels in patients with chronic periodontitis: a controlled clinical trial

*De Souza AB, Okawa RTP, Silva CO, Sukekava F, Araujo MG. The effect of non-surgical periodontal treatment on C-Reactive Protein (CRP) levels in patients with chronic periodontitis: a controlled clinical trial*

**Aim:** The aim of the present study was to evaluate serum C-reactive protein (CRP) levels in chronic periodontitis patients and periodontally healthy individuals and to assess the effect of non-surgical periodontal treatment on the CRP levels. **Material and Methods:** Twenty two patients with chronic periodontitis (Test Group) and 22 periodontally healthy individuals without any systemic disorder (Control Group) were included in the study. At baseline, periodontal clinical variables and CRP levels were obtained in both groups. In the Test Group, oral hygiene instruction and scaling and root planning were carried out and after 60 days periodontal clinical variables and CRP levels were re-evaluated. **Results:** The baseline CRP level in the Test Group was significantly

higher than the corresponding values in the Control Group ( $1.97 \pm 1.55$  mg/L vs.  $1.26 \pm 1.05$  mg/L;  $p < 0.05$ ). After periodontal treatment in the Test Group, there were improvements in all periodontal clinical variables ( $p < 0.05$ ). In addition, the CRP level decreased significantly only in those patients with higher baseline levels of CRP ( $> 3$  mg/L). **Conclusion:** Chronic periodontitis seemed to promote elevated levels of CRP. Furthermore, non-surgical periodontal treatment significantly decreased the levels of CRP in patients with high baseline levels of such pro-inflammatory cytokine.

### Microbiological diversity of localized aggressive periodontitis by 16S rRNA clonal analysis

*Faveri M, Ribas TRC, Silva ESC, Figueiredo LC, Feres M, Mayer MPA. Microbiological diversity of localized aggressive periodontitis by 16S rRNA clonal analysis*

**Aim:** The purpose of this study was to determine the bacterial diversity in the subgingival plaque of subjects with localized aggressive periodontitis (LAgP) by using capillary-based Sanger sequencing on 16S rRNA gene.

**Material and Methods:** Thirty subjects were assigned into two groups: LAgP ( $n = 15$ ), consisting of subjects with LAgP; and PH ( $n = 15$ ), consisting of subjects with periodontal healthy (PH). Two subgingival samples were taken in the LAgP group [probing depth (PD)  $> 5$ mm and PD  $< 3$ mm] and one in the PH group. DNA was extracted and 16SrRNA bacterial genomic libraries were constructed and sequenced. Bacterial diversity was estimated and a phylogenetic tree was built. **Results:** A total of 2.041 clones were analyzed (mean,  $45.4 \pm 4.5$  clones per sample) and 164 phlotypes were identified. Of these, 42% were represented by not-yet cultivated phlotypes. Associations with LAgP were observed for several uncommon species or phlotypes, such as *Selenomonas*

sputigena, Filifactor alocis, Pseudoramibacter alactolyticus, Dialister pneumosintes, Dialister invisus, Synergistes sp BH007/OT359, Prevotella sp. AH125/OT292, Desulfobulbus sp. R004/OT041 and Selenomonas sp. DS051/OT137. Species or phylotypes more prevalent in periodontal health included species of Streptococcus, Actinomyces sp. BL008/OT171 and Actinomyces sp. IP073/OT448. Species or phylotypes from the genus Parvimonas, Pseudoramibacter, Synergistes, Dialister and Filifactor was found in higher prevalence in shallow sites from LAgP subjects when compared with PH. **Conclusion:** Species or phylotypes not previously associated with LAgP may be involved with the disease. In addition, there are differences between the microbial diversity present at shallow sites of subjects with PAgL and PH.

### **Comparison of subgingival microbial profiles of chronic periodontitis and periodontal health using the RNA-oligonucleotide quantification technique**

*Mestnik MJ, Oliveira ACG, Feres M, Teles F, Mayer MPA, Faveri M. Comparison of subgingival microbial profiles of chronic periodontitis and periodontal health using the RNA-oligonucleotide quantification technique.*

**Aim:** To assess the prevalence, levels and proportions of uncultivated/unrecognized bacterial taxa, as well as “unusual” bacterial species in chronic periodontitis patients (ChP) and periodontally healthy individuals (PH) using RNA-oligonucleotide quantification technique (ROQT).

**Material and Methods:** ChP patients (n=19) and PH subjects (n=15) were selected and their clinical periodontal parameters were evaluated. Subgingival plaque samples were collected and analyzed for the prevalence, levels and proportions of 39 bacterial taxa, including cultivated and uncultivated/unrecognized microorganisms using ROQT. **Results:** ChP subjects showed significantly higher

mean counts, prevalence and proportion of Tannerella forsythia, Treponema denticola, Porphyromonas gingivalis, Selenomonas sputigena, Filifactor alocis, Prevotella sp. oral clone AH125 (Oral Taxon 292), TM7 sp. oral clone AH040 (OT 346), Tannerella sp. oral clone BU063 (OT 286), Peptostreptococcus sp. oral clone DA014 (OT 113) e Selenomonas sp. oral clone EW084 (OT 146), while Actinomyces gerencseriae, Veillonella parvula, Atopobium rimae, Rothia dentocariosa/mucilagionsa and Actinomyces naeslundii were found in higher mean counts and proportion in PH ( $p < 0.01$ ). Regarding “unusual” bacterial species, *S. sputigena* and *F. alocis* were positively correlated ( $r > 0.5$ ;  $p < 0.05$ ) and they both were correlated with PD increase ( $p < 0.05$ ). Peptostreptococcus sp. OT 113 was the only uncultivated bacterial taxon that showed a positive correlation with PD increase ( $r > 0.5$ ,  $p < 0.05$ ). Uncultivated/unrecognized taxa accounted for 42.8% and 44.1% of the subgingival microbiota in ChP and PH subjects, respectively. **Conclusion:** The microbial profiles of uncultivated/unrecognized bacterial species and “unusual” bacterial species in subjects with ChP differs markedly from that observed in subjects with PH.

### **Levels of Selenomonas sputigena and not-yet-cultivated Selenomonas phylotypes in subgingival biofilms of generalized aggressive periodontitis**

*Fermiano D, Gonçalves LFH, Feres M, Figueiredo LC, Teles F, Faveri M. Levels of Selenomonas sputigena and not-yet-cultivated Selenomonas phylotypes in subgingival biofilms of generalized aggressive periodontitis*

**Aim:** To compare the levels of Selenomonas sputigena and uncultivated/unrecognized Selenomonas species in subgingival biofilms from generalized aggressive periodontitis subjects (GAgP) and periodontally healthy individuals (PH). **Material and Methods:** GAgP (n=15) and PH (n=15)

subjects were recruited and their clinical periodontal parameters were evaluated. Subgingival plaque samples were collected (9 samples/subject) and analyzed for the levels of 10 bacterial taxa, including cultivated and uncultivated/unrecognized microorganisms using the RNA-oligonucleotide quantification technique (ROQT). Differences in the levels of the test taxa between groups were sought using the Mann-Whitney test. **Results:** GAgP subjects showed significantly higher mean counts of *Porphyromonas gingivalis*, *Selenomonas sputigena* and *Selenomonas* oral clone CS002 (*Mitsuokella* sp. Oral Taxon 131), while *Actinomyces gerencseriae* and *Streptococcus sanguinis* were found in higher mean counts in PH subjects ( $p < 0.01$ ). *Selenomonas* sp. oral clone EW084 (*Selenomonas* sp. OT 146) was only detected in the GAgP group. In the GAgP group, levels of *P. gingivalis* and *S. sputigena* were higher in sites with probing depth (PD)  $> 5$ mm than in shallow sites (PD  $< 3$ mm) ( $p < 0.01$ ). Furthermore, sites with PD  $< 3$ mm in GAgP subjects harbored higher levels of these two species than sites in PH subjects. There were positive correlations between PD and levels of *P. gingivalis* ( $r = 0.77$ ;  $p < 0.01$ ), *S. sputigena* ( $r = 0.60$ ;  $p < 0.01$ ) and *Selenomonas diana*e (oral clone EW076) ( $r = 0.42$ ,  $p < 0.05$ ). **Conclusion:** *S. sputigena*, *Selenomonas* sp. oral CS002 (OT 131) and *Selenomonas* sp. oral clone EW084 (OT 146) may be associated with the pathogenesis of GAgP, and their role in the onset and progression of this infection should be further investigated.

### Impact of different dosages and duration of systemic antibiotic therapy in the treatment of generalized chronic periodontitis: a double-blinded, placebo-controlled, RCT- preliminary results

*Borges J, Faveri M, Figueiredo LC, Duarte PM, Feres M. Impact of different dosages and duration of systemic antibiotic therapy in the treatment of generalized chronic periodontitis: a double-blinded, placebo-controlled, RCT- preliminary results.*

**Aim:** Although metronidazole (MTZ) + amoxicillin (AMX) has been constantly used as an adjunct to the periodontal treatment, the optimal dosage and duration of this antibiotic protocol is still unclear. Therefore, the aim of this study was to compare the clinical outcomes of different doses of MTZ as well as of the duration of the systemic administration of MTZ+AMX in the treatment of generalized chronic periodontitis (ChP). **Material and Methods:** Sixty subjects were randomly assigned to receive scaling and root planning (SRP)-only (control group) or combined with 250 mg or 400 mg of MTZ, plus AMX (500 mg), for either 7 or 14 days (four test groups). Subjects were clinically monitored at baseline and at 3 months post-therapy. **Results:** The four antibiotic groups exhibited overall better clinical results in comparison with the control group. However, subjects receiving MTZ (250mg or 400 mg) + AMX during 14 days presented the deepest reduction in the full-mouth mean probing depth (PD) and gain in clinical attachment (CA) in comparison with those treated with SRP-only ( $p < 0.05$ ). These two test groups also exhibited a greater mean gain in CA in initially deep sites and a lower percentage of sites with PD  $> 5$  mm at 3 months post-treatment, in comparison with the control group ( $p < 0.05$ ). **Conclusion:** The adjunctive use of MTZ+AMX during 14 days, independently of the MTZ dosage used, offers short-term clinical benefits, over SRP alone, in the treatment of subjects with generalized ChP. The added benefits of the 7-days antibiotic regimen were less evident.

**MTZ alone or with AMX in the treatment of chronic periodontitis: a 1-year double-blinded, placebo-controlled, RCT. Part I: Clinical results**

*Feres M, Soares GM, Mendes JA, Faveri M, Socransky SS, Teles R, Figueiredo LC. MTZ alone or with AMX in the treatment of chronic periodontitis: a 1-year double-blinded, placebo-controlled, RCT. Part I: Clinical results*

**Aim:** Previous studies have suggested that the adjunctive use of metronidazole (MTZ) or MTZ+amoxicillin (AMX) is beneficial in the periodontal treatment. However, data from double-blinded placebo-controlled RCTs beyond 6 months for the MTZ+AMX therapy or for comparisons between these two antibiotic protocols are still lacking. Therefore, the aim of this study was to evaluate the effects of the adjunctive use of MTZ or MTZ+AMX in the treatment of generalized chronic periodontitis (ChP).

**Material and Methods:** 118 subjects were randomly assigned to receive scaling and root planing (SRP)-only or combined with MTZ (400 mg/TID) or MTZ+AMX (500

mg/TID) for 14 days. Subjects were clinically monitored at baseline, 3, 6 and 12 months post-therapy. **Results:** The two antibiotic groups showed lower mean number of sites with probing depth (PD)>5 mm (SRP+MTZ+AMX=4.7, SRP+MTZ=6.3, SRP=16,  $p<0.05$ ), and fewer subjects exhibiting nine or more of these residual sites (SRP+MTZ+AMX=9, SRP+MTZ=11, SRP=25,  $p<0.05$ ) at 1 year post-treatment. Logistic regression analysis showed that MTZ and MTZ+AMX were the only significant predictors of subjects presenting M 4 sites with PD $\geq$ 5 mm at 1 year (MTZ+AMX: OR, 13.33; 95% CI, 3.75-47.39;  $P=0.0000$ ; MTZ: OR, 7.26; 95% CI, 2.26-23.30;  $P=0.0004$ ). The frequency of adverse events did not differ between the two antibiotic treatments ( $p>0.05$ ). **Conclusion:** The adjunctive use of MTZ or MTZ+AMX significantly improved the outcome of mechanical treatment of generalized ChP. MTZ+AMX should be considered the first-line treatment because it increased the odds of a subject converting to "low risk" of disease progression, with similar tolerability to the MTZ therapy.