

Heitz-Mayfield L, Tonetti MS, Cortellini P, Lang NP on behalf of European Research Group on Periodontology (ERGOPERIO). Microbial colonization patterns predict the outcomes of surgical treatment of intrabony defects. J Clin Periodontol. 45 (Refs)

Purpose: To explore the impact of the microbial colonization patterns in the sub-gingival plaque on the clinical outcomes 1 year after treatment of intra-bony defects.

Materials and Methods: This parallel group, randomized, multi-centre and controlled clinical trial was designed to compare the efficacy of two treatment modalities in intrabony periodontal defects. Patients younger than 21 years, with uncontrolled or poorly controlled diabetes, unstable or life threatening conditions, requiring antibiotic prophylaxis or heavy smokers (>20 cigarettes/day) were excluded. Only patients with severe periodontitis, with full mouth plaque scores (FMPS) and/or full mouth bleeding scores (FMBS) <25% were included. All subjects received initial periodontal therapy. For the surgical phase, the test treatment consisted of access of the defect with papilla preservation flaps, surgical debridement and application of Bio-oss and Bio-guide. In control group the application materials were omitted. A single defect was treated in each patient and clinical outcomes were evaluated at 1 year. At baseline, sub-gingival microbial samples were obtained from the deepest site in each quadrant, and in addition from the single intra-bony defect site to be surgically treated, resulting in a total of five plaque samples per patient. These samples were analyzed using DNA-DNA hybridization techniques for the presence and levels of 40 sub-gingival species.

Findings: A total of 122 subjects were treated. No significant differences between test and control patients were observed for any of the subject or defect characteristics. No significant differences were observed between the microbiota of the intrabony defects and the microbiota of the mouth as assessed by the analysis of the four deepest sites per quadrant. The prevalence of periodontal pathogens at intrabony defect sites was high; 68% P. g, 45% T. denticola, 49% T. socranskii, 71% P. intermedia, 88% F. nucleatum and 93% A.A. While heavy smokers were excluded from this study subjects who smoked had greater proportions of “orange complex” (32.4% versus 23.9% in non-smokers). In the control group, CAL changes between baseline and 1 year were 2.5 mm. This was significantly less than the CAL gain in the test group of 3.3 mm. Total bacterial counts had a significant negative impact on CAL gains. Introduction of total bacterial counts decreased the significance of clinical inflammatory parameters such as FMBS. Red complex counts but not proportions had a significant negative impact on 1 year CAL gains. Total counts, red complex counts and T. forsythensis counts had a significant but small negative effect on the probability to gain more than 3 mm of CAL. Counts of P. g, T. denticola and other complexes, as well as proportion of complexes or specific pathogens did not have a significant effect.

Conclusions: The results of this study support the notion that the presence of high bacterial counts and the persistence of specific bacterial pathogens in the pocket before surgical treatment are negatively associated with the outcome of treatment.

Hermann I, Lekholm U, Holm s, Kultje C. Evaluation of patient and implant characteristics as potential prognostic factors for oral implant failures. Int J Oral Maxillofac Implants 2005;20:220-30.

Purpose: to evaluate patient-related factors and implant characteristics individually, (2) to evaluate combination of patient-related and implant characteristics with regard to their influence on dental implant success rate, also to identify possible prognostic factors for implant survival and failure.

Materials and Methods: 4 multi-center studies reporting on Branemark implant system (3.75mm) with a uniform placement protocol were utilized in this study. These included 4 prosthetic treatment protocols: a) single tooth loss, partial edentulism, edentulous with overdentures, and edentulous with fixed prostheses. Patient population consisted of 487 (45% men, 55% women) average age 51.3 years, total of 1738 placed implants with 531 restorations, evaluated after 5 years in clinical function (from time of loading). Out of these, 1 randomized implant per patient was selected to create a pool of 487 placed implants.

Parameters evaluated were gender, age, jaw treated (maxilla or mandible), responsible clinic, jawbone quality (Lekholm and Zarb type 1-4), jaw shape (Lekholm and Zarb shape A-E), implant length (short 7-10mm, long >13mm). Combined parameters were combinations of bone quality and jaw shapes(A-B-C/1-2-3, A-B-C/4, D-E/1-2-3D-E/4), implant length within the combinations above as each of 4 combinations has two subgroups “short” vs. “long” implants, and number of implants supporting the restorations.

Findings: implant cumulative success rate after 5 years was 92.4%. No significant differences regarding implant failures were these parameters: responsible clinic, number of implant supporting prostheses, gender, and age. Parameters that had significant differences were jaw bone quality, jaw shape, implant length, treatment protocol, and bone related combinations and jaw treated.

Conclusions: according to the authors it appeared that patient related factors had the greatest impact on implant failures. Patient selection seems to be utmost important for increasing implant success.

Summary of prognostic factors for possible implant failures		
Prognostic factors	Positive influence	Negative influence
Jaw	mandible	Maxilla
Jawbone quality	1-3	4
Jaw shape	A, B, and C	D and E
Bone combination	I, II, and III	IV
Implant length	>13mm	7 and 10mm

Parameter evaluated		
Strong significant Diff.	Significant Diff.	No significant difference
Jaw bone quality	Maxilla vs. mandible	Gender
Jaw shape	Prosthetic tx protocols	Age
Implant length		Responsible clinics
Bone quality +shape		# implants supporting restoration

Jaramillo A, Arce RM, Herrera D, Betancourth M, Botero JE, Contreras A. Clinical and microbiological characterization of periodontal abscesses. J Clin Periodontol 2005; 32:1213-8. (36 Refs)

Purpose: To describe the clinical and microbiological characteristics of periodontal abscesses.

Materials and Methods: A total of 54 patients from a Colombian dental school who presented with one or more periodontal abscesses were selected for the study. For the purposes of this investigation, a periodontal abscess was defined as an acute localized infection adjacent to a periodontal pocket. Exclusion criteria of this study included the following: 1) negative pulp testing of a tooth involving a periodontal abscess; 2) consumption of antibiotics in the past 3 months; and 3) non-controlled systemic diseases. The following periodontal measurements were taken during the study: BOP, pain, erythema, tumefaction, and suppuration were recorded as positive or negative. Probing depths, tooth mobility and radiographic bone loss were also recorded. Subgingival microbial samples were obtained from the periodontal pocket associated with the abscess using 3 sterile paper points which were inserted into the pockets. The samples were then analyzed using the microbial culture techniques according to Slots (1986). Selected colonies of *P. gingivalis*, *A. actinomycetemcomitans*, and *P. intermedia/nigrescens* from pure cultures were utilized to test their susceptibility to amoxicillin, tetracycline, azithromycin, and metronidazole. Descriptive statistics were then performed for the clinical and microbiological parameters using GraphPad Prism statistical software.

Findings: Of the 54 patients utilized in this study, 47 patients (87%) had been diagnosed with chronic periodontitis, 5 patients (9.3%) had been diagnosed with aggressive periodontitis, 2 patients (3.7%) had been diagnosed with periodontal health; 2 patients (3.5%) had diabetes and 6 patients (11.1%) were smokers. Bleeding on probing was detected in all lesions. Erythema, tumefaction and suppuration were present in 93.3%, 95% and 93.3% of the cases, respectively. An increased probing pocket depth (9.3 ± 2.5 mm) was the most frequent characteristic followed by radiographic bone loss and increased tooth mobility. Pain was reported by 41 patients (68.3%) and dental extrusion was reported in 23.3% of the cases. Fifty-two or 81.6% of the patients had a history of past periodontitis. Four patients (6.6%) had abscess formation which resulted from periodontal treatment. Mandibular anterior teeth were found to be most affected (41.6%) by periodontal abscess formation, followed by maxillary anterior teeth (20%) and mandibular molars (18.4%). The composition of subgingival microbiota in the periodontal abscesses consisted of the following bacteria: *Fusobacterium* spp. had a frequency detection of 75%, *P. gingivalis* had a frequency detection of 51.7%, and *T. forsythia* had a frequency detection of 15%. Black-pigmented microorganisms such as *P. intermedia/nigrescens* were also detected with a frequency of 60%. The recovery of *A. actinomycetemcomitans* (frequency detection of 30%) was lower than *P. gingivalis*. Superinfecting bacteria (Gram-negative enteric rods) were the also a prevalent group with a frequency detection of 21.7%. For the susceptibility to antimicrobials, immediate resistance to tetracycline was found in 2 of the 14 isolates of *P. intermedia/nigrescens*. Three of the 4 isolates of *A. actinomycetemcomitans* and 1 of the 11 isolates of *P. gingivalis* were resistant to metronidazole. One isolate of *A. actinomycetemcomitans* and 2 of *P. intermedia/nigrescens* were found to be resistant to amoxicillin. None of the bacteria tested were resistant to azithromycin.

Conclusions: Most periodontal abscesses were found to be related to a previous history of periodontal disease. The most common group of teeth affected by periodontal abscesses in the study population was the mandibular incisors. The microbiota of periodontal abscesses in this study most frequently consisted of *Fusobacterium* spp., *P. intermedia/nigrescens*, and *P. gingivalis*. *A. actinomycetemcomitans* had demonstrated a frequency of detection in 30% of the cases. The presence of enteric and non-fermenter Gram-Negative rods in periodontal abscesses had not been previous reported in any other studies. The authors speculated that these

microorganisms could have a potential role in the rapid tissue destruction found in periodontal abscesses. The authors also suggested that treatment of periodontal abscess should include debridement to control the infection and reduce inflammation, as well as the judicious use of antibiotics to avoid microbial resistance.

Ren L, Leung K, Darveau RP, Jin L. The expression profile of lipopolysaccharide-binding protein, membrane bound CD 14, and Toll-like receptors 2 and 4 in chronic periodontitis. J Periodontol 2005; 76: 1950-9.

Purpose: To investigate the simultaneous expression profiles of LBP, mCD14 and TLR 2 and 4 in periodontal pocket tissues and healthy gingival tissues in an attempt to explore the potential role of these pattern recognition receptors in the pathogenesis of periodontal diseases.

Materials and Methods: 43 Chinese adults with a mean age of 47.9 years with untreated advanced chronic periodontitis with a PD of ≥ 5 mm, LOA ≥ 3 mm and radiographic evidence of bone loss on at least two teeth per quadrant were selected. After a baseline examination and a course of non-surgical periodontal therapy they were followed for at least 6 months for treatment response with routine prophylaxis at 3 month intervals. At subsequent examinations, all subjects required periodontal surgery. Gingival biopsies were collected during periodontal surgery. When possible, two biopsies were obtained from each patient: 1) periodontal pocket tissues (PoTs) from unresolved periodontitis sites and 2) clinically healthy tissues (HT-Ps). 15 systematically and periodontally healthy subjects with a mean age of 23.4 years who required tooth extraction for orthodontic purposes were selected as control subjects. Gingival biopsies (HT-Cs) were obtained during tooth extraction. Biopsies were sectioned and prepared for immunohistochemical analysis. The expression levels of LBP and mCD14 peptide were evaluated and quantitatively analyzed using a computerized image analysis system with a digital camera and software. The proportion of positively stained area over the total area of the specimen was calculated and presented as area % (10^2) for LBP and area % for mCD14 respectively. RNA in gingival tissues was isolated and subjected to PCR. Statistical analysis was performed to determine the significance of the differences in co-detection frequency of LBP and mCD14 between healthy controls and patients under various conditions.

Findings: No significant difference was found in expression patterns and levels of both LBP and mCD14 among patients who were smokers, ex-smokers, or non-smokers. No significant correlation was found between the expression patterns and levels of LBP and mCD14 and the age of subjects, either within the patient group or within the control group, therefore, individual results in each group were pooled for data analysis and presentation. mCD14 was mainly confined to the cells around epithelium-connective tissue interface in all samples, whereas LBP mainly expressed in the outer layer of gingival epithelium, which was especially confined to the cytoplasm of granular and keratinized layers. In the underlying connective tissues of the epithelium, LBP was mainly detected on the surface of vascular endothelial cells and/or inside the lumen of blood vessels. LBP and mCD14 were significantly higher in healthy controls than those in diseased tissues. Overall, a positive correlation existed between LBP and mCD14 in detection expression. In PoTs, TLR 2 expressed in both pocket epithelia and underlying connective tissues, in which TLR 2 mainly expressed on the membrane of pocket epithelial cells in granular and keratinized layers and the macrophages-like cells in connective tissues. In HT-Ps, TLR 2 expressed in the same area of gingival epithelial cells, whereas the expression density was weaker than that of PoTs. This distribution was similar in HT-Cs. TLR 4 was predominantly detected

on the membrane of cells in connective tissues of PoTs and no expression was found in HT-Ps and HT-Cs. In PoTs, CD68-labeled macrophages were found in the connective tissues of pocket epithelium, whereas they were sparsely seen in connective tissue of HT-Cs and HT-Ps. However, CD68 was not detected in gingival epithelium of all categories. CD1a-labeled dendritic cells were consistently detected in the supra-basal layer of oral gingival epithelium in all categories of gingival biopsies.

Conclusions: The present study suggests that the in vivo expression of LBP and mCD14 may be interrelated. The expression patterns of mCD14 and TLR2 and 4 appear to be associated with different periodontal conditions.

Zitzmann NU, Lindhe J, Berglundh T. Host response to microbial challenge following resective/non-resective periodontal therapy. J Clin Periodontol 2005; 32:1175-1180. 18 (Refs)

Purpose: The purpose of this study was to investigate the immune reaction in gingival sites treated with either open flap debridement (OFD) or gingivectomy (GV) at baseline and after 3 weeks of de novo plaque formation.

Materials and Methods: The sample size of this study consisted of 15 patients who were diagnosed with generalized severe chronic periodontitis. In each patient 2 different methods of surgical treatments were employed at randomly selected quadrants with one quadrant in the maxilla and the other quadrant in the mandible. Periodontal pockets were eliminated by soft tissue resection (gingivectomy), while in the contralateral quadrant an open flap debridement procedure or nonresective surgical technique was utilized in pocket elimination. Following a 6 month period of plaque control, a clinical examination at baseline or time 0 was performed and the following indices were evaluated: probing pocket depth (PPD), probing attachment level (PAL), soft tissue recession from the CEJ (REC), bleeding on probing (BOP), plaque index (PII), and gingivitis index (MGI). Gingival biopsies were also obtained for immunohistochemical analysis. The CD3 monoclonal antibody was used to detect T cells, while the CD4 and CD8 markers were used to detect T-helper cells and cytotoxic T cells, respectively. B cells were identified by CD19 monoclonal antibodies and PMNs were identified by anti-PMN elastase monoclonal antibodies. CD54, CD62E, CD106 and BMS 170 cell markers were used to identify endothelial cells that expressed various cell adhesion molecules such as ICAM, ECAM, VCAM, and Mad-CAM-1. The subjects were instructed to abstain from all mechanical and chemical plaque control measures for a period of 3 weeks. On day 21, PII and MGI scores were made and biopsies sampled from 2 sites, one GV treated site and one OFD treated site. The data obtained at baseline or day 0 (6 months following surgical therapy) and on day 21 (3 weeks of plaque formation) were analyzed using the Student's t-test for paired observations.

Findings: On day 0, the mean PPD was significantly smaller (1.9 ± 0.5 versus 2.9 ± 0.7 mm) and the amount of recession significantly larger (4.2 ± 1.5 versus 3.2 ± 1.3 mm) in the GV sites than in the OFD sites. The PAL was similar at the both GV sites and OFD sites (6.0 ± 1.5 and 6.1 ± 1.1 mm). In both groups, the PII and MGI scores were low and only 3 sites among the surgical areas bled on probing. At day 0, all biopsies demonstrated a small inflammatory cell infiltrate (ICT). The size and cellular component of the ICT varied between the biopsies sampled from the GV and OFD treated sites. The ICT at the OFD sites occupied a larger area than at the GV sites (0.19 ± 0.1 mm² versus 0.08 ± 0.04 mm²). There was also noted to be a significantly larger proportion of CD19+ cells ($10.1 \pm 3.2\%$ versus $5.4 \pm 2.5\%$) and elastase+ cells ($0.9 \pm 0.4\%$ versus $0.5 \pm 0.4\%$) in the OFD sites than in the GV sites. On day 21, the inflammatory lesions that occurred in the specimens were more than twice as large in the OFD biopsies as in the GV biopsies (0.42 ± 0.19 versus 0.19 ± 0.14 mm²). The lesions at the OFD sites contained larger proportions of CD3+, CD19+, CD8+, and elastase+ cells than the corresponding ICT at the GV sites. The

proportions of endothelial cell markers were also significantly greater in the OFD sites than the GV sites.

Conclusions: In both the OFD and GV treated sites, the size of the inflammatory lesion increased during the 3 weeks of no plaque control. The increase in the ICT was more pronounced in the OFD sites than in the GV sites. In the OFD treated sites, changes in the densities of T and B cells was roughly 3 times higher than in the corresponding GV treated sites. The host response that occurred in the gingival sites treated with OFD (non-resective) was more pronounced than those sites treated with GV (resective).