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Local antibiotic therapy guided by microbiological diagnosis

Treatment of *Porphyromonas gingivalis* and *Actinobacillus actinomycetemcomitans* persisting after mechanical therapy

Andrea Mombelli[1], Bruno Schmid[2], Alexandra Rutar[2] and Niklaus P. Lang[2]

[1]School of Dental Medicine, Department of Periodontology, University of Geneva, [2]School of Dental Medicine, Department of Periodontology and Fixed prosthodontics, University of Bern, Switzerland

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Abstract

Background: The aim of this study was to determine the distribution patterns of *Porphyromonas gingivalis* and *Actinobacillus actinomycetemcomitans* in periodontitis patients after standard mechanical periodontal therapy, and to evaluate the effect of additional local antibiotic therapy, given to all teeth with cultural evidence of these bacteria.

Methods: 17 patients were included. 852 separate subgingival microbial samples were taken from the mesial and distal aspect of every tooth in 17 subjects at baseline. 46 of these samples, from 10 positive subjects, showed cultural evidence for *P. gingivalis*. 82 samples, from 5 subjects, were *A. actinomycetemcomitans*-positive. Three subjects showed no evidence for persistence of *A. actinomycetemcomitans* or *P. gingivalis*. In the other 14 subjects, all *A. actinomycetemcomitans*- or *P. gingivalis*-positive teeth were treated with tetracycline fibers (ACTISITE®). Subgingival microbial samples were again taken from two sites of every tooth, 1 month after fiber removal. 89% of the initially *P. gingivalis*-positive sites were now negative, but 16 previously negative sites now tested positive. 77% of the initially *A. actinomycetemcomitans*-positive sites were now negative, but 5 previously negative sites now tested positive. The teeth with persisting *P. gingivalis* or *A. actinomycetemcomitans* were again treated with fibers. Two sites of every tooth were once more sampled after 1 month. At this time, 5 subjects still showed cultural evidence of *P. gingivalis* at a total of 19 sites, and 4 subjects were positive for *A. actinomycetemcomitans* in a total of 27 sites. These 9 patients were finally submitted to systemic antibiotic therapy (3×250 mg metronidazole plus 3×375 mg amoxicillin/d for 7 days). Despite of all efforts, *P. gingivalis* was again detected 3 months later in isolated sites in 3 subjects, and *A. actinomycetemcomitans* could be cultivated from one single site.

Conclusions: Therapy with tetracycline fibers guided by microbiological diagnosis effectively reduced *P. gingivalis* and *A. actinomycetemcomitans* locally, but was unable to completely eradicate the target organisms. Additional systemic antibiotic therapy further reduced *P. gingivalis* and *A. actinomycetemcomitans*. The observed persistence patterns suggest that reemergence of *A. actinomycetemcomitans* was due to recolonization, whereas the strikingly reproducible local reemergence of *P. gingivalis* in some sites indicated failed eradication.

Key words: *A. actinomycetemcomitans*; amoxicillin; eradication; metronidazole; periodontal therapy; persistence; *P. gingivalis*; tetracycline.

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Numerous studies suggest that there is a correlation between the clinical outcome of periodontal therapy and the presence or absence of particular microorganisms, notably *Porphyromonas gingivalis* and *Actinobacillus actinomycetemcomitans*, after therapy (Slots & Rosling 1983, Christersson et al. 1985, Kornman & Robertson 1985, Haffajee et al. 1988, Rodenburg et al. 1990). It has also been mentioned that positive sites are at greater risk for further attachment loss (Slots et al. 1986, Bragd et al. 1987, Slots & Listgarten 1988, Fine 1994, Rams et al. 1996) and that the absence of specific pathogens has a negative predictive value for further attachment loss (Wennström et al. 1987, Dahlén et al. 1996). Since scaling and root planing alone cannot predictably eliminate the microorganisms mentioned above (Mombelli et al. 1994, 2000), it may be advantageous to complement mechanical therapy with antimicrobial agents.

Comprehensive microbiological examinations of all teeth of a subject show that *A. actinomycetemcomitans* and *P. gingivalis* are inhomogeneously distributed in the dentition (Mombelli et al. 1991, 1994). Thus, areas colonized by specific pathogens should perhaps be approached with more aggressive therapy than the rest of the dentition. Today, using specifically designed delivery devices, antimicrobial agents can be applied locally at high concentrations. But how can a clinician be sure that the areas he treats coincide with the sites harboring the pathogens? No diagnostic tool is available at present at a reasonable cost that could give the dentist a detailed distribution map of periodontal pathogens. Provided that such a tool existed, could *P. gingivalis* and *A. actinomycetemcomitans* be eradicated from an infected dentition by microbiologically guided local antimicrobial therapy?

The purpose of this study was to evaluate the effect of local antibiotic therapy, given to every tooth with cultural evidence of *P. gingivalis* or *A. actinomycetemcomitans* after completion of conventional mechanical periodontal therapy.

Material and methods

Subjects

In all, 17 patients, treated previously for advanced periodontal disease, were recruited for this study. All subjects were examined between 8 and 16 weeks after completion of comprehensive periodontal therapy, performed by graduate periodontal students at the Department of Periodontology and Fixed Prosthodontics, School of Dental Medicine, the University of Bern, Switzerland. In a primary treatment phase all accessible supra- and subgingival root surfaces had been thoroughly scaled and root planed, and the patients had been instructed in proper oral hygiene. In a second treatment phase, Modified Widman flap procedures had been performed in all areas with persisting pockets greater than 5 mm. After surgery the patients had rinsed with 0.2% chlorhexidine for 2 weeks. Systemic or local antibiotics had not been used. The clinical goal of therapy was general reduction of pocket probing depths (PPD) to 4 mm or less, persistence of no, or only isolated, pockets 5 mm deep, and less than 15% of all sites bleeding upon gentle probing (0.25 N probing force).

Fourteen of the 17 subjects were entered consecutively irrespective of any microbiological criteria. At this point the sample included 10 subjects with cultural evidence for *P. gingivalis,* but only two with persisting *A. actinomycetemcomitans*. To increase the number of subjects positive for *A. actinomycetemcomitans*, the next 12 patients reaching completion of therapy were screened for presence of *A. actinomycetemcomitans* by taking a pooled sample from the deepest pocket in each dentition quadrant. Only those three subjects with cultural evidence of presence of *A. actinomycetemcomitans* in these sites were accepted into the study.

Clinical protocol

Separate subgingival microbial samples were taken from the mesiobuccal and distobuccal aspects of every tooth in each subject using sterile paper points (Mombelli et al. 2000). The samples were not pooled; 38–56 specimens were taken in each subject. Each of them was individually processed using the anaerobic culturing methods described in the next section. Bleeding after sampling (BOS) was recorded in a dichotomous manner (0 or 1) at each sampled site, then PPD and recession were measured to the nearest mm.

The treatment procedure is shown in Fig. 1. Based on the microbiological analysis, the topographical distribution of *P. gingivalis* and *A. actinomycetemcomitans* in the dentition was determined for each subject. Then all *P. gingivalis*- and/or *A. actinomycetemcomitans*-positive teeth were treated with polymeric tetracycline HCl-containing fibers (Actisite® periodontal fiber, ALZA Corporation, Palo Alto, CA, USA and Procter & Gamble, Cincinnati, OH, USA). After mechanical removal of bacterial deposits on the root surfaces, the fibers were applied to fill the pockets and then secured by applying a small amount of octyl-cyanoacrylate adhesive at the gingival margin. Patients were instructed to perform their usual oral hygiene measures, avoiding the areas where the fibers were applied. Patients were also instructed that the fibers should be kept in place for 7–10 days and that they should call immediately should a fiber be dislodged. Seven to 10 days after placement, the fibers were removed, and the roots of the treated teeth were scaled and root planed. From the day of fiber placement until 2 weeks after fiber removal the patients rinsed with 0.2% chlorhexidine twice daily.

In every subject treated with the fibers, all teeth were again sampled microbiologically and assessed clinically 1 month later (1F + 1M). Once more, all *P. gingivalis*- and/or *A. actinomycetemcomitans*-positive teeth were treated with tetracycline fibers, and sampled 1 month later (2F + 1M). Patients who at this time still showed evidence for persistence of *P. gingivalis* and/or *A. actinomycetemcomitans* were treated with systemic metronidazole (3 × 250 mg) plus amoxicillin (3 × 375 mg) daily for 7 days. These subjects were again assessed after another 1 month (S + 1M)

All 17 subjects were reassessed clinically and microbiologically 3 and 6 months (M3, M6) after their last assessment.

Microbiological procedures

Within 30 min the samples were introduced into an anaerobic chamber. Samples were homogenized, serially diluted in RTF and plated onto Tryptic Soy-serum-Bacitracin-Vancomycin agar (TSBV) (Slots 1982) and Enriched Trypticase Soy Agar (ETSA) (Syed et al. 1980). TSBV plates were incubated in air with 5% CO_2 at 37 °C for 5 days. Transparent colonies with the characteristic stellar structure and a

positive catalase reaction were identified as *A. actinomycetemcomitans* (Mombelli et al. 1998). ETSA, incubated in the anaerobic chamber for 7 days, served for the enumeration of total Colony Forming Units (CFU)/mL of strict and facultative anaerobes, and for the identification of *P. gingivalis*. Strictly anaerobic Gram-negative coccobacilli producing pigmented colonies on ETSA were identified as *P. gingivalis* if they were indole-positive and esculin-negative, hydrolyzed N-benzyol-DL-arginine-2-naphthylamide (BANA) and had no α-glucosidase activity (Mombelli et al. 1994).

Data analysis

Based on dilution factors and sample volumes it was estimated that one colony of a target organism growing on a plate inoculated with the lowest dilution of the sample – the minimal requirement for a positive outcome – corresponded to 400 CFU in the initial sample. The influence of local clinical parameters on presence or absence of the target organisms in samples from individual sites at month 3 was analyzed by logistic multiple regression, using the site as the statistical unit. In order to adjust for differences between individuals, the level of response (intercept) was allowed to depend on the individual.

Results

The total numbers of sites tested at each examination and the numbers of samples positive for *P. gingivalis* and/or *A. actinomycetemcomitans* are listed in Table 1. The individual numbers of samples positive for *P. gingivalis* and/or *A. actinomycetemcomitans* at baseline and thereafter, are shown in Table 2. In total, 4237 microbiological samples were cultured and analyzed for presence or absence of *P. gingivalis* and *A. actinomycetemcomitans*. At baseline, data were available from 852 sites in 17 subjects (38–56 per individual). These findings have been analyzed and reported in detail in a previous publication (Mombelli et al. 2000). In brief, the mean number of sites with a probing depth of 5 mm was 4.5 per subject, and no probing depths reached 6 mm or more. *P. gingivalis* was detected at a high frequency on a patient basis (59% positive subjects). On a site basis, however, the frequency was low (4.6% in positive subjects). In contrast, only five subjects were *A. actinomycetemcomitans*-positive, but two of them showed a very high number of positive sites (44% and 75%, respectively).

In three subjects, neither *P. gingivalis* nor *A. actinomycetemcomitans* was detected in any site. These subjects were not treated any further, but were again sampled 3 and 6 months later. In two subjects there was again no evidence for presence of the two target organisms. In the third person, however, *A. actinomycetemcomitans* was recovered from two sites on the same tooth (#26, mesial and distal) at month 3, and from another site at month 6 (tooth #15 mesial). The 14 subjects showing evidence for presence of *P. gingivalis* and/or *A. actinomycetemcomitans* at baseline were treated with tetracycline fibers. Clinical and microbiological data were collected from 706 sites 1 month later. At this point, three subjects showed no further evidence for presence of either *P. gingivalis* or *A. actinomycetemcomitans*. These subjects were not treated further, but were again sampled 3 and 6 months later. *A. actinomycetemcomitans* had never been detected before, and was not detected after treatment. *P. gingivalis*, present in isolated sites at baseline, was again recovered from isolated sites at the 3- and 6-month follow-ups, in two instances in the exactly same location as at baseline. In the remaining subjects, five of the 46 formerly *P. gingivalis*-positive sites were still positive at 1F + 1M. In addition, 16 sites negative at baseline now showed evidence of *P. gingivalis*. The number of *A. actinomycetemcomitans*-positive sites dropped from 82 to 24. Of these 24 sites, 19 had already been positive for *A. actinomyce-*

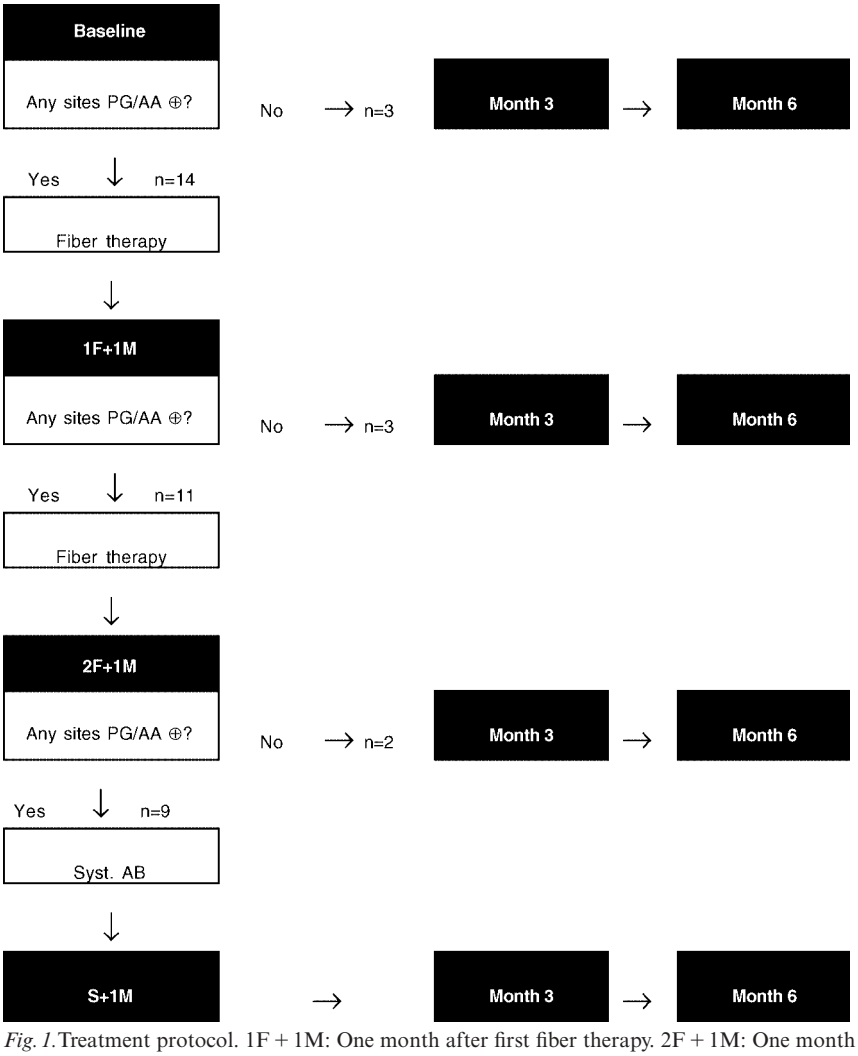

Fig. 1. Treatment protocol. 1F + 1M: One month after first fiber therapy. 2F + 1M: One month after second fiber therapy. S + 1M: One month after systemic antibiotic therapy.

Table 1. Numbers of sites investigated at each time point, and numbers of sites positive for *P. gingivalis* (PG) and *A. actinomycetemcomitans* (AA)

	Sites	PG	AA
BL (Baseline)	852	46	82
1F + 1M (1 month after 1st fiber therapy)	706	24	24
2F + 1M (1 month after 2nd fiber therapy)	568	19	27
S + 1M (1 month after systemic antibiotics)	470	9	1
M3 (Month 3)	797	18	3
M6 (Month 6)	844	16	1
Total	4237	132	138

temcomitans at baseline. Of the 24 positive samples, 15 came from one subject, who was broadly colonized by *A. actinomycetemcomitans* at baseline (42 of 56 tested sites positive).

There remained 11 subjects, who either showed evidence for persisting *P. gingivalis* ($n = 7$) or for *A. actinomycetemcomitans* ($n = 4$). All positive teeth were again treated with tetracycline fibers. One month later, 19 of the 568 tested sites scored *P. gingivalis*-positive, and 27 were *A. actinomycetemcomitans*-positive.

A further two subjects showed no further evidence for presence of either *P. gingivalis* or *A. actinomycetemcomitans*. The nine remaining subjects were treated with systemic antibiotics. One month later, nine of the 470 sites tested continued to score *P. gingivalis*-positive, and one single site was positive for *A. actinomycetemcomitans*.

At the 3-month evaluation, seven of the 14 patients treated by guided local and systemic antibiotic therapy showed evidence for presence of *P. gingivalis*. In five cases the target organism was found in only one site, whereas in two subjects it was recovered in five and eight sites, respectively.

Table 3 lists all 67 sites that showed evidence for presence of *P. gingivalis* at baseline, at month 3, or month 6. In this table, each line represents one investigated site. The order of magnitude of bacterial counts is indicated by single digit numbers, i.e. 5: 10^5 CFU/mL. The mean probing depth of the 46 sites positive at baseline was 4.3 ± 1.7 mm at baseline and did not change significantly after treatment (M3: 4.3 ± 1.8, M6: 4.2 ± 1.7). Logistic regression analysis showed that the presence or absence of *P. gingivalis* at month 3 was much stronger related to presence or absence of *P. gingivalis* at baseline than probing depth or BOS registered at month 3 ($P < 0001$). Table 4 lists all 86 sites with evidence for the presence of *A. actinomycetemcomitans* at baseline, month 3, or month 6. The mean probing depth of these sites was 3.4 ± 1.3 mm at baseline and did not change significantly after treatment (M3: 3.3 ± 1.2, M6: 3.2 ± 1.1). As can be seen, the sites positive for *A. actinomycetemcomitans* at baseline were not identical to the sites showing evidence for presence of the same organism in the follow-up examinations.

Discussion

The results of this study demonstrate the difficulty of eradicating *P. gingivalis* and *A. actinomycetemcomitans* with locally applied antibiotics. Even if a detailed microbiologic assessment provides information about the distribution pattern within the dentition, and all positive teeth are treated, the target organism can be found again in a considerable number of subjects. The data of this study furthermore indicate that this may be due to various reasons. In a small number of sites *P. gingivalis* was detected before and after therapy, indicating a failure of treatment. In a larger number of sites, however, this organism was not detected in the first microbiologic examination. The reproducibility of the bacteriological methods employed in this study has been determined in previously (Mombelli et al. 1989). Target bacteria may have been present at levels below the threshold for detection on the first visit, and may

Table 2. Individual numbers of sites positive for *P. gingivalis* and *A. actinomycetemcomitans*

	P. gingivalis						*A. actinomycetemcomitans*					
Patient	BL	1F + 1M	2F + 1M	S + 1M	M3	M6	BL	1F + 1M	2F + 1M	S + 1M	M3	M6
1	**0**	–	–	–	0	0	**0**	–	–	–	0	0
2	**0**	–	–	–	0	0	**0**	–	–	–	0	0
3	**0**	–	–	–	0	0	**0**	–	–	–	2	1
4	1	**0**	–	–	0	2	**0**	0	–	–	0	0
5	2	**0**	–	–	1	2	**0**	0	–	–	0	0
6	1	**0**	–	–	1	0	**0**	0	–	–	0	0
7	3	3	**0**	–	1	1	**0**	0	0	–	0	0
8	6	1	**0**	–	5	0	**0**	0	0	–	0	0
9	1	3	2	**0**	0	0	**0**	0	0	0	0	0
10	10	6	11	**0**	–	0	**0**	0	0	0	–	0
11	**0**	0	0	0	0	0	3	1	2	**0**	0	0
12	**0**	0	0	0	0	0	9	6	4	**0**	0	0
13	**0**	0	0	0	0	0	42	15	20	**0**	0	0
14	**0**	0	0	0	0	0	24	2	1	1	1	**0**
15	5	5	1	1	1	**0**	**0**	0	0	0	0	0
16	5	3	2	1	1	7	**0**	0	0	0	0	0
17	12	3	3	7	8	4	4	**0**	0	0	0	0

Each line represents one subject. Zero values in bold indicate first instance of non-detection.BL: Baseline. 1F + 1M: 1 month after 1st fiber therapy. 2F + 1M: 1 month after 2nd fiber therapy S + 1M: 1 month after systemic antibiotics. M3: Month 3. M6: Month 6.

Table 3. List of all sites with evidence for presence of *P. gingivalis* at baseline (BL), at month 3 (M3), or month 6 (M6) (n = 67). Numbers indicate the order of magnitude of bacterial counts, e.g. 5: 10^5 CFU/mL

P. gingivalis								
BL	M3	M6	BL	M3	M6	BL	M3	M6
6	–	–	4	–	–	2	–	–
6	–	–	3	–	–	–	6	–
6	5	–	3	–	–	–	4	4
6	6	–	3	–	–	–	4	–
6	5	5	3	–	–	–	3	–
5	3	–	3	–	–	–	3	3
5	–	–	3	–	–	–	3	–
5	–	–	3	–	–	–	2	–
5	–	–	3	–	–	–	2	–
5	–	–	3	–	–	–	2	–
5	4	–	3	–	–	–	2	–
5	–	–	3	–	–	–	2	–
5	–	–	3	–	–	–	–	5
5	5	5	2	–	3	–	–	5
5	–	–	2	–	–	–	–	4
4	–	–	2	–	–	–	–	3
4	–	–	2	–	–	–	–	3
4	–	–	2	–	–	–	–	3
4	–	–	2	–	–	–	–	3
4	5	3	2	–	–	–	–	3
4	–	–	2	–	–	–	–	2
4	–	–	2	–	–	–	–	2
4	–	–						

Table 4. List of all sites with evidence for presence of *A. actinomycetemcomitans* at baseline (BL), at month 3 (M3), or month 6 (M6). Each line represents one site (n = 86). Numbers indicate the order of magnitude of bacterial counts

A. actinomycetemcomitans								
BL	M3	M6	BL	M3	M6	BL	M3	M6
6	–	–	4	–	–	3	–	–
6	–	–	4	–	–	3	–	–
5	–	–	4	–	–	3	–	–
5	–	–	4	–	–	3	–	–
5	–	–	4	–	–	3	–	–
5	–	–	4	–	–	3	–	–
5	–	–	4	–	–	3	–	–
5	–	–	4	–	–	3	–	–
5	–	–	4	–	–	3	–	–
5	–	–	4	–	–	3	–	–
5	–	–	4	–	–	2	–	–
5	–	–	4	–	–	2	–	–
5	–	–	4	–	–	2	–	–
5	–	–	4	–	–	2	–	–
5	–	–	4	–	–	2	–	–
5	–	–	4	–	–	2	–	–
5	–	–	4	–	–	2	–	–
5	–	–	4	–	–	2	–	–
5	–	–	4	–	–	2	–	–
5	–	–	4	–	–	2	–	–
5	–	–	3	–	–	2	–	–
5	–	–	3	–	–	2	–	–
5	–	–	3	–	–	2	–	–
5	–	–	3	–	–	–	3	–
5	–	–	3	–	–	–	2	–
5	–	–	3	–	–	–	2	–
5	–	–	3	–	–	–	–	3
5	–	–	3	–	–			

have multiplied beyond the minimal concentration for detection thereafter. Advantages and disadvantages of culture methods in comparison with other techniques such as DNA probes and PCR continue to be the subject of dispute (Mombelli et al. 1989, Dahlén et al. 1990, Aass et al. 1994, van Steenbergen et al. 1996, Papapanou et al. 1997, Tanner et al. 1998). The major advantage of culture over other identification procedures is its inherent minimal risk for false positive outcomes. Widely used DNA assays, for instance, have a documented cross-over reactivity at 1 : 100, which can produce false positive results for target bacteria in samples containing high numbers of other bacteria. PCR assays may be falsely negative due to presence of inhibitors in sampling material, but may also be falsely positive due to contamination. Culturing may occasionally yield a false negative result due to lack of growth, but it is clear that positive sites harbor vital microorganisms.

The persistence patterns observed in the present investigation at baseline and after therapy may have diagnostic and therapeutic implications. Because of a low proportion of positive sites, a microbiological test to determine elimination of *P. gingivalis* based on a sampling scheme involving only one or two randomly selected sites would have a great chance for a false negative outcome. The observation that subjects with fewer *P. gingivalis*-positive sites also had smaller amounts of P . *gingivalis* in positive sites (data presented previously, Mombelli et al. 2000) further aggravates the matter, because with an insensitive test even appropriately chosen sites might have been falsely diagnosed *P. gingivalis* negative. Reemergence after therapy would thus be interpreted as reinfection, whereas it could as well be multiplication of persisting bacteria above detection level. For *A. actinomycetemcomitans*, those two subjects with 44% and 75% positive sites at baseline, respectively, would probably be diagnosed correctly, even by random sampling. The remaining three *A. actinomycetemcomitans*-positive subjects, however, would have an elevated risk to be falsely diagnosed *A. actinomycetemcomitans*-negative.

The present study is in line with findings from other studies indicating that systemic therapy with amoxicillin and metronidazole very efficiently clears *A. actinomycetemcomitans* (van Winkel-

hoff et al. 1989, 1992, Pavicic et al. 1991, 1994, Kamma et al. 1998). As can be seen in Table 2, repeated fiber application was unable to substantially reduce the number of sites with persisting *A. actinomycetemcomitans*. After systemic treatment, however, the organism could no longer be detected in all but one site (the other three samples from which *A. actinomycetemcomitans* was recovered at months 3 and 6 were obtained from a subject who had scored entirely negative at baseline and had thus not been treated with antibiotics).

Although the overall baseline frequency was almost twice as high for *A. actinomycetemcomitans* as for *P. gingivalis* on a site level (Table 1), none of the sites positive for *A. actinomycetemcomitans* at months 3 or 6 had been positive already at baseline (Table 4). In contrast, eight of the 18 sites positive for *P. gingivalis* at month 3 had been positive already at baseline (Table 3). These findings are compatible with the hypothesis that reemergence of *A. actinomycetemcomitans* was due to recolonization, whereas the strikingly reproducible local reemergence of *P. gingivalis* in some sites indicated failed eradication.

The present study did not directly address the question of whether persistence of pathogens may affect the clinical outcome on a long-term basis. This would require repeated clinical and microbiological assessments without intervention. The present study demonstrated clearly, however, that it is impossible with a single assessment of a few sites to determine whether *P. gingivalis* or *A. actinomycetemcomitans* have been truly eradicated.

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Zusammenfassung

Lokale Antibiotikatherapie geführt durch die mikrobiologische Diagnostik. Behandlung der nach mechanischer Therapie persistenten Keime Porphyromonas gingivalis *und* Actinobacillus actinomycetemcomitans

Hintergrund: Das Ziel der Studie war die Bestimmung der Verteilungsmuster von *Porphyromonas gingivalis* und *Actinobacillus actinomycetemcomitans* bei Parodontitispatienten nach üblicher mechanischer parodontaler Therapie und die Bestimmung des Effektes zusätzlicher lokaler antibiotischer Therapie, die an allen Zähnen mit nachweislicher Anwesenheit dieser Bakterien durchgeführt wurde.
Methoden: 17 Patienten wurden in die Studie eingeschlossen. 852 einzelne subgingivale mikrobielle Proben wurden von den mesialen und distalen Flächen jedes Zahnes der 17 Patienten zur Basisuntersuchung gewonnen. 46 von diesen Proben von 10 positiven Personen zeigten den Nachweis von *P. gingivalis.* 82 Proben von 5 Personen waren A. actinomycetemcomitans positiv. Drei Personen hatten weder *A. actinomycetemcomitans* noch *P. gingivalis.* Bei den anderen 14 Personen wurden alle *A. actinomycetemcomitans* oder Zähne mit der Tetrazyklinfaser (ACTISITE®) behandelt. Einen Monat nach der Entfernung der Faserentfernung wurden erneut subgingivale mikrobielle Proben von zwei Seiten jeden Zahnes entnommen. 89% der anfänglich *P. gingivalis* positiven Flächen waren nun negativ, aber 16 der anfänglich negativen Flächen wurden nun positiv getestet. 77% der anfänglich *A. actinomycetemcomitans* positiven Flächen waren nun negativ, aber 5 anfänglich negative Flächen wurden nun positiv getestet. Die Zähne mit persistierenden *P. gingivalis* oder *A. actinomycetemcomitans* wurden erneut mit der Faser behandelt. Zwei Flächen jedes Zahnes wurden nach einem Monat erneut untersucht und mikrobielle Proben genommen. Zu diesem Zeitpunkt zeigten 5 Personen noch den kulturellen Nachweis von *P. gingivalis* an insgesamt 19 Flächen und 4 Personen waren positiv für *A. actinomycetemcomitans* an insgesamt 27 Flächen. Diese 9 Patienten wurden schließlich einer systemischen antibiotischen Therapie (3 × 250 mg Metronidazol plus 3 × 375 mg Amoxicillin/d für 7 Tage) zugeführt. Trotz aller Anstrengungen wurde *P. gingivalis* 3 Monate später erneut an einzelnen Flächen bei 3 Personen entdeckt und *A. actinomycetemcomitans* konnte von einer einzelnen Fläche kultiviert werden.
Zusammenfassung: Die Therapie mit Tetrazyklinfasern nach einer mikrobiologischen Diagnostik reduzierte effektiv lokal *P. gingivalis* und *A. actinomycetemcomitans*, aber war bei kompletten Beseitigung der Zielbakterien nicht erfolgreich. Eine zusätzliche systemische antibiotische Therapie reduzierte *P. gingivalis* und *A. actinomycetemcomitans* weiterhin. Die beobachteten Persistenzmuster lassen das Wiederauftauchen von A. actinomycetemcomitans infolge einer Rekolonisation vermuten, während das streng reproduzierte lokale Wiederauftauchen von *P. gingivalis* bei einigen Flächen eine misslungene Beseitigung anzeigt.

Résumé

*Traitement local antibiotique établi d'après un diagnostic microbiologique. Traitement de Porphyromonas gingivalis, et d'*Actinobacillus actinomycetemcomitans*, persistant après traitement mécanique.*

But: Le but de cette étude était de déterminer, chez des patients atteints de parodontite, la distribution de Porphyromonas gingivalis et Actinobacillus actinomycetemcomitans après un traitement mécanique parodontal standard et d'évaluer l'effet d'une antibiothérapie additionnelle locale appliquée sur toutes les dents qui présentaient une preuve de la présence déterminée par culture de ces bactéries.
Méthodes: 17 patients furent inclus. 852 différents échantillons microbiens sous-gingivaux ont été prélevés sur les faces mésiales et distales de chaque dès le début de l'étude. 46 de ces échantillons, issus de 10 sujets positifs, présentaient des signes de culture pour *P. gingivalis.* 82 échantillons, chez 5 sujets, étaient positifs pour *A. actinomycetemcomitans.* 3 sujets ne présentaient pas de preuves de persistance d'*A. actinomycetemcomitans* ou de *P. gingivalis.* Chez 14 autres sujets toutes les dents positives pour A. actinomycetemcomitans ou P. gingivalis furent traitées avec des fibres de tetracycline (ACTISITE®). Des échantillons microbiens sous-gingivaux furent prélevés à nouveaux sur 2 sites de chaque dent, 1 mois après le dépôt des fibres. 89% des sites initialement positifs pour P. gingivalis étaient alors devenus négatifs, mais 16 sites préalablement négatifs étaient par contre positifs. 77% des sites initialement positifs pour *A. actinomycetemcomitans* étaient devenus négatifs, mais 5 sites préalablement négatifs s'avéraient positifs. Les dents ayant une présence persistante de *P. gingivalis* or *A. actinomycetemcomitans* étaient à nouveau traitées avec les fibres. 2 sites de chaque dent étaient à nouveau testées un mois plus tard. A ce moment là, 5 sujets montraient encore des signes de présence de *P. gingivalis* sur 19 sites en tout et 4 sujets étaient encore positifs pour *A. actinomycetemcomitans* sur 27 sites en tout. Ces 9 patients étaient finalement soumis à une antibiothérapie systémique (3 × 250 mg de metronidazole plus 3 × 375 mg amoxycilline/jour pendant 7 jours). Malgré tous ces efforts, *P. gingivalis* étaient encore détecté 3 mois plus tard dans des sites isolés chez 3 sujets et *A. actinomycetemcomitans* ne pouvait plus être cultivé que dans un seul site.
Conclusions: Un traitement par fibres de tetracycline établi en fonction d'un diagnostic microbiologique réduit effectivement *P. gingivalis* et *A. actinomycetemcomitans* localement, mais ne peut pas éradiquer complètement les organismes cibles. Un traitement complémentaire antibiotique systémique réduisait un peu plus *P. gingivalis* et *A. actinomycetemcomitans.* Cette persistance que nous avons observée laisse penser que la réémergence d' *A. actinomycetemcomitans* serait dûe à une recolonisation alors que la réémergence locale reproduisible systèmatique de *P. gingivalis* dans quelques sites indique un échec de l'éradication.

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Address:
Andrea Mombelli, Prof. Dr med. dent.
University of Geneva
School of Dental Medicine
19 rue Barthélemy-Menn
CH-1211 Geneva 4
Switzerland

Tel: +41 22 382 91 45
Fax: +41 22 382 99 92
e-mail:
andrea.mombelli@medecine.unige.ch