

Residing Bacterial Flora Pertaining to Root Canals and Associated Periodontal Pocket

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Abstract: *In the present study the flora from root canals and adjacent periodontal pockets of teeth with advanced periodontal disease were examined in order to compare the microbial flora from both sites. Three samples were collected from each of the twelve patients, one from the root canal and two from adjacent pocket at two different sites, criteria for inclusion in the survey were; minimum of 5 mm pocket depth, intact clinical crowns and lack of peri apical lesion. The study has demonstrated that the micro organism present in root canals of caries free teeth with advanced periodontitis generally resemble those found in adjacent periodontal pockets. The similarity in recovery of organisms suggests that the pocket could be the source of root canal infection in cases of advanced periodontitis.*

1. Introduction

The relationship of pulpal and periodontal disease has been a subject of speculation for many years. Studies have indicated that if both disease entities are present, they must be considered together¹ and their periodontal and endodontic therapy is essential for successful outcome of the treatment.²

It often becomes difficult to diagnose as to which lesion appeared first. Well documented evidence suggest that pulpal disease initiates and / or maintains periodontal disease.³ however, in periodontal disease of long standing, bacteria and their by-products could invade the pulp via a variety of pathway such as through hypo calcified areas in cementum, empty Sharpey's fiber spaces and accessory root canals. It is also possible that periodontal disease may progress to the root apex and invade the pulpal tissue through apical foramen⁴. the aim of the present study was to compare the bacterial flora from root canal and adjacent periodontal pockets of intact teeth with advanced periodontitis in the absence of apical pathology, to establish the pathway of periodontal infection to root canal other than from apical foramina.

2. Materials and Method

Criteria for sample selection was:

- 1) Pocket depth ranging from 5mm upto the apex on two sites of the teeth from cemento – enamel junction to the base of the pocket.
- 2) Intact clinical crowns of the teeth with no detectable clinical and / or radio-graphic caries.
- 3) Absence of periapical lesion.
- 4) The clinical indication that tooth was hopeless from periodontal point of view and required extraction.

- 5) Patients evaluation was based on a medical history and peri-apical radiography. None of the patients had been treated with anti-microbial agents within the last three month.

Sampling Procedures

Three samples were collected from from each patients. the tooth was isolated and gently dried with the help of the cotton rolls. Vitality of the tooth was checked by means of electric pulp tester. For sampling two sterile paper points were inserted on two different sites of the pocket. The paper points remained in position for 1 minute then they were dropped into the transport media.

Collection and transport of specimens

Specimens were in the form of absorbent point from the pocket and canals. These points were immediately put into carry Blair media and were transported to Bacteriology laboratory of the department of microbiology, for anaerobic and aerobic bacterial culture and identification.

Culture procedure

In the laboratory, the specimens were taken out from cary Blair medium and were suspended in 1 ml of thioglycolate from broth. the gram – stained smear was prepared from broth to see the morphology of existing bacteria, so as to select out medium for anaerobic culture. For aerobic culture, a loopful of broth was inoculated on blood agar and blue plates and were incubated at 37 °C for 48 hours. After incubation the growth was observed then the representative colony of each type of growth organism was isolated by subculture. identification of isolated bacteria were done according to criteria described in medical microbiology.⁵

For anaerobic culture the suspended broth was incubated on freshly prepared supplemented brain heart infusion blood agar plates. And put in anaerobic jar. Anaerobiosis was achieved by

gas pack anaerobic system, supplied by BBL Microbiology system, Bactom Dickinson and Co , Cockey Svilli , MD . 21030. M ethylene blue solution was used as indicator of anaerobiosis.

Incubation of culture was made at 37⁰ C for 72 hours . Representative colonies of growth were isolated by subculture and identification of bacteria was done by smear examination, mobility and biochemical reaction, etc as described in laboratory methods in anaerobic Bacteriology.⁶

3. Result

Five of the 12 teeth studied were vital. It was found that all these contained bleeding pulps of the remaining seven, 3 were partially vital while 4 were non – vital. The root canals of these teeth appeared necrotic when opened with no bleeding although some of them had a certain degree of positive reaction when paper point were first inserted in the root canals.(table 1)

The relative frequency of isolated and proportion of the sub gingival micro flora from 24 periodontal sites is shown in table II. Black pigmented bacteroides were isolated from every pocket examined, streptococci were also isolated from all the pockets. Staphylococci were detected in 54.16 % of the pockets while other gram +ve and gram –ve organisms were detected less frequently.

The distribution of cultivable flora from seven root canal is also shown in table 2. Streptococci were found in every root canal. Black pigmented bacteroides were present in 85.71% of canal, peptococcus were present in 42.85% canals were as other microorganisms were present with variable frequency.

Table 1: Clinical parameter at microbiologic sampling.

Subjects	Tooth position	pocket depth C.E.J to base Mesial Distal		level of vitality 0-4	pulpal diagnosis
1	3	5	6	1.5	V.
2	2	6	5	1.5	V.
3	3	5	6	1.5	V.
4	1	6	5	1.5	V.
5	5	5	6	1.5	V.
6	3	5	5	2.5	P.V.
7	2	9	7	3.0	P.V.
8	1	7	8	3.5	P.V.
9	2	9	8	4.0	N.V.
10	2	11	10	4.0	N.V.
11	5	9	11	4.0	N.V.
12	2	10	9	4.0	N.V.

CEJ = Cemento enamel junction
V= vital ,PV =Partially vital
NV = nonvital

Table II: Bacteria isolated from root canals and adjacent periodontal pockets of group I (untreated teeth)

Isolated bacteria	No of pocket culture (24)		No of canal culture (12)	
	No	%	No	%
Black pigmented bacteroid	24	100.00	6	85.71
peptostreptococcus	9	37.50	1	14.28
peptococcus	7	29.16	3	42.85
veillonella	5	20.80	2	28.57

lactobacillus	3	12.50	-	-
eubacterium	3	12.50	-	-
fusobacterium	4	16.66	-	-
Strepto viridance	24	100.00	7	100.00
staphylococcus	13	54.16	1	14.28
E coil	4	16.66	2	28.57
klebsilla	2	8.33	1	14.28
Pseudomonas	2	8.33	1	14.28
neisseria	4	16.66	-	-
Bacillus	4	16.66	-	-
Diptheroides	5	20.80	1	14.28

Every organism detected in root canals were also found in flora of adjacent periodontal pocket. However, the reverse was not true. Lactobacillus, Eubacterium, Fusobacterium, Neisseria, Micrococcus and Bacillus present in periodontal pockets were absent in the root canals.

The number of canals in which bacteria were obtained increased as the depth of adjacent periodontal pockets increased Table III. Of the 6 teeth with 5-7 mm pocket depth, Streptococci was obtained only from one canal. Of the 3 teeth with 8-9 mm pocket depth, Bacteriodes and Ptreptococci were obtained from all the canals, Peptococcus and Veillonella were obtained from one root canal. Of the remaining, three teeth with pocket depth of 9 mm. Bacteriodes and Streptococci were present in all the canals. Peptostreptococcus, Vellonella, Staphylococcus, Neisseria, Diptheroides,and Klebsillawere present in one canal and Peptococcus, E. Coli were obtained from 2 canals.

Table 3: Percentage Distribution of Bacterial Flora From Pockets and Canals at Different Pocket Depths

Isolated bacteria	5-7 mm (6 teeth)			8-9 mm (3 teeth)			9 mm (3 teeth)		
	M	D	C	M	D	C	M	D	C
Black pigmented Bacteriodes	100	100	-	100	100	100	100	100	100
Peptostreptococcus	50	16.6	-	66.66	66.6	-	33.3	-	33.3
Peptococcus	33.3	33.3	-	-	33.3	33.3	66.66	-	66.6
Veillonella	-	33.3	-	-	33.3	33.3	33.3	33.3	33.3
Lactobacillus	16.6	16.6	-	-	-	-	-	33.3	-
Eubacterium	16.6	16.6	-	-	-	-	33.3	-	-
Fusobacterium	-	-	-	33.3	33.3	-	66.6	-	-
Streptococcus viridance	100	100	100	100	100	100	100	100	100
Styphylococcus	50	66.6	-	33.3	100	-	33.3	33.3	33.3
E coli	16.6	-	-	33.3	33.3	-	-	33.3	33.3
Pseudomonas	-	-	-	-	-	-	33.3	33.3	33.3
Neisseria	16.6	-	-	-	-	-	33.3	66.6	-
Micrococcus	-	-	-	33.3	33.3	-	33.3	33.3	-
Bacillus	16.6	33.3	-	-	-	-	33.3	-	-
Diptheriodes	-	-	16.6	33.3	33.3	-	-	66.6	33.3
Klebsilla	-	-	-	-	-	-	33.3	33.3	33.3

M= Mesial pocket
D= Distal pocket
C= Root canal

4. Discussion

This study has demonstrated that the microorganisms present in the root canal of caries free teeth with advanced periodontitis generally resembled those found in adjacent periodontal pockets. Kipioti et al⁷ observed the strong resemblance between

the microbial flora from root canal of human caries free teeth with advanced periodontitis and microbial flora from adjacent periodontal pockets.

The bacteria present in root canals in relation to different periodontal pocket depth were observed. The number canals from which bacteria were isolated increased as the depth of periodontal pocket increased. This increase in positive root canal culture signifies that with greater portion of root exposed to flora of periodontal pocket and oral cavity, the cultures positivity of root canal increases. Rubachet al⁸ observed several apical auxiliary canals in apical third of the root. Thus accessory canals may be the primary channels through which microorganisms may communicate from periodontal pocket to root canals.

5. Conclusions

The present study was done to compare the microbial flora from root canals, with that of the adjacent periodontal pockets. The following conclusions were drawn:

- 1) The most frequently isolated bacteria from root canals and adjacent periodontal pockets are Bacteriodes and Streptococcus, while Styphylococcus, Peptococcus, Veillonella, Diptheriodes, Micrococcus, and Klebsilla are present less frequently. Lactobacillus, Eubacterium, Feurobacterium and Bacillus are obtained from periodontal pockets but not from root canals.
- 2) The bacterial flora isolated from root canals and adjacent periodontal pockets resemble each other.
- 3) The percentage of positive root canal cultures increases as the depth of periodontal pocket increases.

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