Microbiological examination of infected dental root canals.


Source

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Abstract

OBJECTIVES:

The aim of this study was to investigate the root canal microbiota of primary and secondary root-infected canals and the association of constituent species with specific endodontic signs and symptoms.

METHODS:

Microbial samples were taken from 60 root canals, 41 with necrotic pulp tissues (primary infection) and 19 with failed endodontic treatment (secondary infection). Strict anaerobic techniques were used for serial dilution, plating, incubation and identification.

RESULTS:

A total of 224 cultivable isolates were recovered belonging to 56 different bacterial species. Individual root canals yielded a maximum of 10 bacterial species. Of the bacterial isolates, 70% were either strict anaerobes or microphilic. The anaerobes most frequently isolated were: Peptostreptococcus micros (35%), Fusobacterium necrophorum (23.3%), Fusobacterium nucleatum (11.7%), Prevotella intermedia/nigrescens (16.7%), Porphyromonas gingivalis (6.7%) and Porphyromonas endodontalis (5%). The root canal microflora of untreated teeth with apical periodontitis was found to be mixed, comprising gram-negative and gram-positive and mostly anaerobic microorganisms and usually containing more than 3 species per canal. On the other hand, facultative anaerobic and gram-positive bacteria predominated in canals with failed endodontic treatment, which harbored 1-2 species per canal. Suggested relationships were found between anaerobes, especially gram-negatives, and the presence or history of pain, tenderness to percussion and swelling (P<0.05). In particular, associations were found between:

- pain (n=29) and P. micros (P<0.01), P. intermedia/nigrescens and Eubacterium spp. (both P<0.05);
- history of pain (n=31) and P. micros (P<0.01) Porphyromonas and Fusobacterium spp. (P<0.05);
- tenderness to percussion (n=29) and Porphyromonas spp. (P<0.01), Peptostreptococcus and Fusobacterium spp. (P<0.001);
- swelling (n=20) and Peptostreptococcus spp. (P<0.01), Porphyromonas and Enterococcus spp. (P<0.05);
- wet canals (n=33) and Porphyromonas and Fusobacterium spp. (P<0.05);
- purulent exudate (n=20) and Porphyromonas, Peptostreptococcus and Fusobacterium spp. (P<0.05); previous endodontic treatment and Enterococcus faecalis, Streptococcus spp., P. micros, F. necrophorum (P<0.05).

CONCLUSIONS:
Our findings indicate potential complex interactions of species resulting in characteristic clinical pictures which cannot be achieved by individual species alone. They also indicate that the microbiota of primary infected canals with apical periodontitis differs in number and in species from the secondary infected canals by using the culture technique.

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