International Poster Journal IPJ of Dentistry and Oral Medicine

Int Poster J Dent Oral Med 2008, Vol 10 No 03, Poster 413

Vitality of dental biofilms in relation to plaque formation

Language: English

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Date/Event/Venue:
March 21-24, 2007
IADR/AADR/CADR 85th General Session and Exhibition
New Orleans, Louisiana, USA

Introduction

Several investigations demonstrated a difference in the formation of plaque between different individuals enabling the clinician to distinct between "slow" and "heavy" plaque formers.

Objectives

Our aim was to compare the percentage of vital micro-organisms in slow and heavy plaque formers, in different areas of the mouth, and at different teeth.

Material and Methods

Participants: Fifty participants (38 female, 12 male) including students of the dental school and participants from the local community in Dresden, Germany.

Study design:
After a professional tooth cleaning was performed, the plaque which formed after 8 h, 24 h, and 72 h of undisturbed plaque accumulation was assessed quantitatively and qualitatively.
Parameters:
Plaque index (PlI; Silness and Löe 1964).
Plaque formation rate index (PFRI; Axelsson 1990)
Vital fluorescence microscopy (VF; Netuschil et al. 1989).
Participants were assigned to "heavy" or "light" plaque formers according to either PFRI or PlI.
Statistics:
U-test ($p < 0.05$).

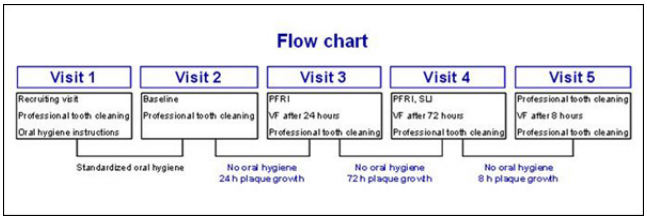
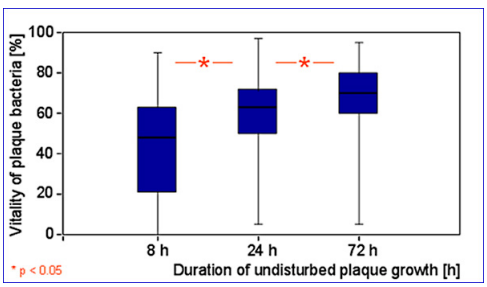


Figure 1: Flow chart

Results

A statistically significant increase of plaque vitality with duration of plaque formation was observed. At all investigation time points a higher amount of vital microorganisms was registered in "heavy" plaque formers when compared to "slow" plaque formers ($p<0.01$). No differences in plaque vitality could be found between upper and lower jaw and between different quadrants of the mouth. The biofilm of incisor teeth exhibited statistically significant less vital micro-organisms as that of molar teeth ($p<0.002$).



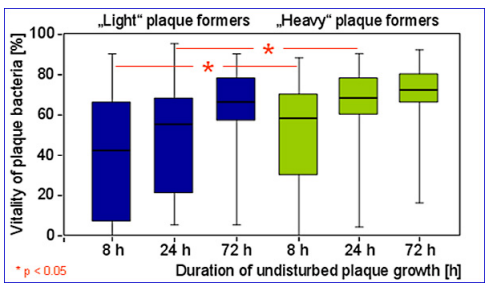


Figure 2: Vitality of plaque bacteria at 8 h, 24 h, and 72 h of undisturbed plaque growth

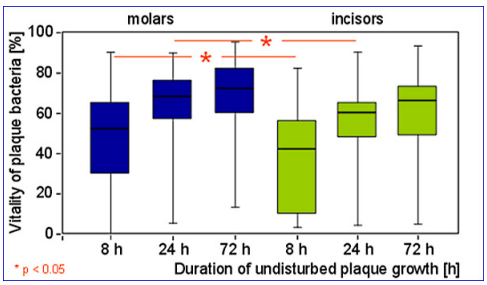


Figure 3: Plaque vitality at "light" and "heavy" plaque formers by PFRI

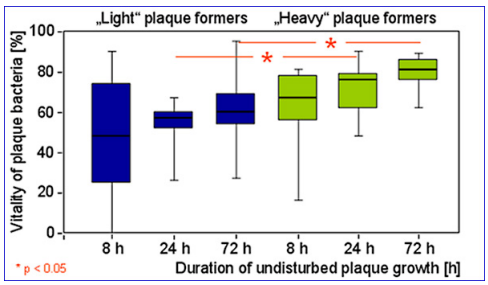


Figure 4: Plaque vitality at molars and incisors

Figure 5: Plaque vitality at "light" and "heavy" plaque formers by PFRI

Conclusions

The evaluation of plaque formation rate could be helpful for preventive strategies of caries and of periodontal diseases. Persons as well as teeth exhibiting a heavy plaque formation show a statistically significant higher amount of vital micro-organisms and should be therefore included in high risk oriented prevention and recall systems.

Abbreviations

PII = Plaque index
PFRI = Plaque formation rate index
VF = Vital fluorescence

This Poster was submitted by Prof. Dr. Thomas Hoffmann.

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