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Vitality of dental biofilms in relation to plaque formation

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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 (PII; Silness and Løe 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 PII.

Statistics:

U-test ($p < 0.05$).

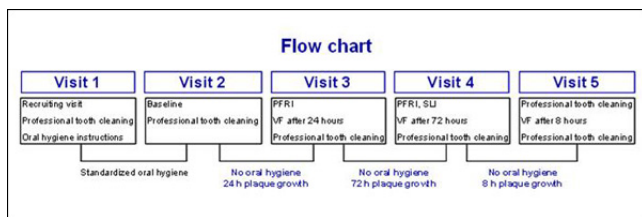


Figure 1: Flow chart

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 ($p < 0.002$).

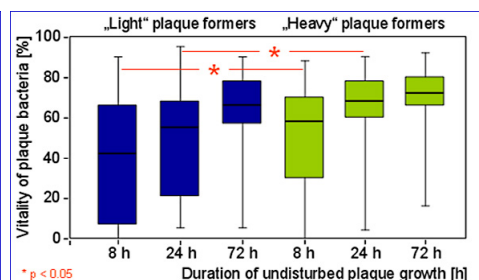
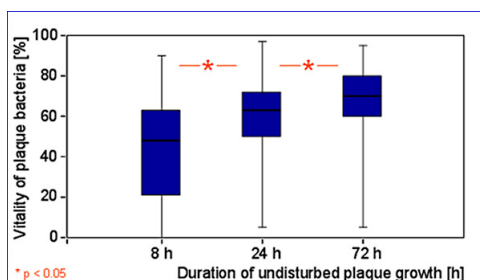


Figure 2: Vitality of plaque bacteria at 8 h, 24 h, and 72 h of undisturbed plaque growth

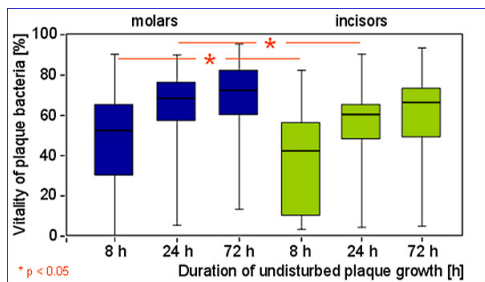


Figure 3: Plaque vitality at "light" and "heavy" plaque formers by PFRI

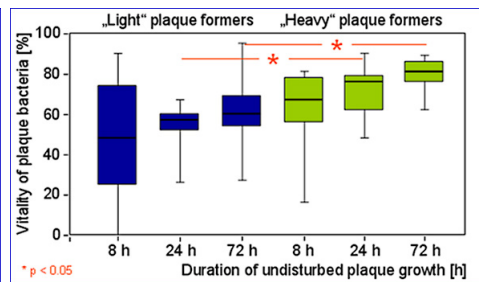


Figure 4: Plaque vitality at molars and incisors

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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VITALITY OF DENTAL BIOFILMS IN RELATION TO PLAQUE FORMATION

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OBJECTIVES

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

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.

METHODS

Flow chart

Visit 1	Visit 2	Visit 3	Visit 4	Visit 5
Recruiting visit Professional tooth cleaning Oral hygiene instructions	Baseline Professional tooth cleaning	PFRI, PII VF after 24 hours Professional tooth cleaning	PFRI, PII VF after 72 hours Professional tooth cleaning	Professional tooth cleaning PFRI, PII, VF after 8 hours Professional tooth cleaning
Standardized oral hygiene		No oral hygiene 24 h plaque growth	No oral hygiene 72 h plaque growth	No oral hygiene 8 h plaque growth

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 micro-organisms was registered in "heavy" plaque formers when compared to "light" 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).

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:
A professional tooth cleaning was performed and then the plaque formation rate was assessed quantitatively and qualitatively after 8h, 24h, and 72h of undisturbed plaque accumulation.

Parameters:

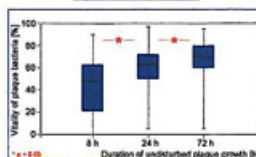
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Participants were assigned to "heavy" or "light" plaque formers according to either PFRI or PII.

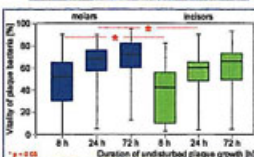
Statistics:
U-test (p < 0.05).

RESULTS

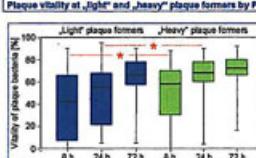
Plaque vitality



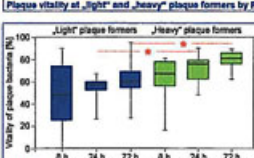
Plaque vitality at molars and incisors



Plaque vitality at „light“ and „heavy“ plaque formers by PFRI



Plaque vitality at „light“ and „heavy“ plaque formers by PII



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.