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Effect of a Crossover Design on the 24-hour Plaque Regrowth

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Authors:

Dr. Diana Wolff, PD Dr. Thomas Pioch, PD Dr. Christof E. Dörfer
University of Heidelberg, School for Dental Medicine

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Introduction

The aim of this study was to evaluate whether or not a crossover design would influence the 24-hours plaque regrowth.

Objectives

The cleaning efficacy of different toothbrushes was frequently tested in a plaque regrowth crossover design, i.e. participants had to abstain from oral hygiene, repeatedly. This might have influenced the amount of initial plaque accumulation. As the baseline plaque is the most important confounder for the amount of plaque reduction those changes would significantly influence the outcome of the study.

Material and Methods

In two separate toothbrush studies with a crossover design, 158 participants volunteered to abstain twice (T1 and T2) for 24 hours from all oral hygiene procedures prior to the test. The time between the two arms of each study was 12 days. Plaque accumulation was measured by one calibrated examiner using the Turesky modification of the Quigley & Hein Index.

Data Handling and Statistical Analysis

Double data entry and plausibility check were performed. Non-parametric Wilcoxon test for paired samples was done to test the differences for statistical significance. The significance level was set at $p = 0.05$.

Turesky Plaque Index (TPI)

This modification of the Quigley-Hein plaque index was introduced by Turesky et al. in 1970 and represents a system for evaluating the extension of plaque. The amount of plaque is determined with disclosing solution and scored from 0 to 5 (Fig. 1). The mean score per person is taken as measure for the amount of plaque.

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- 0 No plaque
- 1 Separate flecks of plaque at the cervical margin of the tooth
- 2 A thin continuous band of plaque up to 1 mm at the cervical margin of the tooth
- 3 A band of plaque wider than 1 mm but covering less than 1/3 of the tooth
- 4 Plaque covering at least 1/3 but less than 2/3 of the crown
- 5 Plaque covering 2/3 or more of the crown

Fig. 1: Grading of the Turesky modification of the Quigley & Hein plaque index.

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- Fig. 2: 24-hours plaque regrowth at T1 and T2

Results

The overall 24-hours plaque regrowth resulted in scores of 2.10 ± 0.06 (T1), and 1.67 ± 0.56 (T2; $p < 0.001$; Wilcoxon test for paired samples). The most pronounced differences were found at proximal (T1: 2.20 ± 0.58 ; T2: 1.74 ± 0.54 ; $p < 0.001$) and lingual sites (T1: 1.56 ± 0.60 ; T2: 0.98 ± 0.43 ; $p < 0.001$). As these areas are difficult to reach it is unlikely that the differences are the consequence of violations of the regrowth protocol.

	T1	T2	p-values
Overall	2.10 ± 0.60	1.67 ± 0.56	<0.001
Lingual sites	1.56 ± 0.60	0.98 ± 0.43	<0.001
Buccal sites	2.66 ± 0.82	2.36 ± 0.87	<0.001
Central sites	1.92 ± 0.66	1.51 ± 0.60	<0.001
Proximal sites	2.20 ± 0.58	1.74 ± 0.54	<0.001

Fig. 1: 24-hours plaque regrowth values at the first timepoint (T1) and at repetition after 12 days (T2)

Conclusion

Repeating plaque regrowth within 12 days results in a significant lower plaque accumulation, especially at sites, which are difficult to reach. We assume that patients keep up an improved oral hygiene during the course of the study founded on an increased oral health awareness. This might significantly influence the outcome of cross-over study designs.

This Poster was submitted by Dr. Diana Wolff.

Correspondence address:

PD Dr. Christof E. Dörfer
 Clinic for Conservative Dentistry
 University of Heidelberg
 Im Neuenheimer Feld 400
 69120 Heidelberg
 Germany

Poster Faksimile:

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D. WOLFF*, T. PIOCH, C.E. DÖRFER

University of Heidelberg, Clinic for Conservative Dentistry, Im Neuenheimer Feld 400, 69120 Heidelberg, Germany

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Figure 2 24-hours plaque regrowth at T1 and T2.

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Double data entry and plausibility check.

Non-parametric Wilcoxon test for paired samples to test the differences for statistical significance.

The significance level was set at $p = 0.05$.

Turesky Plaque Index (TPI)

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Figure 1 Grading of the Turesky modification of the Quigley & Hein plaque index.

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Correspondence to: Priv.-Doz. Dr. Christof Dörfer, Poliklinik für Zahnerhaltungskunde, Im Neuenheimer Feld 400, D-69120 Heidelberg, e-mail: christof_dorfer@med.uni-heidelberg.de