

# A clinical study to investigate biomarkers from fluids of the oral cavity and the benefits on plaque and gingivitis reduction when using an electrical toothbrush with an irrigator

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<b>Registration date</b> 23/01/2019	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan <input checked="" type="checkbox"/> Results
<b>Last Edited</b> 17/03/2022	<b>Condition category</b> Oral Health	<input type="checkbox"/> Individual participant data

## Plain English summary of protocol

### Background and study aims

Periodontal (gum) disease is prevalent worldwide. The critical strategy is prevention through effective daily oral hygiene and early diagnosis and treatment before further progression occurs. Since oral (mouth) fluids and dental plaque samples are easy to collect in everyday dental practice and because they contain biomarkers of gingivitis (gum inflammation), these samples may provide a good basis for a specific and improved early periodontal diagnostic tool. The aim of this study is to investigate whether the use of an electric toothbrush and an irrigator over a period of 8 weeks is able to reduce gingivitis and plaque and improve oral fluid/pathogen biomarker levels reflecting better gingival health.

### Who could participate?

Generally healthy adults with evidence of mild to moderate gingivitis

### What did the study involve?

Participants are randomly allocated to either the test group (electric toothbrush and irrigator) or the control group (regular manual toothbrush). Participants use their assigned products with a regular toothpaste twice daily at home for the duration of the study. At the beginning of the study and at weeks 2, 4, and 8 dental plaque and gingivitis status are evaluated by a dentist. Also saliva and fluids from the gingival pockets are collected for biomarker analysis. Additionally, home saliva samples are collected by the participants before all clinical visits for analysis.

### What were the possible benefits and risks of participating?

The study was designed to assess if the participants in the test group experience an improvement in oral health. The participants received information by dental professionals about their oral health status and weaknesses in their oral hygiene routine. In addition, their participation helped in the development of products that aim to improve oral health. Both groups received a dental prophylaxis (cleaning procedure) at their final visit. There were no notable risks involved with participating.

Where was the study run from?  
University of Bern (Switzerland)

When was the study starting and how long was it expected to run for?  
November 2010 to July 2013

Who was funding the study?  
Procter and Gamble Company (USA)

Who is the main contact?  
Dr Christoph Ramseier

## Contact information

**Type(s)**  
Scientific

**Contact name**  
Dr Christoph Ramseier

**Contact details**  
Department of Periodontology  
School of Dental Medicine  
University of Bern  
Freiburgstrasse 7  
Bern  
Switzerland  
3010

## Additional identifiers

**EudraCT/CTIS number**

**IRAS number**

**ClinicalTrials.gov number**

**Secondary identifying numbers**  
Clinical Protocol 2010009

## Study information

**Scientific Title**  
Clinical parameters and oral fluid biomarkers in gingivitis subjects using a powered toothbrush with irrigator or a manual toothbrush alone: an 8-week randomized controlled clinical trial

**Study objectives**

The objective of the research is to investigate whether 8 weeks use of an improved homecare oral hygiene regimen that includes combination of an electric toothbrush and an irrigator will result in better gingival health (measurement of gingival index (GI) by Löe & Sillness (1963)) compared to a standard homecare oral hygiene regimen.

This study will secondarily evaluate the ability to distinguish the levels of gingivitis-associated oral fluid biomarkers and dental plaque between the two treatment groups.

### **Ethics approval required**

Old ethics approval format

### **Ethics approval(s)**

Kantonale Ethikkommission Bern, Postfach 56, Murtenstrasse 31, 3010 Bern, Switzerland, Tel: 0041 31 632 86 33, Email: pfiffner@kek-unibe.ch, 08/10/2012, IRB Approval #: KEK 066/11

### **Study design**

Single-center randomized controlled examiner-blind two-treatment parallel study

### **Primary study design**

Interventional

### **Secondary study design**

Randomised parallel trial

### **Study setting(s)**

Other

### **Study type(s)**

Prevention

### **Participant information sheet**

Not available in web format, please use the contact details to request a patient information sheet

### **Health condition(s) or problem(s) studied**

Oral mild to moderate gingivitis

### **Interventions**

Participants were stratified at baseline on age, tobacco use, number of bleeding sites, and mean plaque index. Within these strata, participants were randomly assigned to either the Test group (electrical toothbrush/irrigator and a standard anti-cavity toothpaste) or the Control group (regular manual toothbrush and a standard anti-cavity toothpaste).

Participants were instructed to use the study products at home twice daily (morning and evening) in place of their normal oral hygiene for the duration of the study (8 weeks).

Participants were asked to refrain from flossing for the duration of the study.

Participants of the Test group were instructed to brush their teeth using the toothpaste and electrical brush according to manufacturer instructions. They were instructed to rinse their mouth with water after brushing to remove excess paste. Then Participants should rinse their mouth with the irrigator with 300 ml water for approximately 1 minute.

Participants of the Control group were instructed to brush their teeth as they normally do using the products provided. Participants were instructed to rinse their mouth with water after brushing to remove excess paste.

At baseline and at week 2, 4, and 8 plaque and gingivitis were evaluated and gingival crevicular fluid (GCF) and whole saliva (WS) were collected for biomarker analysis. Additionally, home saliva samples were collected by the participants prior to all clinical visits for metabonomics and biomarker analysis on 5 consecutive days (one sample per day).

## **Intervention Type**

Other

## **Primary outcome measure**

Gingival inflammation and bleeding measured by Gingival Index (Löe & Sillness 1963) at baseline, week 2, 4, and 8

## **Secondary outcome measures**

Measured at baseline, week 2, 4, and 8:

1. Gingivitis-associated oral fluid biomarkers: whole Saliva and GCF (both collected at the clinic) were quantitatively analyzed for the amount of matrix-metalloproteinase (MMP)-8 and interleukin (IL)-1 $\beta$  by means of ELISA technique
2. Dental plaque measured by Plaque Index (Silness-Löe 1964)

## **Overall study start date**

08/11/2010

## **Completion date**

10/07/2013

# **Eligibility**

## **Key inclusion criteria**

1. Be at least 18 years of age
2. Provide written informed consent prior to participation and be given a signed copy of the informed consent form
3. Be in good general health as determined by the Investigator/designee based on a review of the medical history/update for participation in the study
4. Agree to return for the scheduled clinical visits and follow study instructions
5. Agree not to participate in any other oral care study for the duration of this study
6. Agree not to use any non-study oral hygiene products for the duration of the study (including dental floss)
7. Agree to delay any elective dentistry, including dental prophylaxis (outside of the study protocol), until study completion
8. Agree to refrain from brushing their teeth and from performing any other oral hygiene procedures 12 hours prior to each visit
9. Agree to refrain from eating, chewing gum, drinking or using tobacco for 4 hours prior to each visit
10. Have at least 20 gradable teeth
11. Have at least 15 gingival bleeding sites (as described in section 13 - Löe & Silness GI)

**Participant type(s)**

Healthy volunteer

**Age group**

Adult

**Lower age limit**

18 Years

**Sex**

Both

**Target number of participants**

60

**Total final enrolment**

60

**Key exclusion criteria**

1. Severe periodontal disease, as characterized by purulent exudate, generalized mobility, and /or severe recession
2. Active treatment for periodontitis
3. Fixed facial or lingual orthodontic appliances
4. Regular use of electric toothbrush
5. Need of antibiotic prophylaxis prior to the dental visit
6. Antibiotic use or prescription mouth rinse use within one month prior of Screening (Visit 1)
7. Dental prophylaxis within one month prior of Screening (Visit 1)
8. Any disease or condition that could be expected to interfere with the subject safely completing the study
9. Pregnancy or lactation

**Date of first enrolment**

11/02/2013

**Date of final enrolment**

10/05/2013

**Locations****Countries of recruitment**

Switzerland

**Study participating centre**

University of Bern, Department of Periodontology, School of Dental Medicine

Freiburgstrasse 7

Bern

Switzerland

3010

# Sponsor information

## Organisation

Procter and Gamble Company

## Sponsor details

8700 Mason-Montgomery Road

Mason Ohio

United States of America

45040

## Sponsor type

Industry

## Website

<https://us.pg.com>

## ROR

<https://ror.org/04dkns738>

# Funder(s)

## Funder type

Industry

## Funder Name

Procter and Gamble

## Alternative Name(s)

Procter & Gamble, PandG, The Procter & Gamble Company, P&G

## Funding Body Type

Government organisation

## Funding Body Subtype

For-profit companies (industry)

## Location

United States of America

# Results and Publications

### Publication and dissemination plan

Study protocol, statistical analysis plan, and other additional documents are not intended to become available online. Planned publication of the study results in a high-impact peer reviewed journal.

### Intention to publish date

31/12/2019

### Individual participant data (IPD) sharing plan

The datasets generated during and/or analysed during the current study are not expected to be made available because if the raw data is available but not analyzed appropriately by qualified experts in the area, it may lead to misinterpretation of the results.

### IPD sharing plan summary

Not expected to be made available

### Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Results article</a>		07/01/2021	17/03/2022	Yes	No