The WhiteTeeth app

The development and evaluation of a smartphone app for promoting oral health behavior and oral hygiene in adolescent orthodontic patients
Scheerman, J.F.M.

Citation for published version (APA):
In the absence of good oral hygiene, patients with fixed orthodontic appliances can develop white spot lesions that remain visible for the rest of their lives. As the opacity or discoloration of these lesions can seriously compromise dental aesthetics, orthodontic treatment may not be entirely successful. It is therefore necessary to establish the extent to which innovative oral health promotion programs can further improve patients' oral health behaviors and outcomes. However, little is known about the effectiveness of continuous behavioral support via mobile phones (mHealth).

This thesis describes the development and evaluation of a mobile app—the WhiteTeeth app—that was designed to promote good oral health behavior among adolescent orthodontic patients. The app's development was guided by intervention mapping (IM). Development thus starts with an analysis of the health problem, which includes identification of the psychosocial factors related to the health behavior. To identify the psychosocial factors underlying oral health behavior in our target group, we conducted a systematic literature review with meta-analysis and a cross-sectional clinical study. Then, to target these psychosocial factors and facilitate continuous behavioral support, various behavior change techniques were incorporated into the app.

The app provides feedback on users' oral health behavior and allows users to evaluate and monitor their behavior. Finally, a randomized controlled trial was conducted. This showed that the app improved oral hygiene in adolescent orthodontic patients.
The WhiteTeeth app

The development and evaluation of a smartphone app for promoting oral health behavior and oral hygiene in adolescent orthodontic patients

JANNEKE SCHEERMAN
The WhiteTeeth app

The development and evaluation of a smartphone app for promoting oral health behavior and oral hygiene in adolescent orthodontic patients

ACADEMISCH PROEFSCHRIFT

ter verkrijging van de graad van doctor
aan de Universiteit van Amsterdam
op gezag van de Rector Magnificus
prof. dr. ir. K.J.J. Maex
ten overstaan van een door het College voor Promoties ingestelde commissie,
in het openbaar te verdedigen in de Agnietenkapel
op woensdag 26 september 2018, te 12.00 uur

doors

Janneke Francisca Maria Scheerman
geboren te Heemskerk
PROMOTIECOMMISSIE

Promotores
Prof.dr. C. van Loveren
Universiteit van Amsterdam
Prof.dr. G.H.W. Verrips
Universiteit van Amsterdam

Copromotor(es)
Prof.dr. B.K.G. van Meijel
Hogeschool Inholland/Amsterdam UMC
Dr. P. van Empelen
TNO Child Health

Overige leden
Prof.dr. F. Lobbezoo
Universiteit van Amsterdam
Prof.dr. G.A. van der Weijden
Universiteit van Amsterdam
Prof.dr. J.J.M. Bruers
Universiteit van Amsterdam
Prof.dr. A.M. Kuijpers-Jagtman
Radboud Universiteit Nijmegen
Dr.ir. M.H. van der Veen
Vrije Universiteit van Amsterdam
Dr. D. Duijster
Vrije Universiteit van Amsterdam
Dr. T.G.W.M. Paulussen
TNO Child Health

Faculteit der Tandheelkunde

PARANIMFEN

Renate Zwolsman, MSc
Dr. Floor Aarts

“You can work from websites, you can work with Photoshop, I work with my iPhone. It’s ridiculous to fight new media. You can’t win, so you just have to incorporate it into your toolbox.”

LUC TUYMANS
TABLE OF CONTENTS

CHAPTER 1.
General introduction
11

CHAPTER 2.
Psychosocial correlates of oral hygiene behaviour in people aged 9 to 19 – A systematic review with meta-analysis
33

CHAPTER 3.
An application of the Health Action Process Approach model to oral hygiene behaviour and dental plaque adolescent orthodontic patients
63

CHAPTER 4.
Mobile app (WhiteTeeth) to promote good oral health behavior among adolescents with fixed orthodontic appliances: Intervention Mapping approach
83

CHAPTER 5.
Study protocol of a randomized controlled trial to test the effect of the WhiteTeeth app
121

CHAPTER 6.
The effectiveness of the WhiteTeeth app, a theory-based oral health promotion program for adolescent orthodontic patients
157

CHAPTER 7.
Summary/Samenvatting
181

APPENDICES.
Overview of authors’ contribution
Dankwoord (acknowledgement)
About the author
PhD portfolio
195