ISRCTN27780232 https://doi.org/10.1186/ISRCTN27780232

Effect of Carvacrol and Thymol against dental caries in children

Submission date
29/06/2018

Recruitment status
No longer recruiting

Registration date
20/07/2018

Overall study status
Completed

Last Edited
07/11/2019

Condition category
Oral Health

[ ] Prospectively registered
[ ] Protocol
[ ] Statistical analysis plan
[ ] Results
[ ] Individual participant data
[ ] Record updated in last year

Plain English summary of protocol

Background and study aims
Dental caries is a disease caused by bacteria that leads to cavity formation in the teeth. These cavities can eventually cause loss of teeth. In children, caries is a more aggressive disease and is a public health issue in many countries, because the cavities that form are difficult to treat and control at such a young age, often causing infections that may affect the child's growth and development. We still have not identified an easy and cost-effective way to prevent cavities in children. This study aims to test the use of two different substances, thymol (THY) and carvacrol (CAR), against dental caries in children, comparing the effect of these substances with chlorhexidine (CHX) and fluoride.

Who can participate in the study?
120 healthy children of both sexes, aged 31-60 months, enrolled to participate in this study.

What does the study involve?
The study involved application of a varnish (transparent or colored liquid that adheres to the teeth) to the child's teeth. These varnishes contained one of these substances: CAR, CAR and THY, CHX or Fluoride. Children were treated with one of these varnishes and followed-up during 12 months to see if these substances could prevent cavities, and which substance was better at preventing cavities. Not all participants received the same treatment, so a lottery system was used to decide which treatment to use for each participant. When a child started out the study being treated with one substance (decision made through the lottery system), they would join a specific "treatment group", and were only treated with this substance until the end of the study. Varnishes were applied, examinations were performed and bacteria was measured in saliva before treatment, and 7, 30, 90, 180 and 360 days after initial treatment. A single dentist examined all children. To collect saliva, children were asked to chew on a piece of paraffin and spit in a cup. The saliva was then diluted and cultured to evaluate growth of Streptococcus mutans (the main bacterium that causes caries).

What are the possible benefits and risks of participating?
These children benefited by being closely followed for dental caries at no cost, and they all

received free dental brushes and toothpastes. There were no risks involved in the study. Some children experienced a burning sensation right after treatment application (similar to what is felt after brushing with adult toothpaste).

Where is the study run from?
The study was run from the public school (kindergarten and daycare) at the “Executiva Regional SER IV” in Fortaleza (Brazil), and at the Pediatric Dental Clinic of the Federal University of Ceará.

When is the study starting and how long is it expected to run for?
May 2008 to February 2010.

Who is funding the study?
The study was partly funded by the Brazilian government through the National Council for Scientific and Technological Development (CNPq).

Who is the main contact?
1. Dr. Cristiane Fonteles. Federal University of Ceará. Postgraduate Program in Dentistry. Phone /Fax:+55-85-33668232, E-mail: cfontele@ufc.br
2. Dr. Jorgeana Abrahão Barroso. Phone: +55-85-33668408, E-mail: jorgeana_abrahao@hotmail.com

Contact information

Type(s)
Scientific

Contact name
Prof Cristiane Sá Roriz Fonteles

ORCID ID
http://orcid.org/0000-0003-4197-6002

Contact details
Department of Clinical Dentistry
Postgraduate Program in Dentistry
Rua Monsenhor Furtado, 1273
Fortaleza
Brazil
60430-355

Additional identifiers

EudraCT/CTIS number

IRAS number

ClinicalTrials.gov number

Secondary identifying numbers
136/08

Study information

Scientific Title
In vivo activity of Carvacrol and Thymol in the inhibition of mutans streptococci and caries experience in high-risk caries-free children: a longitudinal study

Study objectives
Carvacrol and Thymol do not differ in their antimicrobial activity against mutans streptococci and their anticaries properties , when compared to Chlorhexidine and Sodium Fluoride.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Ethics Committee in Research of the Federal University of Ceará (Brazil) - COMEPE, 25/09/2008, 136/08

Study design
Randomized parallel double-blind clinical trial

Primary study design
Interventional

Secondary study design
Randomised parallel trial

Study setting(s)
School

Study type(s)
Prevention

Participant information sheet
Not available in web format, please use contact details to request a participant information sheet.

Health condition(s) or problem(s) studied
Early childhood caries

Interventions
120 children were randomly divided into 4 groups based on the application of different formulations: group 1 (20% carvacrol), group 2 (10% carvacrol + 10% thymol), group 3 (20% chlorhexidine) and group 4 (5% sodium fluoride). The varnishes were similar in color, odor, texture and flavor. The manipulation of them was performed in the laboratory of Clinical Analysis, Faculty of Pharmacy, Dentistry and Nursing, Federal University of Ceará, Brazil. Then they were stored in an aluminum tube and identified by alphabet letters. The 5% sodium fluoride was purchased ready to use (Duraphat®/Colgate). The varnish application was performed in a standardized way, with microbrush® once every 3 months during a period of 1 year. Patients were monitored for the appearance of dental caries cavitated or non-cavitated lesions, during the 12 months of treatment, with clinical examinations every 3 months.

Intervention Type
Other

Primary outcome measure
Dental caries assessed by dental examinations performed by a single examiner during a 12-month period. These examinations were carried out before beginning of treatment, and 7, 30, 90, 180 and 360 days after initiation of treatment. In order to minimize the diagnostic bias between groups, a calibration of the examiner was performed, according to criteria recommended by the World Health Organization (1993). A mean Kappa of 0.83 was obtained, that is considered a good or excellent intra-examiner agreement level (Eklund, Moller, Leclerq, 1996).

Secondary outcome measures
Levels of mutans streptococci in saliva. Upon completion of the initial dental examination, a saliva sample was collected from each participant for the first microbiological analysis (baseline (B), before the start of treatment and 5 collections, 7 (D7), 30 (D30), 90 (D90), 180 (D180) and 360 (D360) days after the start of treatment. One hour prior to saliva collection children performed oral hygiene. Stimulated saliva collection was performed by asking the child to chew a piece of paraffin (3x3cm) Parafilm “M”® Laboratory Film (American National Can, Greenwich, CT) for 60 s. Then saliva was collected in the first minute, transferred into sterile tubes Eppendorfs® and transported for further analysis. The medium used for MS culture was mitis salivarius bacitracin agar (MSB) (Difco, Detroit, Michigan, USA) supplemented with 1% potassium tellurite (Vetec Fine chemicals LTDA, Rio de Janeiro), 1% bacitracin (Sigma) and 15% sucrose (Merck) (Gold, Jordan, Van Houte, 1973).
For microbiological analysis, saliva was diluted into 1:10 and 1:100 dilutions to allow the counting of MS. A volume of 20 µL of each dilution or pure saliva was cultured in triplicate in MSB agar, being spread using a tip in a Petri plate, that were then incubated in a bacteriological incubator (Biomatic) at 37°C in a microaerophilic environment for 48 h. After this period, MS colonies were counted (Western, Krass, 1978) through visual observation (Koneman, 2001) and converted into CFU/ml of saliva.

Overall study start date
05/05/2008

Completion date
01/02/2010

Eligibility

Key inclusion criteria
1. Aged 36–71 months
2. Caries-free children without past caries
3. At a high-risk category for dental caries according to the 2010 guidelines of the American Academy of Pediatric Dentistry
4. Enrolled in schools and preschools in the city of Fortaleza (Brazil)

Participant type(s)
Healthy volunteer

Age group

Child

Lower age limit
36 Months

Upper age limit
71 Months

Sex
Both

Target number of participants
A total of 120 children were included in the study. These children were randomly divided into 4 treatment groups (n=30 each).

Key exclusion criteria
1. History of allergic diseases (asthma, rhinitis, sinusitis, skin rash)
2. History of allergies to medications and food
3. Aphthous ulcers or lesions affecting the oral mucosa
4. Taking antibiotics during the study period
5. Parents or legal guardians refused to sign the informed consent

Date of first enrolment
01/11/2008

Date of final enrolment
01/02/2009

Locations

Countries of recruitment
Brazil

Study participating centre
Federal University of Ceará
Rua Monsenhor Furtado, 1273
Rodolfo Teófilo
Fortaleza
Brazil
60430-355

Study participating centre
Executiva Regional SER IV
Avenida Dede Brasil, 3770 - Serrinha.
Fortaleza
Brazil
60346-196

Sponsor information

Organisation
Federal University of Ceará - Comitê de Ética em Pesquisa - UFC/PROPESQ

Sponsor details
Rua Coronel Nunes de Melo, 1000 - Rodolfo Teófilo
Fortaleza
Brazil
60416-000

Sponsor type
Research council

Website
http://www.dvprppg.ufc.br/cep/index.php/pt-br/contato

ROR
https://ror.org/03srtnf24

Funder(s)

Funder type
Not defined

Funder Name
Conselho Nacional de Desenvolvimento Científico e Tecnológico

Alternative Name(s)
Brazilian National Council for Research and Development, National Council for Scientific and Technological Development, CNPq

Funding Body Type
Government organisation

Funding Body Subtype
National government

Location
Brazil

Results and Publications

Publication and dissemination plan
The results of this trial are being submitted as a single publication to the Journal of Caries Research.

Intention to publish date
06/08/2018

Individual participant data (IPD) sharing plan
The datasets generated and/or analysed during the current study will be included in the subsequent results publication. This dataset consists of statistics of the following variables: age /sex of participants, timing of data collection, mutans streptococci levels in saliva and number of decayed, missing and filled surfaces (dmfs) obtained throughout the study evaluation period. We do not have consent from participants to provide access to patient's raw data.

IPD sharing plan summary
Available on request