WORLD JOURNAL OF PHARMACY AND PHARMACEUTICAL SCIENCES
SJIF Impact Factor 7.421
Volume 7, Issue 7, 610-616 Research Article ISSN 2278 – 4357

TO DETERMINE THE EFFECT OF OIL PULLING ON SALIVARY STREPTOCOCOUS MUTANS COUNT -IN VIVO STUDY

Dr. Shikha Chauhan[1]*, BDS, MDS, Dr. Manvi Malik[2], BDS, MDS, Dr. Vinod Sachdev[3], BDS, MDS, Dr. Shobhit Sachdeva[4], BDS, MDS, Dr. Shivani Mathur[5], BDS, MDS

*[1]Post Graduate Student, Department of Pedodontics and Preventive Dentistry ITS Dental College, Delhi-Meerut Road, Muradnagar, Ghaziabad, Uttar Pradesh 201206.

[2]Reader, Department of Pedodontics and Preventive Dentistry ITS Dental College, Delhi-Meerut road, Muradnagar, Ghaziabad, Uttar Pradesh 201206.

[3]Professor and Head of the Department, Department of Pedodontics and Preventive Dentistry ITS Dental College, Delhi-Meerut road, Muradnagar, Ghaziabad, Uttar Pradesh 201206

[4]Reader Department of Pedodontics and Preventive Dentistry ITS Dental College, Delhi-Meerut road, Muradnagar, Ghaziabad, Uttar Pradesh 201206.

[5]Associate Professor, Department of Pedodontics and Preventive Dentistry ITS DENTAL COLLEGE, Delhi-Meerut Road, Muradnagar, Ghaziabad, Uttar Pradesh 201206.

Article Received on
23 April 2018,

Revised on 14 May 2018,
Accepted on 04 June 2018

DOI: 10.20959/wjpps20187-11786

***Corresponding Author**
Dr. Shikha Chauhan
Post Graduate Student, Department of Pedodontics and Preventive Dentistry ITS Dental College, Delhi-Meerut Road, Muradnagar, Ghaziabad, Uttar Pradesh 201206.

ABSTRACT

Objectives: Oil pulling is an age-old practice that has gained modern popularity in promoting oral and systemic health. The scientific verification for this practice is insufficient. Thus, this study evaluated the effect of coconut oil pulling on the count of Streptococcus mutans in saliva in vivo. **Materials And Methods:** A randomized controlled study was planned and 45 subjects were selected. The subjects were divided into three groups, STUDY GROUP: Group I-Oil pulling, Group II-Chlorhexidine, and CONTROL GROUP: Group III Saline. Group I subjects rinsed mouth with 10 ml of edible coconut oil for 10 minutes. Group II subjects rinsed mouth with 5 ml Chlorhexidine mouthwash for 1 minute and Group III with 5 ml distilled water for 1 minute in the morning. Saliva samples were collected and cultured on 1st day and after 14 days from all subjects. Colonies were counted to compare the efficacy of coconut oil and Chlorhexidine with distilled

water. **Results:** Statistically significant reduction in *S. mutans* count was seen in both the coconut oil pulling and Chlorhexidine group. **Conclusion:** Oil pulling can be explored as a safe and effective alternative to Chlorhexidine. **Clinical significance:** Edible oil-pulling therapy is natural, safe and has no side effects. Hence, it can be considered as a preventive therapy at home to maintain oral hygiene.

KEYWORDS: Chlorhexidine group, *S. mutans.*

INTRODUCTION

Oil pulling is an age-old process mentioned in Charaka Samhita and Sushrutha's Arthashastra. It is referred to as Kavala Graha and Kavala Gandoosha. In Gandoosha the mouth is completely filled with oil so that gargling is impossible and is spitted after 3-5 minutes, whereas in Kavala Graha, a comfortable amount of fluid is retained in the mouth and gargled. In Ayurveda this procedure is said to cure about 30 systemic diseases and basically slows down ageing process. Oil pulling was familiarized in Russia in1990's by Dr F Karach.[1]

Oil pulling or oil swishing therapy is a traditional procedure in which the practitioner rinses or swishes oil in their mouth for preventing dental caries, oral malodor, bleeding gums, dryness of throat and cracked lips.[2] Oil pulling is preferably done in the morning on empty stomach, the oil is taken in the mouth, sipped sucked and pulled between the teeth for 10-15 minutes, the oil turns thin and milky white. The oil should not be swallowed as it contains bacteria and toxins. Oil pulling therapy should be followed by tooth brushing.[1]

Efficacy of oil pulling

The exact mechanism of action of oil pulling is not clear. Some claim that by oil pulling it sucks up bacteria, toxins pus and mucous. Scientifically it cannot be proved as the oral mucosa is not a semi permeable membrane to allow toxins etc to pass through. It is proposed that viscosity of oil can inhibit bacterial invasion and plaque adhesion.[6] Other possible mechanism may be saponification process that results that occurs as a result of alkali hydrolysis of oil by bicarbonates in saliva. These soaps act as good cleansing agents in removing micro organisms or plaque materials. Asokan et al found that sesame oil has no direct antibacterial action other than emulsification and saponification.[3]

Efficacy of coconut oil

Coconut oil has an unique role in the diet as important functional food. The difference between coconut oil and other edible oils is that coconut oil has a medium chain fatty acid whereas other edible oils are composed of long chain fatty acids.[3] The medium sized monoglucerides is hypothesized to alter bacterial cell wall, inhibit enzymes involved in energy production leading to the death of the bacteria. Also found that medium-chain saturated fatty acids and their derivatives act by disrupting the lipid membranes of the organisms. The lauric acid in coconut oil is used by the body to make the same disease fighting fatty acid derivative monolaurin that babies make from the lauric acid they get from their mother's milk.[3,4]

MATERIALS AND METHODS

A single centered randomized controlled trial was conducted in department of Pedodontics and preventive dentistry. A total 45 children with written consent of their parents were included in the study. The subjects were divided into three groups, STUDY GROUP:Group 1:Oil pulling, Group 2-Chlorhexidine, and CONTROL GROUP: Group C -saline.

INCLUSION CRITERIA

- Subjects in the age group of 8-12 years.
- The DMF scores of the children were 1-2.

EXCLUSION CRITERIA

- History of antibiotic use in the past 3-4 weeks.
- History of fluoride treatment in the past 2 weeks

Each subject was allotted to a specific number. The Group I was subjected to oil pulling with 10 ml coconut oil (Patanjali, edible coconut oil) for 10 min. The Group II was given 5ml NaFl based mouthwash (Kidodent) for 1 min. The Group III was given 5ml Saline (Sodium cloride I.P.0.9%) for 2 min every day in the morning for 14 days.

SALIVA SAMPLE COLLECTION

A proforma was designed in which details pertaining to the study were noted for each patient. Saliva sample were collected at baseline (day 1) and after 14 days of both the study and control group. Samples were transferred and processed to the microbiology laboratory for inoculation and colonies were counted using a digital colony counter and recorded.

FIGURE 1: Procedural image: (A) Sample collection, (B) Laminar flow for microbial culture, (C) Colonies of bacteria on blood agar, (E) and (F) Digital colony counter.

RESULTS

There was reduction of values of *S.mutans count* after 14 days but it was not statistically significant in both the groups- Group I (Oil pulling) and Group II (NaFl based mouth wash). Table 1.Statistically significance difference was found in control group (Group III) and Group I as well as Group II. (Table 2 and Table 3).

Table 1: The comparison of mean score of *S.Mutans* count Group I(oil pulling) and Group II (clorhexidine).

	Group	N	Mean	Std. Deviation
Baseline	1	15	433.07	168.438
15th day	2	15	448.00	115.803
Baseline	1	15	354.53	14.871
15th day	2	15	384.27	115.398

Table 2: The comparison of mean score of *S.Mutans* count Group II(clorhexidine) and Group III (saline).

	Group	N	Mean	Std. Deviation
Baseline	2	15	448.00	115.803
15th day	3	15	436.53	170.484
Baseline	2	15	384.27	115.398
15th day	3	15	421.87	171.713

Table 3: The comparison of mean score of *S.Mutans* count Group II(clorhexidine) and Group III (saline).

	Group	N	Mean	Std. Deviation
Baseline	1	15	433.07	168.438
15th day	3	15	436.53	170.484
Baseline	1	15	358.53	134.871
15th day	3	15	421.87	171.713

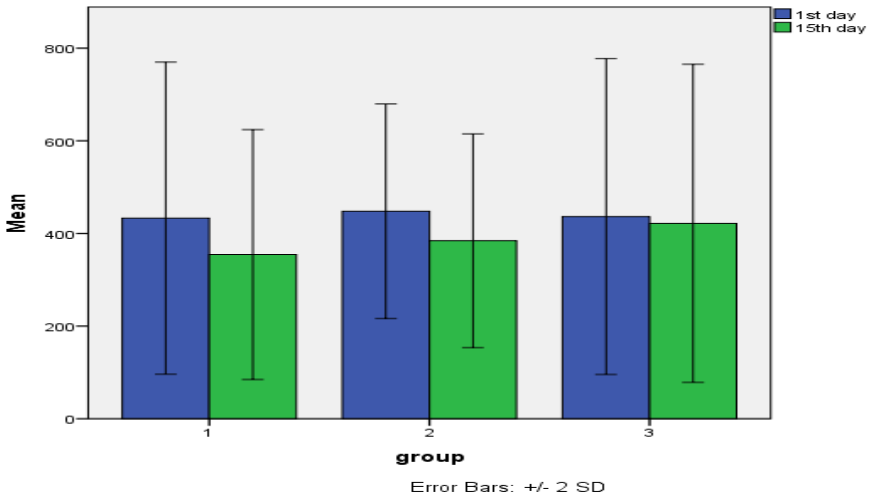

FIGURE 2: Comparison of Group I, Group II and Group III in Reduction of *S.* Mutans count at baseline and after 14 days.

DISCUSSION

Dental caries is a complex multifactorial disease caused by interaction of host, agent, substrate, and time. Oral microorganisms present in saliva are considered crucial for the

initiation and progression of dental caries.Loesche claimed that *S. mutans* is the chief pathogen in dental caries.[4,5] This study was planned to evaluate the efficacy of oil pulling therapy in reducing *S. mutans*, the initiator of dental caries. There was a definitive reduction in the *S. mutans* count in plaque and saliva after oil pulling therapy. The mechanism by which oil pulling therapy causes reduction in *S. mutans* is not known.[5]

The antimicrobial effect of coconut oil was first reported by Hierholzer and Kabara. Recent studies shows that coconut oil has anti microbial activity against various gram positive and gram negative organisms namely Escherichia vulneris, Enterococcer spp, H pyelori, staphylococcus aureus, Candia albicans and other strains due to the presence of monolaurin, a monosacchride in coconut oil.[4,5] Electron microscopic image showed that 15 minutes exposure to monolaurin caused gram positive cocci cell shrinkage and cell membrane disintegration. The glycolipid compound Sucrose monolaurate present in carieshas anticaries effect due to reduced glycolysis and sucrose oxidation in a non competitive manner on streptococcus mutans and thus prevents in vitro plaque.[6]

In this study there is no significant difference in reduction of *S.*mutans count in both oil pulling and NaFl based mouthwash but coconut oil has certain advantages over mouthwash it does not stain, it has no lingering aftertaste and causes no allergy. There are no disadvantages for oil pulling therapy except for the extended duration of the procedure compared with mouthwash

CONCLUSION

Reduction in *S.* mutans count was seen in both the oil pulling and chlorhexidine groups. Statistically insignificant reduction in the mean *S.* mutans counts in both the groups. Oil pulling therapy can be a good preventive home therapy in developing countries like India. More extensive studies with larger samples and over varying time periods should be carried out to establish the efficacy of oil pulling therapy

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