Original Article

www.ijrhs.com
ISSN (o):2321 – 7251

Effect of oil pulling on peak expiratory flow rate

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Abstract:

Introduction and objective: Oil pulling (OP) is an ancient Ayurvedic procedure traditionally followed by the Indians for improvement of general health and oral hygiene. It is believed to be effective in treating many clinical problems including respiratory disorders. Its beneficiary effect on oral health had been well documented; but its impact on general health, especially on respiratory functions are scanty. Hence an attempt had been made to assess the impact of OP on pulmonary functions by recording peak expiratory flow rate (PEFR). **Materials and Methods:** 60 normal healthy students of both genders (30 each) in the age group of 17 to 24 years did OP for 15 minutes before breakfast using 10 ml of sesame oil. PEFR was measured before and after OP by using mini peak flow meter. **Results:** Anthropometrically males had significantly higher values than females ($p < 0.000$). PEFR increased significantly ($p < 0.000$) after OP in both the groups ($p < 0.000$) and there was no significant difference in the level of increase ($p < 0.915$). DISCUSSION: Though PEFR is considered to be effort-dependent, it may not be the reason for its increase after OP in the present study because same effort was enforced before OP also. The most probable reason for increase in PEFR after OP in the present study may be the OP-induced bronchodilator effect. **Conclusion:** OP increases PEFR and as PEFR is a diagnostic and prognostic tool for respiratory diseases, OP-induced changes in PEFR may be of use in therapeutic interventions.

Key words: Normal subjects; Oil pulling; Peak expiratory flow rate; Sesame oil

Introduction

Oil pulling (OP) is an age-old Ayurvedic procedure traditionally followed by Indian folk as one of the effective alternative medicine for oral and systemic health benefits [1]. It involves swishing, sucking and pulling of the oil in the mouth for 15 to 20 minutes on an empty stomach in the morning as soon as getting up from the bed (before eating or drinking). At the end of this process, the viscous oil becomes thin and milky white. During or after swishing, the oil should not be swallowed; it should be spit out because it contains toxins and bacteria drawn from the oral cavity [2].

OP is highly beneficial in maintaining the oral hygiene and many research reports are available in the literature regarding its impact on dental health. It was found to be effective in preventing and getting rid of the bacterial growth that causes dental caries [2]. Amith et al., have reported that OP is effective in suppressing and preventing plaque formation and gingivitis, fixing the loosened teeth, arresting the bleeding in the gums, whitening of the teeth, and preventing the tooth decay [3]. When compared to the conventional methods like brushing, flossing and gargling with antiseptic mouth-washes, OP was found to be 50% more effective in maintaining the oral hygiene [3]. However, documentation of the beneficial effects of OP on systemic health is scanty.

Though OP finds its root way back to Ayurvedic medicine, the OP that we know today is because of Dr. F. Karach. He had mentioned that OP could prevent sleeplessness and cure blood diseases, neural disorders, gastrointestinal problems, headaches, thrombosis, encephalitis, leukemia, ulcers, cardiac problem s and renal diseases. He was

of the opinion that OP was also effective in curing asthma, bronchitis and other respiratory disorders [4]. He was his own experimental piece to claim that he was cured of his fifteen years' old blood disorder and painful chronic arthritis by OP and successfully practiced it in his medical profession also [5,6].

According to a survey report published in a Telugu News Paper named 'Andhra Jyothi' in 1996, OP was capable of relieving body pain and curing skin disorders, constipation, arthritis, heart diseases, diabetes, piles, reproductive disorders in females, polycystic kidney, neural fibroma, polio, cancer, leprosy and respiratory problems such as asthma and bronchitis [7]. However, authentic scientific documentation about the effects of OP on general health, especially on respiratory system is lacking. Hence, an attempt had been made in the present study to evaluate the immediate effect of OP on respiratory function by determining peak expiratory flow rate (PEFR).

PEFR was selected as a parameter in the present study because it is simple to perform and is widely accepted as a reliable parameter of pulmonary functions. We owe our gratitude to Hadorn who introduced PEFR in 1942. It was accepted as a parameter of pulmonary function test only in 1949 [8]. PEFR is affected by a number of factors like age, height, body surface area, high altitude etc. [9]. Many reports are available in literature regarding the link between general health and PEFR [10-13]. But, to the best of our knowledge, no study had been done on the impact of OP on PEFR so far and this is an initial attempt to invade this field.

Materials and Methods

Sixty normal healthy young male and female (30 each) students in the age group of 17 to 24 years in the Madha group of institutes in Chennai participated in this study. Non-athletic, non-exercising and non-smoking subjects were preferred for this study because athletic activities, exercises and smoking may influence the blowing capacity of the individual. Subjects with respiratory problems and any other ailment that needed medication or those who were already on medication for any systemic diseases were excluded from this study. Female subjects were taken for the test in the pre-ovulatory period.

Procedure for OP

It was done for 15 minutes in the morning on empty stomach before drinking or eating anything. 10 ml (one table spoon) of sesame oil was poured into the mouth of the subjects and were instructed to swish or pull the oil gently by moving it around the mouth and through the teeth with the help of the tongue by keeping the head straight.

They were strictly warned not to gargle or swallow the swished oil as it was supposed to contain the toxins drawn from the oral cavity and the whole body.

At the end of 15 minutes, the subjects were asked to spit out the oil that turned into a milky white and thin liquid and washed the mouth with clean plain water [14].

Measurement of PEFR was done by using a mini Wright peak flow meter (Airmed, UK). The instrument was calibrated initially and was periodically checked by comparing it with a standard Wright Peak flow meter. Four mini-meters were used throughout the study. Ethical clearance was obtained from the Institutional Ethical committee and written informed consent was obtained from all the participants after making them understand the purpose and the method of performance of PEFR. Recording was done in the forenoon by the same observer under the supervision of a single guide. All the subjects were given good training by many trials to perform the test perfectly. They blew into the mouth piece of the flow meter with maximal effort in a standing position. Three readings were recorded and the highest value was taken as the final test value. Utmost care was taken to prevent the air leakage between the lips and the mouth piece of the instrument.

The percentage predicted values were taken for analyzing the data. The data were analyzed by Student's t-test using SPSS software, Version 17. The significance level was fixed at $p < 0.05$.

Results

In all 60 subjects, Mean (SD) of Anthropometric parameters (Age, height, weight and BMI) in all 60 subjects are shown in Table 1. PEFR increased significantly ($p < 0.000$) after OP with the mean (SE) difference of - 49.73 ± 4.25 in all the 60 subjects (Table 2). Male – Female difference: Age, height and weight of the males were significantly higher ($p < 0.000$) than the females ($p < 0.000$) and BMI did not show any significant difference ($p < 0.915$) between the groups (Table 3). PEFR increased significantly after OP in both males and females ($p< 0.000$). However, there was no significant difference ($p <$

0.915) in the level of increase between the groups (Table 4).

Table 1: Anthropometric parameters of 60 subjects

Parameter	Mean ± SD
Age in years	19.77 ± 1.98
Height in cm	163.57 ± 8.19
Weight in kg	57.37 ± 9.02
Body mass index	21.41 ± 2.74

Table 2: PEFR of 60 subjects before and after oil pulling

Parameter	Mean ± SE	Mean difference	Sig
PEFR before OP	404.50 ± 10.71	- 49.73 ± 4.25	0.000*
PEFR after OP	454.33 ± 11.32		

PEFR – Peak expiratory flow rate measured as Liters/min

OP – oil pulling

Table 3: Differences in anthropometric parameters between males and females

Parameter	Male (30)	Female (30)	Mean diff	Sig
Age in years	21.03 ± 0.29	18.50 ± 0.22	2.53 ± 0.37	0.000*
Height in cm	168.60 ± 1.37	158.53 ± 0.96	10.07 ± 1.58	0.000*
Weight in kg	60.67 ± 1.61	53.77 ± 1.43	7.20 ± 1.87	0.000*
Body mass index	21.43 ± 0.51	21.36 ± 0.50	0.07 ± 0.64	0.915

Table 4: Difference in the effect of OP on PEFR between females and males

Gender	PEFR before OP	PEFR after OP	Mean difference	Sig
Male (30)	470.67 ± 12.39	520.87 ± 13.73	- 50.13 ± 7.35	0.000*
Female (30)	338.33 ± 3.39	387.67 ± 5.20	- 49.33 ± 4.42	0.000
Female-Male difference	- 132.33 ± 12.49	- 133.13 ± 14.59	- 0.80 ± 7.39	0.915

Discussion

Results of the present study may be encouraging to the health seekers and medical practitioners. Positively, OP increases the respiratory efficiency as shown by the elevated PEFR after OP. As OP is a simple and cost-effective procedure and PEFR is non-invasive, repeatable, reliable and effective measure of pulmonary function, these two were coupled to see the efficacy of OP in the betterment of pulmonary function.

Different types of oil are used for OP procedure. Commonly used ones are sesame oil, sunflower oil and coconut oil [1]. However, sesame oil, also known as gingelly oil or til oil is more preferable and generally recommended because of its antiviral and anti-inflammatory properties. It is also rich in omega 3 fatty acids, and contains vitamins A, B and E, and inorganic substances like iron, calcium, magnesium, copper and phosphorous. It is also preferred for its antioxidant contents such as sesamol, sesamin and sesamolin [15].

Sesame oil was supplied in 10 ml sachets by the VVV & Sons Edible oil Ltd., Idhayam gingelly oil manufacturers in Virudhunagar, Tamil Nadu. Our results showed that PEFR increased significantly after OP in all the subjects and there was no gender influence in the level of increase. Various factors were shown in the literature as causes for increase in PEFR in normal individuals. Age, height and weight were considered as direct influencing factors of PEFR [16-18]. According to Mellissnos & Mead, the change in the dimensions of the large airways in and out of thoracic cage might be the cause for increase

in PEFR [19]. Potter et al speculated that the force generated by the expiratory muscles and the rate of attaining the maximal alveolar pressure could be the causes for increase in PEFR [20]. Basal strength of the respiratory muscles and the initial stretch of the lungs before starting of the blow of air were also considered as the factors to increase PEFR [21,22]. Goyal et al and Dedidas Ray et al showed that regular exercising, hard manual work and physical training were the important factors in increasing the PEFR as these would strengthen the respiratory muscles more [23,16].

At the same time, literature also depicts some factors that decrease PEFR in normal persons such as low socioeconomic status, overcrowding of residence, air pollution and smoking and in patients with respiratory problems like asthma and chronic obstructive pulmonary diseases [8,24,25]. These factors are believed to decrease PEFR by restricting the airways either by obstruction or by loss of elasticity or /and increasing the resistance of the air passages.

However, in our present study most of these factors do not come under consideration because all subjects fall in the category of normal ones and non-exercising, non-athletic and non-smoking. The basal value of PEFR of the subjects (before OP) in our study correlates with normal standard value of other studies and the values of PEFR after OP was significantly higher [9-11].

The exact cause for this is yet to be explored. One of the causes may be that OP strengthens the respiratory and buccal muscles which may increase the dimensions of respiratory passages and force and rate of blowing the air [9,19-22], or it may be because of the cleansing function of the oil on the respiratory tract: it is suggested that swishing of the oil in the mouth activates the enzymes and pulls the toxins out of blood [1]. This statement is supported by Linda Devine according to whom oil swishing could eliminate toxins from the whole body through the tongue [26]. It is an Ayurvedic concept which says that organ meridians are represented in the tongue and each section of the tongue is connected to different organs such as kidneys, lungs, spleen, liver, heart, pancreas, small intestine, stomach, colon, and spine. OP is capable of drawing the toxins from these organs and eliminate them through the tongue [13]. This suggests that OP cleanses the respiratory tract and enhances the lung function.

Another speculation is that OP may increase PEFR by changing the diameter of the bronchioles. It is an established fact that PEFR can be increased by bronchio-dilatation through bronchodilator drugs [11]. We presume that OP also increases PEFR by bronchodilator effect. Extensive studies involving long term practice of oil pulling with more number of subjects and variables of lung functions are needed to authenticate these speculations and explore the exact mechanism of OP in increasing PEFR in particular and other health benefits in general.

Another interesting fact revealed in the present study is that efficacy of OP in increasing PEFR is independent of anthropometric parameters. Some previous studies claim that age, height and weight directly influence PEFR [16-18]. In our study, males had more height and weight than their female counterparts but the OP-induced PEFR did not show any significant difference between the two groups. Thus, irrespective of the gender, height, weight and BMI, OP pulling exerts the equal effect on PEFR.

Conclusion

PEFR increased significantly after OP in all the subjects and there was no significant gender difference in the level of increase between males and females in spite of males having higher anthropometric parameters than their female counterparts in the present study. According to Bruce Fife, OP is considered to be one of "the most effective methods of detoxification and healing known in natural medicine" [6]. Added to this, it is simple and cost-effective procedure with almost zero percent of side effects. So it can be considered as an alternative or additional programmer of 'keeping fit' instead or along with regular exercise and yoga.

Acknowledgement

Authors are thankful to Mr. V.R Muthu, Chairman, VVV & Sons Edible oil Ltd., Idhayam gingelly oil manufacturers, Viruthunagar, Tamil Nadu for supplying the sachets of sesame oil. Authors also thank Ms. S. Jenifer and Aazam Ahammed, students of Madha Dental College for their valuable contribution in this study.

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Website: **www.ijrhs.com**

Submission Date: 01-10-2013
Acceptance Date: 04-10-2013
Publication Date: 31-10-2013

How to cite this article:
Sembulingam K, Sembulingam P, Poornodai V, Chandran G. Effect of oil pulling on peak expiratory flow rate. Int J Res Health Sci 2013;1(3):000-00.

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