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Comparison of Vitamin E and Omega3 effects on oral dryness

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ABSTRACT

To determine whether vitamin E and omega-3 supplementations could increase saliva production and reduce oral dryness, 60 patients with oral dryness received either vitamin E (n=30) or omega-3 (n=30) in a three month prospective clinical trial. There was a significant saliva volume increase in vitamin E group ($p<0.001$) before and after taking the supplementation; However no significant saliva volume change was seen in omega-3 group ($p=0.999$). In this study vitamin E supplementation was found to be significantly better than omega-3 and significantly effective to improve oral dryness.

Introduction

In the 21st century there is two big rise in the human life: the life length (up to 74 years) and Stress; which both can cause oral dryness (1, 2). Almost one-fifth of the adult population is reporting oral dryness. It has reduced their quality of life; because of unpleasant taste, burning sensation, tooth loss, pain from dentures, problems with eating and communication; therefore the importance oral dryness treatment has risen in the century either (3).

Oral dryness (Xerostomia) is a subjective symptom of dryness in the mouth (4). It mostly occurs when the amount of saliva that bathes the oral mucous membranes is reduced (5). It is generally defined as an unstimulated whole saliva flow rate of less than 0.1–0.2 ml/min, and a stimulated whole saliva flow rate of less than 0.7 ml/min (6).

Some medications (which can decrease the salivary flow rates such as: tricyclic antidepressants, certain antihypertensive, and anticholinergics), some Systemic conditions (such as Sjogren syndrome, stress, diabetes, aging, radiation therapy) and also some infectious agents, can cause oral dryness (7, 8).

Oral dryness can cause: oral soreness, burning, pain, dental caries, tooth loss, digestive problems, opportunistic infections (2, 9) difficulties in chewing, tasting, swallowing, and speaking (10).

The ideal treatment for oral dryness is to remove the main cause, like change medications or dosages which in most of the times cant be done; other treatment options can be palliative like mouth wash or chewing gums (11). One of the certain treatments is Pilocarpine, which is a cholinergic drug that has the ability to increase salivary secretion (12), but it is contraindicated in some patients (11); plus it has certain side effects (13).

Vitamin E is a fat-soluble non-enzymatic antioxidant, protecting skin from the adverse effects of oxidative stress including photoaging. It has a major antioxidative and anti-inflammatory effects on skin and mucosa (14). It has been shown that vitamin E increases the mucosal blood flow (15), and has effects on decreasing the exocrine gland inflammation (16); also it is suggested as a potential treatment for oral dryness (17). Omega-3 is an essential fatty acid, which have an anti-inflammatory and immune-modulating effects (18, 19). It was reported that one of the signs of omega-3 defficiency is the dryness of skin and mucosa (20). Also it has an obvious improvement effects on dry eye syndrome (21). Several studies have reported an association between dietry intake of omega-3 and tear film and dry eye syndrome (22). It has been known as a gingival and periodontal anti inflammatory agent (23). It is considered that omega-3 can cause increasing the secretion of exogenous glands such as salivary glands (24); therefore, omega-3, may have positive effects on patients with feeling of oral dryness.

With all of the treatments for oral dryness it still is a rising problem in the adult population and it doesn't have a certain conservative treatment (3). Although there is some studies about the effect of vitamin E and omega 3 on the oral dryness, but the certain intraoral effect of them is still a question (24). This study wants to evaluate the effect of these agents as a conservative, safe treatment for the oral dryness.

Methods and materials:

A three-month randomized clinical trial was designed. This study included patients who had subjective complaints of dry mouth and had come to Naderkazemi clinic in Shiraz in fall and winter 2013.

60 volunteers (male=25, female=35) were remained after eliminating patients who had a history of chemotherapy, radiotherapy or the ones who were having oral dryness causing by medications (anti cholinergics, anti hypertensives, anti depressants).

Volunteers were informed about the aims, procedure and the time of the study, they got assured that the treatments were totally harmless to them and their demographic information (such as name, address, and medical history) would be confidential. They were told that they could leave the study whenever they wanted. They completed the personal

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information sheet which contains name, address, medical and dental history. Their informed consent was taken as well.

We divided them into 2 main groups, group A (The first 30 volunteers) and group B (the second 30 volunteers). After taking their written informed consent, they were asked to spit their saliva in a milliliter graded glass tube, for 5 minutes. Then their saliva volume in milliliter was measured and recorded.

We gave each volunteer in the group A 90 capsules of vitamin E 200 IU, and they were asked to have one capsule everyday after lunch, for 3 months; and each volunteer of group B was given 90 capsules of Omega-3, 1 gram and they were asked to have one capsule, everyday for 3 months.

After 3 months, we wanted them all to return and measured their saliva volume by spitting the saliva into a milliliter graded glass tube for 5 minutes and recorded it to compare.

Paired-sample t-test was used to compare the changes in the saliva volume in each group before and after taking the medications. The statistical software we used was SPSS (Statistical Package for Social sciences, version 20).

Results:

Total response rate of volunteers was 95% out of 60volunteers; 3 volunteers left the study (2 of group A and 1 of group B), then we have final results for 57 volunteers (28 on group A and 29 on group B). They were 24 men and 33 women, having mean age of 44.

There was a significant difference in saliva volume in group A (n=28), before and after taking vitamin E ($p<0.001$); then vitamin E could increase salivary glands secretion and improve oral dryness. But there was no significant difference in saliva volume in group B (29), before and after taking Omega-3($p=0.999$), which showed that Omega-3 had no effects on salivary glands secretion and oral dryness. (Table 1)

As seen in Figure 1, the mean of saliva volume in group A before treatment was 2.27 ml in 5 minutes and after treatment was 2.67 ml in 5 minutes, the volume increased 0.4 milliliter which was significant. But in group B before and after treatment, both were 1.94 ml in 5 minutes, which obviously was not a significant change. (Figure 1)

Table 1

Treatment	n	Saliva volume (ml/5min) before treatment	Saliva volume (ml/5min) after treatment	P*
Vitamin-E (group A)	28	2.27±0.57	2.67±0.62	<o.oo1
Omega-3 (group B)	29	1.94±0.55	1.94±0.57	0.999

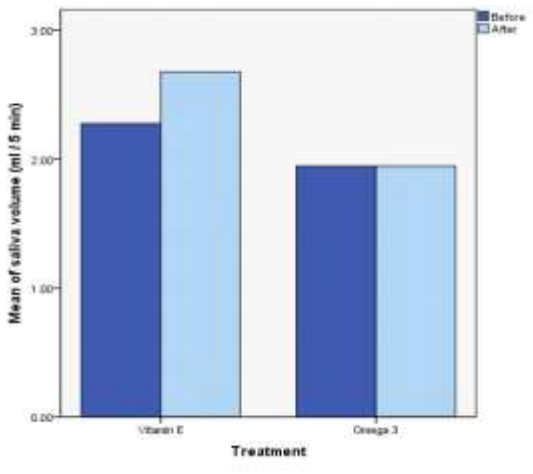

Figure 1

Discussion:

The Oral dryness is a very common problem (approximately, one fifth of the adult population) and reduces the quality of life because of causing many problems such as: dental caries, tooth loss, burning and pain sensation, unpleasant taste and difficulties with chewing and swallowing (3). This prospective, randomized, clinical trial wanted to find the effectiveness of omega3 and vitamin E on salivary secretion and oral dryness as a conservative method.

In this study 28 volunteers in group A; which had daily vitamin E 200 IU supplementation daily for 3 months, showed significant increase (0.4ml) of the mean saliva volume in 5 minutes ($p<0.001$). The mean saliva of group A in 5 minutes before taking vitamin E was 2.27 ml, after 3 months, it increased to 2.67 which was a significant increase ($p<0.001$). Although other 29 volunteers (group B) which had daily Omega-3, 1mg supplementation had no significant change on the mean saliva volume in 5 minutes ($p=0.999$). Then the study showed that vitamin E can increase salivary volume and improve oral dryness, however omega-3 supplementation caused no difference on salivary volume and had no effects on oral dryness.

Lonnie et al. in 1995 reported that vitamin E increased mucosal blood flow on acute radiation enteritis (11). Also Uma et al. in 2010 reported that vitamin E supplements reduced inflammation of salivary glands and improved their function on radioiodine exposed mice (17). Kesavalu et al. showed in a rat model that omega-3 suppressed periodontal and gingival inflammation and increased retention of alveolar bone (23). In a randomized, placebo-controlled clinical trial study, the combination of fish oil (containing omega-3) and vitamin E significantly reduced IL-1production by peripheral blood mononuclear cells (which causes inflammation); thus fish oil combined with vitamin E was more effective than fish oil alone in decreasing the production of TNF-alpha. This could result in restoration of neural stimulation of the exocrine glands and decrease of exocrine gland inflammation (16).

Singh et al. in a three month randomized, placebo controlled, double masked clinical trial in 2010 reported that treatment with n-3supplement, which contains flaxseed oil, fish oil (omega-3) and vitamin E, was found having significant increase in unstimulated and stimulated whole salivary flow rate after three months. It is consistent with the notion that n-3 supplements were effective in alleviating the oral dryness of patients with sjogrens syndrome (24). This study, which was the most similar study to ours, reported that n-3 were significantly effective on increasing salivary flow rate; as the supplement (n-3) contained both omega-3 and vitamin E and also flaxseed oil, the study could not determine that which one caused the increasing or which one had been more effective in alleviating oral dryness. However, it could be assessed that n-3 is effective, it was not determined whether flaxseed oil, fish oil, vitamin E, or the combination of them, had the main effect. Further they can have interference with each others effects that is unknown in the study. Although in our study we evaluated the effects of vitamin E and omega-3 on oral dryness separately to eliminate the possible interactions and to determine each one's effect on salivary glands secretion and which one is more effective.

There were several limitations to the current study. We were unable to control the volunteer nourishment in three months to eliminate other nutrient factors which can affect salivary glands secretion. Also salivary flow is very person-specific, then it was difficult to compare across subjects.

Considering the results of this study, omega 3 did not have significant effects on salivary glands secretion and oral dryness; although daily consumption of vitamin E is significantly effective on salivary glands secretion and has improvement effects on oral dryness. As it is a vitamin supplement and it has no side effects up to 400 IU daily intake and it is an over the contour (OTC) drug which means it does not need to be prescribed, it can be considered as an effective, easy accessible, very conservative drug for all people suffering from oral dryness; specially for patients having idiopathic xerostomia or patients who are allergic or having side effect reactions to the routine treatments such as Pilocarpine.

Conclusion:

In this study treatment with vitamin E was found to be significantly effective on increasing the salivary volume. However omega-3 was not found to be effective. The results of this study are consistent with the notion that vitamin E supplements were effective in alleviating the oral dryness of patients. However, further researches have to be done, using larger groups of patients having oral dryness for a longer duration, eliminating other factors that can affect oral dryness. In addition, the fact that vitamin E supplementation resulted in improvements of clinical parameters; may be an indication that patients with oral dryness may benefit from dietary vitamin E.

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