D1200 Section D200 Zoar Hai

3/11/17

Effectiveness of Three Oral Hygiene Regimens on Oral Malodor Reduction: A Randomized Clinical Trial

1. **When was the work published?**

The work was published on January 27, 2015.

1. **What are the main points of the article? Write a 150- 200 word summary of the article that accurately conveys the content of the article.**

The study assesses the effects of different oral hygiene procedures on the reduction of volatile sulfur compounds (VSCs) in subjects with oral malodor. Thirty male volunteers who matched with study criteria were divided randomly into two groups. Both groups performed tooth brushing, mouth washing with chlorine dioxide, tongue cleaning (using the back of a toothbrush) and combination of those in different sequences for five weeks. Total VSCs of subjects were measured with a Breathtron, and oral health status was also examined. The results were that tooth brushing alone did not reduce the VSCs but by adding the mouthwash and tongue cleaning and using all 3 oral hygiene regimens altogether, it significantly reduced the VSCs that caused the subjects to exhibit oral malodor.

1. **Does the work meet the standards to be considered an appropriate/academic/scholarly source? Justify your choice. The study is conducted**

Yes, the work meets the standards of an academic/scholarly source. The work has been peer reviewed with a number of peer-reviewed reports and is considered recent (conducted within the last 5 years). The authority and credibility is evident based on the authors’ qualifications.

1. **Are the qualifications of the author(s) appropriate for an academic article? Briefly describe the authors’ qualifications.**

The qualifications of the authors seem to be appropriate for an academic article based on my findings. Below are the authors’ along with their qualifications.  
  
Yoko Kawaguchi and Masayuki Ueno have conducted 11 other studies related to oral health and 4 studies related to neurology. All studies are peer reviewed published journals that use the same systematic approach as the article used for this paper. The other authors of this article: Takashi Zaitsu, Ei Ei Aung, and Sayaka Furukawa are only involved in 1-3/11 of these peer-reviewed studies.

1. **Is the purpose clearly stated? Restate the purpose of the paper in your own words.**

Yes, the purpose is clearly stated. The purpose was to figure out the effects of 3 different oral hygiene aids (tooth brushing, mouthwash, and tongue cleaning), alone and altogether in order to evaluate its effects on reducing the VSCs (the main causative for oral malodor) in people who exhibit bad breath.

1. **Is the experimental design clearly described? Describe the design in your own words.**

Yes. The study was conducted in a randomized, single-blind, 5 week parallel design. 30 men who had existing oral malodor were selected for the study and were split equally into 2 groups (Group A and Group B). During the 1st week, both groups were each instructed to brush using a scrubbing method by using their own toothbrush with a dentifrice of their choice. During the 2nd and 3rd week, Group A was given instruction to use toothbrush + chlorine dioxide mouth wash for 30 seconds twice daily while group B was instructed to use toothbrush + tongue cleaning (using the back of their toothbrush). Those that performed tongue cleaning were given small toothbrushes and were told to place it as far back as possible, moving the brush forward in a slow steady motion while rinsing the debris between each stroke and were told to repeat the procedure until they no longer saw debris on their brush. For the 4th and 5th week, both groups were instructed to use all 3 aids: tooth brushing, mouth rinse, and tongue cleaning.

After week 5, all subjects went through a series of tests: total VSCs, debris index score, bleeding on probing, tongue coating, saliva measurement, and the condition of their teeth. All tests were conducted by a principle investigator who was blinded during the examination. The experimental design also included details on how all these tests were measured which allows the study to be reproducible.

**7. Have the possible influences on the findings been identified and controls instituted? Describe and evaluate the use of controls and possible influences (spurious variables)**

Yes. All subjects, as full monastery residents, lived under the same roof and had a similar life style, including the content time and frequency of meals. Therefore the problem of different food and eating habits, which could cause an extrinsic effect on oral malodor, were avoided in the study. They were also evaluated during the same time of the day, and were asked to refrain from drinking and eating as well as oral hygiene practices at least 2 hours before the measurement, so the effects of food and oral hygiene can be controlled and equal for all subjects.

**8. Has the sample been appropriately selected (if applicable)? Describe the sample used in the study, and evaluate its appropriateness.**

Since there are many factors that can affect oral malodor, the study did not include females because their menstrual cycle can have an affect on oral malodor. Furthermore, 48 male monk volunteers were screened to assess whether they matched the criteria, which included no systemic diseases, no current use of antibiotics, no severe dental caries, no periodontal pocket more than 3 mm in depth, no history of allergy to any kind of mouthwash, no habits of smoking or betel quid chewing, and total VSCs more than the threshold level of 250 ppb measured by Breathtron. 18 were excluded because they exhibited 1 or more of these characteristics. After the screening, the final subjects used for this study were 30 males between the ages of 18-30. The 30 males were then divided into groups using a computer-generated randomized system.

The study also mentions the use of ANCOVA which verifies the group on equalness and adjusts any differences between people. 30 subjects is a low number to conclude results but it does meet the standards of a minimum of 26-30 subjects. The study also can only apply to males, and specifically those living in the area the study was conducted: Yagon, Myanmar.

1. **Has the reliability and validity of the article been assessed? Evaluate, and state the test/diagnosis results.**

Yes, the reliability and validity have been assessed. The person conducting the test was the principle investigator; therefore no calibration was needed because there was only one person examining the subjects using the same methods. The tests included taking various scores (like bleeding upon probing and tongue coating level) as well as measuring VSCs and debris present. The results were that VSCs had significantly decreased between week 2-4, with group A showing lower VSCs than group B. Tongue coating significantly reduced from the 2nd week’s examination in both groups while bleeding upon probing significantly decreased during the first week in both groups. The debris index also showed lower scores after the first week of examination.

1. **Is the experimental therapy compared appropriately to the control therapy? Describe and evaluate the use of the control group.**

There was no use of a control group present in the study.

1. **Is the investigation of sufficient duration? Evaluate, and explain your reasoning.**

Yes. The 5-week study is considered efficient for checking the effects of oral care aids. The study should be long enough to permit detection of effects. The duration of a study varies based on what the study is on. For example, clinical trials should be at least 3-6 months long for testing a condition like gingivitis but only 30-90 days for testing toothbrushes. If testing something like the progression of caries, the study needs to be conducted over a span of several years. In conclusion, the duration all depends on the study.

1. **Have the research questions or hypothesis been answered? Restate the research questions and/or hypotheses in your own words, and describe if or how they are answered.**

Yes. The research question/hypothesis was answered: Does the effect of 3 oral aids: tooth brushing, mouthwash, and tongue cleaning, reduce oral malodor? The experiment was constructed in a way to first test the effect of one aid for the first 2 weeks (tooth brushing), then to test the effect of two of these aids, using 2 groups to test either tooth brushing and tongue cleaning or either tooth brushing and mouthwash for the 3rd and 4th week, then to test the use of all 3 aids in the 5th and 6th weeks. The results concluded that the use of the first aid (the toothbrush) did not reduce oral malodor alone, but the use of all 3 aids significantly reduced oral malodor. The results were based on the oral malodor evaluation. Oral malodor was given to detect the amount of VSCs using a portable sulfide monitoring device (Breathtron). The people in the study were told to close their mouth tightly and breathe through their nose. The amount of VSCs were shown on the breathtron in ppb. Those that exhibited more than 250 ppb were categorized as having malodor. They used the same method to test the results of the study at every week.

1. **Do the interpretations and conclusion logically follow the experimental finding? Restate the conclusion, and explain if or how they follow the experimental findings.**

Yes. The conclusion completely follows the study and are not in any way unrelated or generalize what the study was about. Conclusion: This study showed the effects of both a chemical method (the mouth rinse) and a mechanical method (tongue cleaning), greatly reduced halitosis, but combing all three aids (tooth brushing, mouthwash, and tongue cleaning) was most effective in reducing VSCs present in bad breath. All 3 aids were tested in a sequential manner, in order to evaluate the results of these aids on bad breath. Multiple tests were conducted at each week to evaluate the effectiveness of the 3 aids used. The experimental findings followed the conclusion in that all 3 aids used together was most effective in reducing oral malodor.

1. **Do you agree or disagree with the article and findings? Explain why?**

I agree with the article and its findings. It is a known that poor oral hygiene can cause bacteria build up on the tongue, which produce VSCs which causes bad breath. Brushing ones teeth will not reduce this unless they are brushing the tongue. Other aids- like the ones used in this study (mouthwash and tongue cleaning) target areas specific to where the malodor stems from.

1. **What would you change in the article? Why? Think outside of the box. What would you add or delete.**

I would make a bigger study using more subjects from different areas. I would use a tongue cleaner (the study was limited to this), and would select the dentifrice used, being that it can have an effect on the results. The experimental design in the study also mentioned that it was a parallel design which suggests that subjects from group A and group B, never cross over. I would conduct a study where both groups receive the opposing treatment. Also, a single-blind study may suggest bias.