

Important Variables for Halitosis Clinical Trials: Causes, Diagnostic Methods and Treatments

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Short Communication

Halitosis is an unpleasant odor emanating from the mouth and may involve both oral and non-oral conditions and can be in fact a warning sign of a serious health problem, as biomarkers for diabetes, nasopharynx and respiratory diseases, stroke, pneumonia, bronchitis and chronic sinus infections, even to liver and kidney problems [1-4].

In 80–90% of all cases, the oral malodor is caused by production of volatile sulfur compounds (VSC), which are **hydrogen sulfide** (smells like rotten egg), **methyl mercaptan** (rotten cabbage) and **dimethyl sulfide** (rotten cabbage). This last one is present in non-dental causes (from lungs, liver, kidneys and must be better investigated by a clinical physician [5,6]. The VSCs derive from gram negative, anaerobic bacteria found in periodontal pockets and in the crypts at the back of the tongue [7,8]. The oral malodor upon waking is usual and can be related to several factors including reduced saliva production during the night [9], increased microbial metabolic activity during sleep [10], as well as mouth breathing [11].

Against halitosis, many efforts have been undertaken for prevention or alleviation of oral malodor, which is a cause of personal embarrassment and may mal influence interpersonal relations [12,13].

Thinking about the best choice, at present, there are no standard or accepted protocols for the treatment of halitosis [14,15]. Different treatment strategies including mechanical debridement of tongue, rinsing with antimicrobial agents have been proposed for the management of intra-oral halitosis [16]. Both tongue brushing and tongue scraping [17,18] have been advocated as means of reducing the numbers of VSC-producing bacteria, residual food matter and cellular debris from the gingivae and tongue, responsible for emanating the VSCs [16,17,19].

The limitations of mechanical methods to effectively reach and remove VSC-producing bacteria from all oral ecological sites are acknowledged. However, cleansing the tongue at its posterior area is uncomfortable and can be impossible by the gag reflex that it may cause. For this reason, the possibility that mouth rinses may be more effective in reaching the less accessible parts of the oral cavity and the easier use of generally accepted mouth rinses has led to the development of a large number and a wide range of commercially available products as a popular way of dealing with oral malodor [16,20-22].

Although there are a large number of studies evaluating the effect of these products on halitosis, there are still plenty of disagreement among the results and their real effectiveness for halitosis treatments [23].

The protocols for halitosis clinical research can be classified and followed as stated by Yaegaki recommendations [15], as defined by the ADA guidelines. The objective is to create a custom-made treatment strategy, taking into account guidelines, predictability of alternative therapies and preference of patients. This multidisciplinary approach gives the dentist the following advantages: 1. Improves patient selection; 2. reduces failures ratio, by means of combined treatments; 3. help to control the possible persistent symptoms.

Regarding patient's selection, research on positive and negative predicting factors to halitosis therapy is still a challenge due to the heterogeneity of causes, different sources of volatile sulfur compounds, the VSCs characteristics and treatment outcomes. In attempt to identify good responders to the treatment, many authors emphasised the organoleptic assessment as the gold standard for diagnosing oral malodor as an aspect of detection and the portable gas chromatographs for quantification and qualification of the odor components [9,10,13,15,18]. Moreover, the individual evaluation of volatile sulfur compounds during the breath tests can give valuable information.

According to our recent study [24] it seems to be evident that morning halitosis in healthy individuals is a cosmetic problem similar to body odor [25]. Therefore, morning breath is not the best condition to predict how chronic bad breath will perform to the treatment. The oral hygiene is sufficient to eliminate the problem, as states Yaegaki and Coil [26], about the needs to treat morning oral malodor. Tonzetich [10] and Rosenberg [27] argue that the best way for treatment of halitosis is to motivate the patient to practice good oral hygiene, and that a gentle but effective deep tongue cleaning should become part of daily oral hygiene [10,27]. Thus, morning breath is not suitable for evidence-based dentistry as model for real halitosis problems.

Finally, the expertise of a dentist can be essential to control bad breath that persists despite a significant improvement of the oral hygiene, and breathe quality and continuity, thus raising the siege against non-oral conditions.

On the other hand, the important role of an expert dentist is: - to recognize halitosis signals and refer the patient to an appropriate professional;-to help in formulating the complete diagnosis and the correct treatment plan, by evaluating the clinical causes and the oral status (dental, periodontal and oral health);-to evaluate whether or not an oral device can be responsible for the breath condition;-to carry out the necessary periodontal, dental and prosthetic pre-treatment;- to realize oral care needs, for a higher predictability of the causes;-to complete other treatments outcome, when it is considered insufficient;-to collaborate with physician in the evaluation of

treatment outcome, taking into account the tolerance of the patient to the difficulties of the correct diagnostic and the possibilities of treatments.

In conclusion, the treatment for halitosis depends on a multidisciplinary approach, with an important role of the dentist for effective diagnosis. Once established the oraeiology, the treatment is more efficient when both methods (mechanical and chemical) are associated. For morning halitosis, the oral hygiene is an enough proceeding. For chronic and persistent halitosis new approaches taking into account both methods may bring far superior results for elimination of this unpleasant mouth odor. Moreover, the practitioner must be always assessing the possibilities of causes to really have control of the breath smell.

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