THE EFFECT OF A HOMOEOPATHIC HALITOSIS COMPLEX ON PATIENTS WITH ORAL MALODOUR

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I, Jacqueline Watson Neumann, do hereby declare that this dissertation represents my own work in both conception and execution

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To my husband, Peter for his interest, love and motivation

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ABSTRACT

The purpose of this study was to evaluate the efficacy of a homoeopathic halitosis complex in the treatment of patients with oral malodour; in terms of measuring the extent of change in mouth air both subjectively and objectively. The expected result was a progressive lowering of volatile sulphides in mouth air

Convenience sampling was employed to draw 30 patients from dental practices and general public in the greater Durban area. Only healthy persons who suffered from halitosis longer than three months were selected. Of these, one half constituted the control group and received only placebo, the remaining half made up the experimental group and were treated with the halitosis complex, containing Arnica montana 4CH, Mercurius solubilus 4CH, Antimonium crudum 4CH, Carbo vegetabilis 4CH. Arsenicum album 6CH, Bryonia alba 4CH, Nitric acidum 4CH.

Patients were assessed by organoleptic measurement of malodour from the whole mouth over four consultations and this data was tabulated on a numerical rating scale and correlated with measurements recorded on a portable sulphide monitor pm. 700 series which measured in the actual breathing zone of individuals being monitored. The monitoring unit displayed data of an individual's exposure.

This study demonstrated that the use of a homoeopathic halitosis complex led to a reduction in volatile sulfur compounds in mouth air and a significant improvement

in oral malodour. Organoleptic measurement was more strongly indicative of the success of the treatment than measurement by portable sulphide monitor.

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DEFINITION OF TERMS

PHYSIOLOGICAL RESPONSE : The response of the patient to the medication as recorded on portable sulphide monitor and by organoleptic method.

PLACEBO ; Any dummy medical treatment administered to a control group in a controlled clinical trial (Dorland & Newman 1985 : 1299).

HALITOSIS ; From the Latin, *halitus* - meaning exhalation - in this case of offensive breath from the oral cavity, called also fetor ex ore, fetor oris and stomatodysodia (Dorland and Newman 1985 : 1728).

HALITOSIS COMPLEX consists of Arnica Montana, Mercurious Solubilus, Antimonium Crudum, Carbo Vegetabilis, Arsenicum Album, Bryonia Alba Nitric Acidum.

ORGANOLEPTIC Making an impression on an organ of special sense. Capable of receiving a sense impression. (Dorland and Newman 1985 : 1189.)

CHAPTER 1 : INTRODUCTION

All individuals have offensive breath or halitosis at some stage in their lives. Most often Halitosis emanates from bacteria in the mouth. Bad breath appears whenever the normal flow of saliva slows (Simms 1990 : 43.) A decrease in saliva results in an increase in bacteria. Mouths are full of bacteria feeding on protein in bits of food and shed tissue. Bacteria emit fetid gases, the foulest of which are hydrogen sulphide (rotten eggs) and methyl mercaptan (farmyard odour).(Murray1994.)

Available allopathic knowledge on control of halitosis stresses the need for oral cleanliness, eradication of periodontal disease and the use of mouthwashes. Dentists even go so far as to teach patients to rake and brush their tongues with a solution of chlorine dioxide, the same chemical added to swimming pools to kill bacteria. (Hoogendoorn 1990 : 64.)

Surprisingly, one thing that rarely works is a mouthwash. Bad breath is masked with another scent, but lasts no more than an hour.(Murray 1994.) Antibacterial mouthwashes testing agents such as chlorhexidine hydrochloride and alexidine dihydrochloride in mouth rinse form show promise in reducing thick plaque under which bacteria lie (Cormier 1981 : 27). However they can worsen the problem by drying out the mouth, which according to Orland (1982 : 63) is a very important factor as stagnation of saliva flow permits invasion by bacteria.

There are millions of people for whom the easy cures do not work - no matter how often they brush, floss, use breath fresheners, eat, drink, avoid problem food,

halitosis persists all day and every day (Fitz-Patrick 1995).

As far as it could be ascertained no research has been done in the field of treating mouth odour homoeopathically. An analysis of the Indexes of the British Homoeopathic Journal from 1982 - 1995 reveals no research on this problem. In addition, the British Library's Complementary Medicine Index did an online search on the topic and could not trace any references to oral malodour.

Information from provings of homoeopathic remedies in Materia Medicas indicate that bad breath can be treated depending on similarity of symptoms to the remedy. (Jouanny 1984 :38, Boericke 1990 : 77, Morrison 1993 : 46).

Homoeopathic treatment of halitosis will aim to reduce bad breath due to general and oral causes. Homoeopathy, which is a set of rules governing the administration of drugs to sick people, proceeds from the assumption that what is called the "disease process", represents the particular form of the organism's reaction to a harmful stimulus in his external or internal environment. That is, an attempt to re - establish a state of health (Coulter 1986 : xv).

Successful homoeopathic treatment should stimulate the bodies own defence mechanism to give systemic support to its self healing effort. " The highest ideal of therapy is to restore health rapidly, gently, permanently; to remove and destroy the whole disease in the shortest, simplest and least harmful way" (Hahnemann 1934 :10).

Successful treatment by Homoeopathic medicine may result in a gentle, rapid, economical and safe way of reducing halitosis in sufferers. The potential mental handicap of offensive mouth odour may be abolished and reduction of morning breath in the elderly decreased. This improved psychological state will reflect on family and friends and increase an individuals sense of well being.

The aim of this placebo controlled clinical trial is to determine the efficacy of a homoeopathic halitosis complex on oral malodour, where the quality of mouth air is assessed organoleptically, whilst the concentration of volatile sulphide compounds in the oral cavity is measured quantitatively by a portable sulphide monitor.

The objectives are :-

* To evaluate the physiological reaction of patients with bad breath to treatment with a homoeopathic halitosis complex in terms of organoleptic measurement.
* To evaluate the physiological reaction of patients with bad breath to treatment with a homoeopathic halitosis complex in terms of volatile sulphide compound concentrations in mouth air as measured by a portable sulphide monitor.

The Hypotheses are as follows:-

1. It is hypothesised that the use of a homoeopathic halitosis complex will reduce the amount of volatile sulphur compounds in mouth air as recorded by organoleptic measurement.

2. It is hypothesised that the use of a homoeopathic halitosis complex will reduce the amount of volatile sulphur compounds in mouth air as indicated by a decrease in measurement of hydrogen sulphide gas registered on a portable sulphide monitor.

CHAPTER 2 : REVIEW OF THE RELATED LITERATURE

2.1. INTRODUCTION

Bad breath has many causes, including decayed teeth, periodontal disease, coated tongue, sinus problems, tonsillitis, bronchitis, indigestion, constipation, liver problems and strong smelling ingredients in the diet. It usually occurs as part of a broader symptom picture, and here homoeopathic medication may be an alternative way of treating this problem.(Callinan 1995 : 28).

Halitosis - defined as bad breath, offensive breath (Dorland and Newman 1985: 728), has become a health concern amongst the general public. The Department of National Health and Population Development (1994) suggests halitosis affects a large proportion of the population. Many individuals are unaware of their offending breath whilst others are justly or not, on constant guard against it.

A persons mouth odour is not constant. It varies from hour to hour, day to day and changes with the aging process. The breath of a human being is normally slightly sweet, particularly in the young, becoming heavier, odorous and pungent during adolescent years and can be offensive and sour in middle aged and elderly individuals (Nolte 1973 : 334).

2.2. PATHOGENESIS.

Breath odours can originate in the mouth, lungs and nasal passages (Nolte 1973 :334.) Oral malodour encompasses ozostomia, stomatodysodia, halitosis (pathological and physiological) and fetor oris or fetor ex ore. These terms in turn denote different sources of oral malodour. (Dorland 1988 : 728).

Saliva is the defence mechanism of the mouth giving lubricating properties, cleansing properties , neutralizing acids formed by dental plaque and is known to have bactericidal and lytic effect on many pathogenic organisms (Nolte 1973 :50.) A millilitre of saliva contains between ten and a hundred million bacteria. Bacteria increase when little saliva is secreted, therefore any abnormal impairment of saliva will invariably lead to pathology or sequelae (Simms 1990 :43)

Volatile sulfur compounds in the mouth produced by anaerobic gram negative bacteria are responsible for producing hydrogen sulphide (Touyz 1993). Hydrogen sulphide is a malodorous consequence of bacterial sulphate reduction (Holland *et al.* 1987). Substrates for hydrogen sulphide production, such as cysteine, methionine, glutathione and thiocyanate have been demonstrated to be present in saliva (Nolte 1973 : 50). A positive correlation has been found between coated tongue and plaque on gingival margins enhancing volatile sulfur production (Yaegaki & Sanadis 1992).

Bosy *et al.* (1994) found in their research that the mucosal surface of the tongue

is a major site of oral malodour production in subjects with or without periodontal problems.

Anaerobic streptococcal infections of the lungs may be responsible for fetor of the breath (Davidson 1993 : 124) Infective and allergic disorders of the upper respiratory tract may produce drying of the mucous membranes and as a result decrease saliva and produce halitosis (Mcleod 1990 : 48).

2.3 AETIOLOGY

An adequate flow of saliva is essential for healthy mouth air; with age, saliva flow decreases and appears to be associated with decreased nocturnal levels of muscular and physiological activities. This could explain why elderly people suffer more from oral malodour whilst infants are effective in producing more saliva. (Nolte 1973 : 34.)

Factors such as alcohol, hunger, too much talking, a stuffy nose, mouth breathing during fast paced exercise, dry up saliva and cause bad breath. Stress and emotional crisis can have the same effect, although this is poorly understood (Murray 1994).

Other factors decreasing saliva flow are medications such as over the counter antihistamines, anti allergy drugs, diuretics, tranquillisers, anti hypertensive drugs, mouthwashes and drugs containing sulphur (Nolte 1973 :332).

It may be that hormonal changes could be a factor in causing malodour. A few days before menstruation, hormonal change triggers production of more of the smelly sulphurous compounds in the mouth. Another hormonal shift at the time of ovulation has the same effect. (Fitz-Patrick 1995.)

The Department of Health and Population Development (1994) advises that disulfiram (Antabuse) may produce halitosis, as may foreign objects lodged in the nose of children, but the major cause of halitosis is that originating in the oral cavity, including coated tongue, healing of extraction sockets,, wearing of dentures. Tooth decay is an obvious cause as this provides areas for bacteria to increase or food to be retained thereby increasing the amount of leukocytes and therefore blood to the area which becomes available as a substrate for putretative bacteria.

2.4. MANAGEMENT

Current treatment for oral causes of halitosis are:-

Mouthwashes : Much research has been reported on mouth washes eliminating oral bacteria and therefore reducing malodour. Yaegaki and Sanada (1992) experimented with an oil - water mouthwash to determine the effect on sulfides in mouth air, showing that volatile sulfides are consistently reduced.

Rosenberg *et al.* (1991) used chlorhexidene mouth rinse regimens to show reductions in mouth odour. Portable sulphide monitoring and organoleptic measurements were employed to measure volatile sulfide levels. Chlorhexidine

was effective in reducing microbial levels for longer than three hours as measured by the rinsing technique.

Murray (1994) claims that mouthwashes cannot penetrate well protected bacteria lying under thick layers of plaque and mucous, and because most mouthwashes contain alcohol, can intensify the problem by drying out the mouth.

Tongue treatment : Until recently, dentists assumed that oral halitosis was due to periodontal disease, ie when plaque grows it seals the gums to the teeth keeping out oxygen, therefore indirectly increasing anaerobic bacterial growth, leading to bad breath, but according to a study by Bosy *et al.* (1994) ; there was a significant correlation between tongue odour and peak volatile sulfide levels and between tongue odour and whole mouth organoleptic measurement..

A study done on the effect of removal of tongue coating on volatile sulfide compound concentrations in the mouth air of individuals with gum disease showed tongue coating plays an important role in volatile sulphur compound production (Barrow *et al.* 1993 : 20-22).

Murray (1994) suggests spraying the tongue with chlorine dioxide (the same chemical added to swimming pools) and using a tongue scraper to abrade bacteria.

Carstens *et al.* (1994 : 64) suggests children in particular should clean their tongues by regularly brushing them with a toothbrush because coated tongue plays a role in maintaining oral infection and therefore halitosis.

Oral hygiene : The Department of Health and Population development (1993) maintain adequate home oral cleanliness is essential for healthy mouth air. Conventional tooth brushing and flossing is vital and frequent professional dental cleaning is helpful in controlling the problem. Yaegaki and Sanada (1992) found that volatile sulphur compounds and methyl mercaptan/hydrogen sulfide ratio in mouth air from patients with perodontal involvement were eight times greater than those of control subjects. Ketobutyrate, which is a byproduct of the metabolism of methionine to methyl mercaptan, was higher in the saliva of patients with periodontal disease

Herbal treatment. According to Herbalists a hot infusion of Mentha pulegium (Pennyroyal) can be very useful in controlling halitosis. (Hemmes 1992 : 82).

2.5 THE HALITOSIS SOCIAL HANDICAP

An individuals complaint of bad breath may be based on psychological factors and is called psychogenic halitosis. It may be reported by the hypochondriacal patient, who commonly amplifies normal body sensations(Carson *et al* 1990 :198). Perception of halitosis may also reflect a serious thinking disorder. An obsessional patient may have a pervading sense of uncleanliness or the paranoid person may have the delusion that his halitosis is a symptom of rotting internal organs. (Merck 1992 : 2844.)

The constant often unsubstantiated fear of offending others by bad breath may lead to a true neuroses and this results in a serious social handicap (FitzPatrick 1995).

2.6. HOMOEOPATHIC TREATMENT

Whereas orthodox medicine tries to cure others by treating it with substances intended to suppress the symptoms of the illness, homoeopathy tries to cure illness by healing it with substances intended to increase the symptoms slightly in order to galvanize the body' s self healing system into action (Handley 1993). Each homoeopathic remedy is a "picture" that shows characteristic symptom and in the halitosis complex the remedy pictures are as follows:-

**Arnica Montana* - Fetid breath, dry and thirsty, bitter taste, taste as from bad eggs, soreness of gums after teeth extraction, empyhaema of maxillary sinus

**Mercurius solubilus* - Sweetish metallic taste, saliva fetid, coppery gums, spongy, receding. Crown of teeth decay, tongue heavy , thick moist coating, yellow flabby; teeth indented; fetid odour from mouth can smell it all over the room. Thirsty.

**Antimonium crudum* - Dry lips, cracks in corners of mouth, saltish saliva, slimy mucous, tongue coated thick white as if whitewashed. Pappy taste. No thirst.

**Carbo Vegetabilis* - Tongue coated white/yellow/brown. Gums retracted, bleed easily. Pyorrhoea.

**Arsenicum* album - unhealthy mouth ulceration, dryness, burning heat, tongue dry, clean, red, worse after midnight, metallic taste.

**Bryonia alba* - Lips dry, dry mouth, tongue, throat with increased thirst. Tongue coated, yellow/dark brown, bitter taste.

**Nitric acidum* - Putrid breath, tongue clean, salivation and fetor oris.(Jouanny 1993),(Morrison 1993) (Boericke 1990).

2.7. SUMMARY

There are millions of people, suffering from bad breath, for whom the easy cures do not work and there exists a need for an effective treatment which decreases or eliminates oral malodour. This study aims to evaluate the efficacy of a homoeopathic complex in the management of oral halitosis

CHAPTER 3 : MATERIALS AND METHOD

3.1. THE STUDY DESIGN

This was a double blind study with the medicine dispensed by an independent party on a random basis.

A minimum of thirty participants were chosen by convenience sampling. These individuals were randomly divided into two groups. Patients were assigned numbers in numerical order as they arrived at the clinic. All patients with odd numbers became the placebo group, whilst patients with even numbers formed part of the experimental group. One group took three pills of the halitosis complex twice a day. The other group were given placebo, but followed the same conditions of pill taking.

3.2 THE SUBJECTS.

Patients were recruited by advertising in local newspapers, shopping centres and libraries. Local dentists, Orthodontists, Maxillae Facial and Oral surgeons, Periodontists and Prosthodontists recommended this research to patients with oral malodour.

Subjects of all races and both sexes were selected, above the age of 16 years and meeting the following criteria determined before treatment:-

*Patients had suffered from intermittent halitosis more than three months.

*The study only included effectiveness of treatment on general and oral causes for halitosis in clinically healthy subjects and did not include people known to be suffering from the following disorders:-

Diabetes Mellitus

Diabetes Insipidus

Renal disorders

Malignancies

Wegeners Granulomatosis

Bronchiectasis

Gangrene

Tuberculosis of the lungs

Abscess of the lungs

3.3 INTERVENTIONS

The tincture for the homoeopathic halitosis complex was made by a transvaal laboratory to the following specifications:-

Arnica Montana 4CH,

Antimonium crudum 4CH

Carbo Vegetabilis 4CH

Arsenicum Album 6CH

Bryonia Alba 4CH

Nitric Acidum 4CH

Mercurius solubilus 4CH

Lactose pills were impregnated with the tincture by a homoeopathic dispenser.

Placebo treatment consisted of lactose pills without impregnation.

Individual were instructed to take 3 pills twice a day, pills to be placed under the tongue and allowed to dissolve gradually. Pills were to be taken twenty minutes before meals and not in association with coffee or tea. Patients were instructed to store medicine in a dark place away from any camphor containing substances.

Treatment lasted over four consultations, patients were assessed at each consultation.

3.4. MEASUREMENT

Two kinds of data were needed for this study:-

* The physiological response of patients with halitosis to treatment with halitosis complex as measured by oganoleptic method
* The physiological response of patients with halitosis to treatment with halitosis complex as measured by portable sulphide monitor

The data needed for organoleptic measurement was obtained by a panel of at least two experienced judges. This involved training four individuals to recognize different degrees of offensive mouth odour which can then be tabulated on a numerical rating scale (Aker 1995). According to Naidoo (telephone conversation 19 May 1995), organoleptic testing done by the perfume industry revealed no criteria for "nosers", other than a normal sense of smell and both nostrils patent . Cleaton- Jones (telephone conversation April 12, 1995), confirmed this. Training was done over a two month period prior to seeing patients for halitosis.

Patients were assessed by organoleptic measurement of malodour from the whole mouth over four consultations.The results were recorded on a visual analogue scale (Aker 1995).

The data needed for measurement of hydrogen sulphide in mouth air was obtained from a portable sulphide monitor Metrosonic pm 700 series single gas monitor (Roberts Safety and Medical Products (Pty) Ltd) which measured by sensor in the actual breathing zone of the individual being monitored. (Rosenberg *et al.* 1991). The monitoring unit displayed data of an individuals exposure in parts per million.

3.5. STATISTICAL ANALYSIS.

Non Parametric tests were used as the sample size in each group was 15. Mann Whitney Unpaired tests were used to compare the placebo and experimental groups. The Mann-Whitney test is used to compare two unpaired or independent groups.

To decide whether there was a significant improvement between consultations within a group, Wilcoxon's Signed Rank Tests were used. This particular test is used to compare two related samples.

All tests were done at the Alpha = 0.05 level of significance. The hypothesis is rejected if the calculated P-value is less than Alpha.

CHAPTER 4 : RESULTS

TABLE 1 - COMPARISON OF SAMPLES WITHIN THE PLACEBO GROUP AS RECORDED ON THE VISUAL ANALOGUE SCALE BY NOSERS (WILCOXONS SIGNED RANK TEST)

Samples	Median differences	Significance Level	P-Value	Ho
Sample 1 : c11n Sample 2 : c21n	1.5 1.9	0.05	0.3	Accept
Sample 1 : c11n Sample 2 : c31n	1.5 3.05	0.05	0.5	Accept
Sample 1 : c11n Sample 2 : c41n	1.5 2.2	0.05	0.5	Accept
Sample 1 : c21n Sample 2 : c31n	1.9 3.05	0.05	0.5	Accept
Sample 1 : c21n Sample 2 : c41n	1.9 2.2	0.05	0.5	Accept
Sample 1 : c31n Sample 2 : c41n	3.05 2.2	0.05	0.09	Accept

Visual Analogue Scale (1 -------10cm)
c11n - Consultation 1. Placebo group.
c21n - Consultation 2. Placebo group.
c31n - Consultation 3. Placebo group
c41n - Consultation 4. Placebo group
Ho = There is no significant improvement between the samples at the Alpha = 0.05 level

TABLE 2 : COMPARISON OF SAMPLES WITHIN THE EXPERIMENTAL GROUP AS RECORDED ON THE VISUAL ANALOGUE SCALE BY NOSERS. (WILCOXONS SIGNED RANK TEST)

Samples	Median differences	Significance level	P-Value	Ho
Sample 1 c12n Sample 2 c22n	2.0 0.75	0.05	0.008	Reject
Sample 1 c12n Sample 2 c32n	2.0 0.65	0.05	0.019	Reject
Sample 1 c12n Sample 2 c42n	2.0 0.35	0.05	0.004	Reject
Sample 1 c22n Sample 2 c32n	0.75 0.65	0.05	0.193	Accept
Sample 1 c22n Sample 2 c42n	0.75 0.35	0.05	0.090	Accept
Sample 1 c32n Sample 2 c42n	0.65 0.35	0.05	0.048	Reject

Visual Analogue Scale (1 ---------10cm)
c12n = Consultation 1, Experimental group. VAS
c22n = Consultation 2, Experimental Group. VAS
c32n = Consultation 3, Experimental Group. VAS
c42n = Consultation 4, Experimental Group. VAS
Ho =There is no significant Improvement between samples at the Alpha = 0.05 level of significance

The median difference in consultation 1 was higher than in consultation 2,3 and 4. Very little median difference between consultation 2 and 3 and 2 and 4 where little significant improvement took place. However, improvement was significant between consultation 1 and 2, 1 and 3 , 1 and 4 and 3 and 4.

TABLE 3 : COMPARISON OF SAMPLES WITHIN THE PLACEBO GROUP AS RECORDED ON THE PORTABLE SULPHIDE MONITOR(PARTS PER MILLION).

Samples	Median differences	Significance level	P-Value	Ho
Sample 1 c11m Sample 2 c21m	0.2 0.2	0.05	0.170	Accept
Sample 1 c11m Sample 2 c31m	0.2 0.2	0.05	0.361	Accept
Sample 1 c11m Sample 2 c41m	0.2 0.2	0.05	0.361	Accept
Sample 1 c21m Sample 2 c31m	0.2 0.2	0.05	0.36	Accept
Sample 1 c21m Sample 2 c41m	0.2 0.2	0.05	0.5	Accept
Sample 1 c31m Sample 2 c41m	0.2 0.2	0.05	0.34	Accept

c11m = Consultation 1, Placebo group.
c21m = Consultation 2, Placebo group.
c31m = Consultation 3, Placebo group
c41m = Consultation 4, Placebo group
Ho = There is no significant improvement between samples at the Alpha = 0.05 level of significance

Median differences were identical in all consultations and P-values were all above the 0.05 level of significance, showing there was no significant improvement noted in the placebo group throughout the consultation period.

TABLE 4. COMPARISON OF SAMPLES WITHIN THE EXPERIMENTAL GROUP AS RECORDED ON THE PORTABLE SULPHIDE MONITOR. (PARTS PER MILLION)

Samples	Median differences	Significance level	P-Value	Ho
Sample 1 : c12m Sample 2 : c22m	0.2 0.1	0.05	0.007	Reject
Sample 1 : c12m Sample 2 : c32m	0.2 0.2	0.05	0.020	Reject
Sample 1 : c12m Sample 2 : c42m	0.2 0.1	0.05	0.000	Reject
Sample 1 : c22m Sample 2 : c32m	0.1 0.2	0.05	0.361	Accept
Sample 1 : c22m Sample 2 : c42m	0.1 0.1	0.05	0.037	Reject
Sample 1 : c32m Sample 2 : c42m	0.2 0.1	0.05	0.012	Reject

c12m = Consultation 1 . Experimental Group.
C22m = Consultation 2. Experimental Group
c32m = Consultation 3. Experimental Group
c42m = Consultation 4. Experimental Group
Ho =There is no significant improvement between samples at the Alpha = 0.05 level of significance

There are slight discrepancies in the median differences except between consultation 1 and 3 and 2 and 4. The table shows significant improvement within the experimental group, except between consultation 2 and 3 where the hypothesis is accepted

TABLE 5 - COMPARISON BETWEEN PLACEBO AND EXPERIMENTAL GROUPS ACCORDING TO DATA FROM PORTABLE SULPHIDE MONITOR (MANN WHITNEY)

Group	Consultation	SL	P-Value	Decision
Placebo	1	0.05	0.822	Accept
Experimental	1	0.05		
Placebo	2	0.05	0.276	Accept
Experimental	2	0.05		
Placebo	3	0.05	0.365	Accept
Experimental	3	0.05		
Placebo	4	0.05	0.001	Reject
Experimental	4	0.05		

Ho - There is no significant difference between Experimental and Placebo Groups
SL - Level of Significance

No significant difference between experimental and placebo groups was indicated during consultations 1, 2 and 3 however, in consultation 4 a smaller P value indicates that there was some difference between the two groups

TABLE 6 - COMPARISON BETWEEN PLACEBO AND EXPERIMENTAL GROUPS ACCORDING TO DATA FROM NOSERS ON VISUAL ANALOGUE SCALE (MANN WHITNEY TEST)

Group	Consultation	SL	P-Value	Decision
Placebo	1	0.05	0.37	Accept
Experimental	1	0.05		
Placebo	2	0.05	0.011	Reject
Experimental	2	0.05		
Placebo	3	0.05	0.001	Reject
Experimental	3	0.05		
Placebo	4	0.05	0.0007	Reject
Experimental	4	0.05		

Ho - There is no significant difference between Experimental and Placebo Groups
SL - Level of Significance

Although no significant difference between the groups was noted at the 1st consultation, during consultations 2 3 and 4 there was a significant difference between placebo and experimental groups as indicated by the nosers.

CHAPTER 5 : DISCUSSION

5.1. INTERPRETATION

Within the placebo group, over the four consultations, organoleptic testing and testing with the portable sulphide monitor indicated no significant improvement in halitosis. Table 1 and Table 3 conclusively indicate high P-Values, strongly emphasizing the hypothesis. The control group therefore did not show any improvement in halitosis and, in fact, as noted in Figure 2, an increase in halitosis was noted in the 3rd and 4th consultations.

In respect of the change in halitosis within the experimental group ie those patients receiving the halitosis complex, when tested by nosers (Table 2), the hypothesis was rejected thus showing a significant improvement between consultations overall, but some discrepancies were recorded between consultation 2 and consultation 3 and between consultation 2 and 4 where the median differences were very slight, indicating a tendency to accept the hypothesis between these 2 samples

In Table 4, significant improvement in oral malodour was recorded on the portable sulphide monitor over the treatment period. A large P-Value between consultation 2 and 3 indicates a tendency to increased halitosis in that treatment period.

Figure 1 illustrates the findings between groups. When the portable sulphide monitor was used to measure mouth air the results varied over the four consultations. The second consultation shows a decrease in volatile sulphide compounds for the experimental group, but a discrepancy exists in the 3rd consultation where a slight increase in halitosis is seen. Case histories show that some patients recorded colds or respiratory ailments at this stage of the treatment and around the third consultation patients became lax about taking their pills regularly. This may have accounted for the tendency for the consultation figures to rise again. The 4th consultation showed a considerable decrease in halitosis .

In Figure 2; a comparison between the two groups showed a consistent indication of decrease in halitosis in the experimental group over the treatment period when measured organoleptically. It can be seen that the placebo group recorded no significant improvement.

An interpretation of the foregoing results indicates that the more subjective measurement ie physically smelling mouth air was more strongly indicative of the success of the treatment .Measurement by portable sulphide monitor indicated some discrepancies within consultations and between groups.

5.2. ARGUMENT

To date there are no homoeopathic journal articles researching halitosis available.

The samples consisted of 15 placebo patients and 15 experimental patients. In the sample of 15 experimental cases moderate improvement was seen in all patients and patient satisfaction with the treatment was noted.

Measurement of oral malodour is complicated by a variety of parameters, including complexity of gaseous molecular species, temporal variation and choice of suitable subject population. Since oral malodour is a perceived olfactory stimulus, assessment by human judges may be the most logical measurement. However, human malodour measurement may vary widely among and between judges and consequently cannot be reproduced in other laboratories (Rosenberg 1992).

5.3 SPECULATION

With hindsight, one of the problems of the study, lies with the diversity of clinical characteristics of halitosis of patients coming for treatment. The results suggest that the majority of patients with primary complaints of halitosis did not actually have halitosis but suffered from an imaginary halitosis due to presumptions based upon others' attitudes. A study by Iwakura *et al* (1994) suggests patient complaints for halitosis be categorized by questionnaire before treatment into 3 types. Type 1; self conscious; Type 2, conscious by the indication of others; and Type 3, conscious by presumption from the attitude of others.

The halitosis complex consisted of low potencies of drugs meant to deal with the problem on a more physiological level. Future studies might wish to concentrate on simillimum rather than a homoeopathic complex medication, which would deal satisfactorily with the subjective problems of the patients.

CHAPTER 6 : CONCLUSIONS AND RECOMMENDATIONS

The tendency of the facts indicate that halitosis is reduced in experimental patients. This is significant when tested by nosers, organoleptically. There is some reduction in mouth odour over four consultations when tested by portable sulphide monitor although liable to fluctuations across consultations. This could be accounted for in the design of the portable sulphide monitor pm 700 series, which was possibly not sensitive enough to measure such fractional changes and complexity of gaseous molecular species. Future research in this field should consider improved and simplified instrumentation. For more reliability, development of reference standards for oral malodour assessment and development of within mouth, site specific measurement standards could be established.

The potencies in the homoeopathic complex were deliberately kept low in order to have a purely physiological action, but there appears to be a need for a remedy covering mental and emotional and physical problems with regard to halitosis. To this end, the homoeopathic Law of Similars should not be forgotten ie the remedy required by the patient is that which has a total pathogenesis that exactly fits the set of symptoms occuring in the patient, in this way the individuality of each person is considered ie each person receives his simillimum; and with this type of remedy a more holistic cure can be arrived at.

A further investigation into potencies used in the complex is recommended and in the long term, how long does the effect last? How much medication should be taken, at what time of day and over what period of time with a more homogenous population sample, would yield interesting and useful information to the researcher.

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APPENDIX A

SUMMARY STATISTICS

Variable	c11n
Average	1.905333
Median	1.5
Mode	1.5
Standard error	.327152
Range	5.1
Coeff. Of variation	66.500402

Variable	c11m
Average	0.22
Median	0.2
Mode	0.2
Standard error	0.022254
Range	0.3
Coeff. Of Variation	39.176891

Variable	c12n
Average	2.166667
Median	2.
Mode	2.
Standard error	0.37514
Range	5.2
Coeff. Of variation	67.057463

Variable	c12m
Average	0.213333
Median	0.2
Mode	0.2
Standard error	0.021529
Range	0.3
Coeff. Of variation	39.084815

Variable:	c21n
Average	2.073333
Median	1.9
Mode	3.
Standard error	0.331299
Range	3.9
Coeff. Of variation	61.886516

Variable :	c21m
Average	0.2
Median	0.2
Mode	0.1
Standard error	0.032367
Range	0.5
Coeff. Of variation	62.678317

Variable :	c22n
Average	1.086667
Median	0.75
Mode	0.2
Standard error	0.23317
Range	2.5
Coeff. Of variation	83.104009

Variable :	c22m
Average	0.153333
Median	0.1
Mode	0.1
Standard error	0.01919
Range	0.2
Coeff. Of variation	48.471088

Variable :	c31n
Average	2.4913333
Median	3.05
Mode	3.05
Standard error	0.382297
Range	4.55
Coeff. Of variation	59.431287

Variable :	c31m
Average	0.213333
Median	0.2
Mode	0.1
Range	0.4
Standard error	0.35006
Coeff. Of variation	63.551424

Variable :	c32n
Average	1.
Median	0.65
Mode	0.
Standard error	0.263086
Range	3.5
Coeff. Of variation	101.892801

Variable :	c32m
Average	0.156667
Median	0.2
Mode	0.2
Standard error	0.017503
Range	0.25
Coeff. Of variation	43.269055

Variable :	c41n
Average	2.17
Median	2.2
Mode	1.95
Standard error	0.323552
Range	4.35
Coeff. Of variation	57.747024

Variable	c41m
Average	0.22
Median	0.2
Mode	0.1
Standard error	0.03266
Range	0.4
Coeff. Of variation	57.495957

Variable :	c42n
Average	0.613333
Median	0.35
Mode	0.
Standard error	0.191328
Range	2.8
Coeff. Of variation	120.816784

Variable :	c42m
Average	0.103333
Median	0.1
Mode	0.1
Standard error	0.012408
Range	0.2
Coeff. Of variation	46.507263