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## Clinical Report

# Personality Traits in Patients with Oral Malodor

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## Abstract

Many patients presenting at oral malodor clinics have psychological halitosis, which is characterized as being obsessive about having oral malodor or being distressed from a keen awareness of oral odor. We used the Tokyo University Egogram (TEG) to evaluate personality traits in patients presenting at the oral malodor clinic of this institute. The incidence of each TEG personality type was compared between a total of 600 patients presenting at the clinic and a cohort of healthy individuals. Differences were found between the malodor patient and healthy groups. Nurturing Parent (NP)-dominant, Adult (A)-dominant, inverse N (NP low, Free Child high), showed a significant decrease of 6.7, 11.3, and 3.6%, respectively; whereas N (A low) and N (NP high, Free Child low) showed a significant increase of 3.3 and 6.4%, respectively ( $p < 0.01$ ).

Key words: Malodor—Personality traits—TEG

## Introduction

Oral malodor is defined as bad odor of any cause emanating from the oral cavity on the breath, and is classified as either physiological or pathological<sup>1,12,13</sup>. Approximately 80–90% of cases of oral malodor are associated with oral diseases such as periodontal disease, and

are attributed to volatile sulfur compounds (VSC), including H<sub>2</sub>S, CH<sub>3</sub>SH and (CH<sub>3</sub>)<sub>2</sub>S, as major odor substances<sup>2,12</sup>. When a patient is worried that they might have oral malodor, regardless of its presence or absence or intensity, the condition is referred to as halitosis. Pathological halitosis can be further classified as organic (physical) or psychological. Organic

halitosis is associated with dental and oral diseases such as periodontal disease, otorhinolaryngological diseases such as sinusitis, and systemic diseases such as diabetes, and requires both treatment of the underlying disease to improve the odor level and mental support to reduce anxiety. Psychological halitosis can be subdivided into neurotic disorder, where patients have a strong belief that they have oral malodor because of anxiety disorder, but no referential ideas or delusions, or psychotic disorder, which is associated with delusional disorder<sup>1,13</sup>. In some patients presenting at oral malodor clinics, even a mild level of physiological odor comparable with that in healthy individuals may engender heightened anxiety and fear, and this may even interfere with their ability to lead a normal social life. Such patients tend to be reluctant to maintain interpersonal relationships and have reduced levels of mental and physical activities<sup>10,11</sup>.

It is essential to ascertain the personality traits of patients presenting at oral malodor clinics when their condition is strongly influenced by psychological factors, as this will affect the type of treatment they require. The present study was conducted using the Tokyo University Egogram (TEG), a psychological test based on transactional analysis theory, as described in previous studies<sup>5,6</sup>. The TEG has been confirmed to be reliable and valid by multivariate analysis, and is mainly used in the treatment of psychosomatic/neurotic disease in psychosomatic medicine, with good results<sup>3,4</sup>.

The aim of this study was first to assess odor level in patients presenting at the oral malodor clinic of this institute by measuring VSC levels. Their personality traits as determined by the TEG were then compared with those in a cohort of healthy individuals to identify any traits specific to the patient group.

## Methods

### 1. Patients

A total of 600 patients presenting at the oral

malodor clinic of Tokyo Dental College Chiba Hospital between July 2008 and March 2013 and on whom a complete set of data were available were enrolled in the study with informed consent.

Those scoring <10 points on the TEG deviation scale or >30 points on the TEG questionnaire scale were excluded. The TEG results obtained from 5,832 healthy persons (male, 3,750; female, 2,045; unknown, 37; average age, 30.7yr), as determined by the Department of Psychosomatic Medicine, Tokyo University were used for comparison purposes<sup>5</sup>. This study was approved by the Ethics Committee of Tokyo Dental College (No.513). There was no profit contradiction in this research.

### 2. Transactional analysis

The TEG was used to determine the personality profile of each subject. This Egogram classifies individuals based on 5 basic states—Critical Parent (CP), Nurturing Parent (NP), Adult (A), Free Child (FC), or Adapted Child (AC)—which are then further subdivided into 5 dominant types, 5 inferior types, and 15 mixed types to give a total of 25 types altogether. Here, the incidence of each of these 25 basic personality profile types was compared between the two groups<sup>6</sup>.

### 3. Measurement of breath odor level

The breath odor measuring device Oral Chroma™ (Abimedical Corporation, Kawasaki, Japan) was used to measure the concentrations of VSCs, specifically H<sub>2</sub>S, CH<sub>3</sub>SH, and (CH<sub>3</sub>)<sub>2</sub>S. The breath odor level of each patient was graded on a 5-point scale (0=no smell to 4=very strong) based on the olfactory evaluation and concentration of CH<sub>3</sub>SH (Table 1)<sup>8</sup>.

### 4. Statistical analysis

The chi-square test was used to analyze the incidence of the 25 basic personality profile types obtained by the TEG in both groups, and also between patients in the no-smell group and each personality profile type.

**Results**

**1. Participants**

Based on the exclusion criteria described above, among the 600 patients enrolled, a total of 404 were eligible for inclusion in the analysis (132 male and 272 female; average age, 48.8yr). The exclusion rate was almost 33%, which was comparable with that in our previous survey (29%)<sup>9)</sup>.

**2. Comparison of TEG pattern**

Of the 25 basic personality profile types, clear differences were identified in 10 between the two groups (Fig. 1): NP-dominant,

A-dominant, and inverse N (NP low, FC high) showed a decrease of 6.7, 11.3, and 3.6%, respectively, in the oral malodor group; whereas AC-dominant, NP-inferior, A-inferior, N-type (A low), N-type (NP high, FC low), inverse N (A low), and M-type showed an increase of 2.0, 1.5, 2.8, 3.3, 6.4, 1.5, and 2.0%, respectively (Table 2, Fig. 1).

**3. Breath odor level**

Acceptable levels of breath odor were recorded in 74% of the total number of patients, with 219 (54%) showing no malodor and 80 (20%) only slight malodor. Substantial levels of malodor, on the other hand, were recorded in the remaining 105 patients (26%). Patients with different levels of breath odor were widely distributed across the 25 basic personality profile types, with no significant correlation between the personality traits of the patients and the intensity of oral malodor (Table 3).

**4. Statistical analysis**

A chi-square analysis of the incidence of the

Table 1 Oral malodor levels

Level	Smell	Oral Chroma (CH <sub>2</sub> S concentration)
0	No smell	Under 100 ppb
1	Malodor warning	101–200 ppb
2	Malodor	201–400 ppb
3	Strong malodor	401–800 ppb
4	Very strong	Over 801 ppb

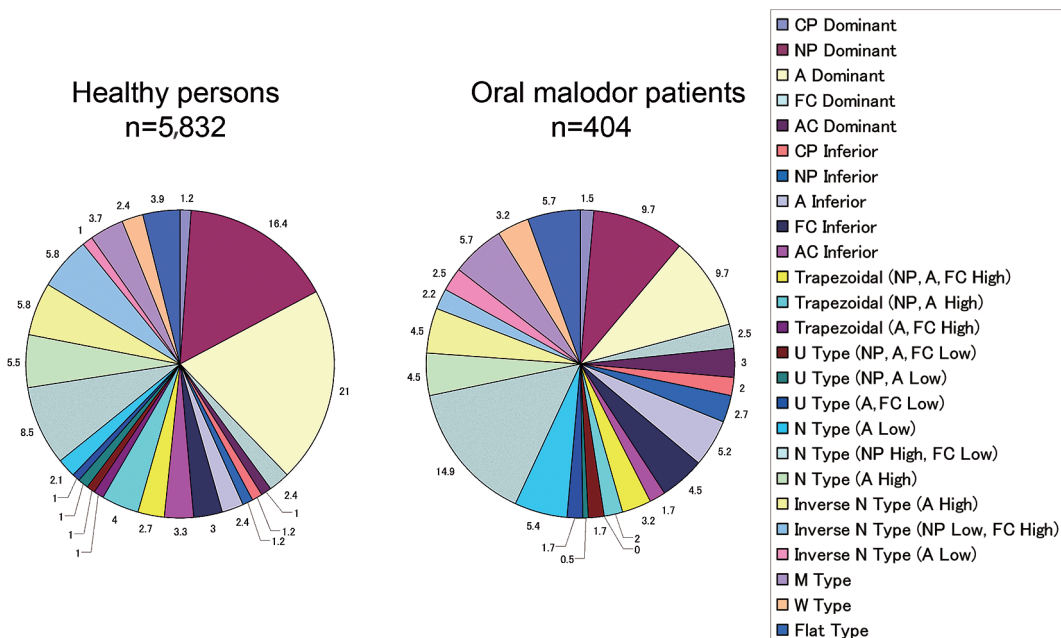


Fig. 1 Comparison of TEG patterns

25 basic personality profile types revealed that, compared with healthy individuals, patients presenting at the breath odor clinic had a significantly lower incidence of NP-dominant, A-dominant, and inverse N (NP low, FC high) types ( $p < 0.01$ ), and a significantly higher incidence of AC-dominant, NP-inferior, A-inferior, N-type (A low), N-type (NP high, FC low), inverse N-type (A low) ( $p < 0.01$ ), and M-type ( $p < 0.05$ ) (Table 2).

### Discussion

The attitude of the individual patient to the taking of the test itself is important in clini-

cally applying the TEG. An extremely low score on the deviation scale ( $< 10$  points) has been associated with social withdrawal, while an extremely high score on the TEG questionnaire ( $> 30$  points) has been associated with reduced reliability of the Egogram profile and an ambivalent attitude, suggesting indecisiveness<sup>7</sup>. A total of 196 patients (33%) were excluded due to either of these scores in the present study. A likely reason for this high exclusion rate is that many of the patients had high self-restraint and were very defensive, traits not specific to those presenting at oral malodor clinics, but commonly observed among subjects in psychological testing of this kind.

Table 2 TEG patterns of oral malodor patients

	Total (person)	Frequency (%)		Difference (%)	Chi-square test
		Patient	Healthy		
1 CP Dominant	6	1.5	1.2	0.3	NS
2 NP Dominant	39	9.7	16.4	-6.7	**
3 A Dominant	39	9.7	21	-11.3	**
4 FC Dominant	10	2.5	2.4	0.1	NS
5 AC Dominant	12	3	1	2	**
6 CP Inferior	8	2	1.2	0.8	NS
7 NP Inferior	11	2.7	1.2	1.5	**
8 A Inferior	21	5.2	2.4	2.8	**
9 FC Inferior	18	4.5	3	1.5	NS
10 AC Inferior	7	1.7	3.3	-1.6	NS
11 Trapezoidal (NP, A, FC High)	13	3.2	2.7	0.5	NS
12 Trapezoidal (NP, A High)	8	2	4	-2	NS
13 Trapezoidal (A, FC High)	0	0	1	-1	NS
14 U Type (NP, A, FC Low)	7	1.7	1	0.7	NS
15 U Type (NP, A Low)	2	0.5	1	-0.5	NS
16 U Type (A, FC Low)	7	1.7	1	0.7	NS
17 N Type (A Low)	22	5.4	2.1	3.3	**
18 N Type (NP High, FC Low)	60	14.9	8.5	6.4	**
19 N Type (A High)	18	4.5	5.5	-1	NS
20 Inverse N Type (A High)	18	4.5	5.8	-1.3	NS
21 Inverse N Type (NP Low, FC High)	9	2.2	5.8	-3.6	**
22 Inverse N Type (A Low)	10	2.5	1	1.5	**
23 M Type	23	5.7	3.7	2	*
24 W Type	13	3.2	2.4	0.8	NS
25 Flat Type	23	5.7	3.9	1.8	NS

N = 404, \*\* $p < 0.01$ , \* $p < 0.05$ , NS: not significant

When the incidence of each of the 25 basic TEG personality profile types was compared between the patient and healthy individual groups, a significant difference ( $p < 0.01$ ,  $p < 0.05$ ) was observed in 10 types, including the NP-dominant, A-dominant, and inverse N (NP low, FC high) types, which showed a decrease of 6.7, 11.3, and 3.6%, respectively. The NP-dominant type is characterized by motherly consideration of others, gentleness as a major factor in determining behavior, attitudes and judgment, and reliability and leadership in daily life. People with the A-dominant personality type are considered to be intelligent, self-affirmative, able to make judgments calmly and thus to enjoy their

life; their behavior and attitudes are based mainly on intellectual and reasoned judgment, which is also reflected in their daily activities. The inverse N (NP low, FC high) personality type is described as being innocent, self-centered, and healthy. The NP-dominant and A-dominant types are the most frequent among the 25 basic TEG personality profile types, accounting for 16.4 and 21.0% of the Japanese population, respectively<sup>5)</sup>. The incidence of these types in the patients presenting at the oral malodor clinic was only half of that in healthy individuals. This suggests that patients tend to care too much about their surroundings, which then causes mental instability or depression further com-

Table 3 TEG patterns and malodor levels

	Malodor levels					Total
	0	1	2	3	4	
1 CP Dominant	2	2	1	0	1	6
2 NP Dominant	20	10	5	1	3	39
3 A Dominant	19	7	5	4	4	39
4 FC Dominant	8	1	0	1	0	10
5 AC Dominant	7	2	3	0	0	12
6 CP Inferior	3	3	0	2	0	8
7 NP Inferior	6	1	1	2	1	11
8 A Inferior	11	7	1	2	0	21
9 FC Inferior	11	4	2	1	0	18
10 AC Inferior	3	1	2	0	1	7
11 Trapezoidal (NP, A, FC High)	6	0	6	1	0	13
12 Trapezoidal (NP, A High)	6	0	0	0	2	8
13 Trapezoidal (A, FC High)	0	0	0	0	0	0
14 U Type (NP, A, FC Low)	5	2	0	0	0	7
15 U Type (NP, A Low)	1	0	0	1	0	2
16 U Type (A, FC Low)	3	2	0	0	2	7
17 N Type (A Low)	12	5	3	1	1	22
18 N Type (NP High, FC Low)	25	16	10	3	6	60
19 N Type (A High)	11	2	2	1	2	18
20 Inverse N Type (A High)	12	3	1	2	0	18
21 Inverse N Type (NP Low, FC High)	4	2	2	1	0	9
22 Inverse N Type (A Low)	7	1	0	2	0	10
23 M Type	13	4	5	1	0	23
24 W Type	9	2	1	1	0	13
25 Flat Type	15	3	2	1	2	23
Total	219	80	52	28	25	404

pounded by low problem-solving ability.

In contrast, the incidence of the AC-dominant, NP-inferior, A-inferior, N (A low), N (NP high, FC low), inverse N (A low), and M types showed an increase of 2.0, 1.5, 2.8, 3.3, 6.4, 1.5, and 2.0%, respectively in the patients. People with the AC-dominant personality type are always mindful of others' reactions, have a high degree of internal anxiety, and are highly dependent on others. People with the A-low personality type have high levels of responsibility and want to give a better impression of themselves to others; they tend to be frustrated after making efforts to improve the situation but without success as they have a low ability to address real problems. People with the N (A low) personality type tend to be unable to say "no" to others, try hard in everything they do, and are good-natured. People with the N (NP high, FC low) personality type are kind and very considerate of others, but tend to have a high degree of self-restraint. This suggests that very few of the patients presenting at oral malodor clinics are intelligent, self-affirmative, and able to make calm judgments, and instead they tend to be individuals who find it difficult to say "no" to others' requests, are very considerate of others, and have a high degree of self-restraint. These results are consistent with those of our previous study<sup>9)</sup>. At our clinic, we often encounter patients with oral psychosomatic disease who are introverted, delicate, and blame themselves for everything. This is consistent with the present finding that the incidence of the N (NP high, FC low) type was increased by as much as 6.4% in the patient group<sup>12)</sup>.

To verify this finding, we used the chi-square test to compare the frequency of TEG personality type among those categorized as "no-smell" in both groups. The oral malodor levels are shown in Table 3. The results revealed that many in the malodor group in this category (0, no smell) had the unique N type (NP high, FC low).

However, no difference was observed between groups at level 1, which is comparable with that in a healthy individual and does

not require any kind of treatment. This confirmed the absence of a correlation between intensity of oral malodor and any specific personality trait in the patient group.

## Conclusion

When the incidence of the 25 basic TEG personality profile types was compared between patients and healthy individuals, a significant difference was observed in 10 types.

The results of this study suggest that assessing patient personality is helpful in determining effective treatment for oral malodor.

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