



CASE REPORT

*YAB Buunk-Werkhoven*  
*M Dijkstra-le Clercq*  
*EL Verheggen-Udding*  
*N de Jong*  
*M Spreen*

**Authors' affiliations:**

*YAB Buunk-Werkhoven, EL Verheggen-Udding,*  
*N de Jong, M Spreen, Dr. S. van Mesdag*  
Forensic Psychiatric Centre, Groningen,  
The Netherlands  
*M Dijkstra-le Clercq, Eerstelijns Psychologen*  
Praktijk, Ter Aar, The Netherlands  
*YAB Buunk-Werkhoven, Department of Social*  
Psychology, University of Groningen,  
Groningen, The Netherlands

**Correspondence to:**

*Dr Yvonne A.B. Buunk-Werkhoven*  
SPOH ARTS  
Social Psychology Oral Hygiene  
Advice Research Training Supervision  
Rozenstraat 74a  
1016 NX Amsterdam  
The Netherlands  
Tel.: +31 (0)6 518 733 89  
E-mail: yvonne@apbuunk.com

## Halitosis and oral health-related quality of life: a case report

**Abstract:** *Objectives:* This is a clinical case of a 36-year-old Dutch male, patient in the Dr. S. van Mesdag Forensic Psychiatric Centre in Groningen. It demonstrates a short-time effect of a tailored oral hygiene self-care intervention in three sessions over a period of 3 months on halitosis and a patient's oral health-related quality of life (OH-QoL). *Methods:* In addition to a dental screening and professional oral hygiene care, a semi-structured interview was conducted by the dental hygienist, and questionnaires were administered. The questionnaires included were; the Dutch version of the Oral Health Impact Profile-14 (OHIP-14-NL; used as a measurement of OH-QoL), scales for expected social outcomes for having healthy teeth, attitudes towards oral hygiene behaviour (OHB) and dental anxiety. *Results:* Clinical observations showed an improvement in patient's OHB, while the extreme foetor-ex-ore was reduced to an acceptable level. A retrospective assessment showed that patient's attitude towards the recommended OHB together with his self-perceived OH-QoL had positively increased. *Conclusions:* This case highlights the value of professional individual oral hygiene instructions performed by a dental hygienist. It also illustrates that a patient's effective OHB may play an important role in the reduction in halitosis and self-perceived OH-QoL. Finally, the retrospective version of the OHIP-14-NL may be an adequate method to assess self-perceived OH-QoL within a relative short period of time.

**Key words:** best practice case report; forensic psychiatric patient; halitosis; oral health-related quality of life; oral hygiene behaviour

## Introduction

Oral health can be defined as 'a standard of health of the oral and related tissues which enables an individual to speak and socialize without active disease, discomfort or embarrassment and which contributes to general well-being' (1, p. 8). Oral disease can lead to impairments on several dimensions in the physical, the psychological and the social domain (2). For instance, large cavities or severe gingival diseases (periodontitis) can make the extraction of teeth necessary. Tooth loss could lead to problems with biting, chewing, swallowing, speaking, smiling and appearance, which may lead to feelings of shame or decreased self-esteem.

Another possible effect of oral disease is halitosis, i.e. a bad breath odour. At least 50 per cent of the population suffers from halitosis (3), and approximately 25% of these individuals experience such a severe problem that it affects their social functioning. For example, individuals may feel nervous and embarrassed in the presence of other people and may avoid social contacts and intimate relationships (3, 4). Thus, halitosis

**Dates:**

Accepted 3 May 2011

**To cite this article:**

*Int J Dent Hygiene* 10, 2012; 3–8  
DOI: 10.1111/j.1601-5037.2011.00512.x  
Buunk-Werkhoven YAB, Dijkstra-le Clercq M,  
Verheggen-Udding EL, de Jong N, Spreen M.  
Halitosis and oral health-related quality of life:  
a case report.

© 2011 John Wiley & Sons A/S

is what Locker refers to as an impairment that can lead to a decrease in the quality of life (5–7).

The present case report concerned a patient in a forensic psychiatric institution, the Dr. S. van Mesdag Forensic Psychiatric Centre. This institution is located in the Netherlands, and houses individuals with mental disorders who have committed serious offenses (i.e. murder – including serial – rape or pedophilia). To reduce recidivism, patients are required to receive treatment appropriate for their psychiatric needs.

Recently, two studies on the oral health and its self-reported impact on quality of life in Dutch forensic psychiatric population (8, 9) showed that this population is characterized by a low level of awareness of personal oral hygiene and the impact this may have on oral health and well-being. The findings emphasize the value of dental screening and professional dental care in this population and stress the importance of regular individual oral hygiene instruction, as part of patients' general personal care, because it can improve patients' oral health status (10–12). Therefore, the aim of this clinical case report was to demonstrate that an oral hygiene behaviour (OHB) intervention tailored to the individual may reduce halitosis and benefit patient's oral health-related quality of life (OH-QoL).

## Method

### Overview

Over a period of 3 months, a 36-year-old Dutch unmarried male forensic psychiatric patient, Mr. X., from the Dr. S. van Mesdag Forensic Psychiatric Centre in Groningen participated in this case report. Patient was aware that participation was voluntary. Ethical approval for this case report was obtained from the ethics committee of the institution.

### The patient

The patient, Mr. X. of Dutch origin, was the youngest of four children. When he was almost 12 years old, his father died. His medical history revealed that he was diagnosed with obesity at age three and suffered from deafness (tinnitus) until age four, which was successfully treated with surgery although he continued having speech problems, i.e. lisping. There was family history of obesity, and his mother was prediabetic. His mental health history included a diagnosis of educationally subnormal impression (mildly mentally retarded). The highest level of education he achieved was secondary special education.

At the age of 3 or 4 Mr. X. went to the dentist for the first time. Until he was about 6 years old, his parents brushed his teeth twice a day. As far back as he could remember, he always had poor oral health.

### Dental and dental hygiene treatment

A dental screening was conducted by a dentist and the patient was diagnosed with 'pre-edentulous', implying an aggressive

process of periodontitis to a point where extraction of all teeth would become necessary. A full denture was evidently the next step, but this was complicated because of Mr. X.'s very complex oral condition; the maxilla was in an extreme Class II occlusion.

Additionally, it was noted that because of his extreme foetor-ex-ore (very strong offensive breath odour), the co-residents and the staff avoided Mr. X. or remained at a distance in social contacts. Therefore, a visit to the dental hygienist (the first author) was considered urgent.

The first session with the dental hygienist occurred 3 months after the dental screening. This included an assessment of Mr. X.'s oral hygiene self-care with the index for OHB (13). This index for OHB (eight items) is a method for assessing and evaluating actual oral self-care practices of individuals and population groups. This measure was constructed using the most applicable items, such as tooth brushing (frequency, time of brushing, measures of force, duration in minutes, method and use of fluoride toothpaste), interdental cleaning (use of floss, tooth sticks, interdental brushes) and tongue cleaning (Appendix I; 14–15). Mr. X. reported to have an occasional toothache, broken teeth, regular gingiva bleeding, mobility of his teeth and strong offensive breath odour. Mr. X.'s daily OHB included twice daily (after breakfast and before going to sleep) manual tooth brushing (horizontal/circular method) with fluoridated toothpaste, and mouth washing several times a day. He did not use any interdental cleaning methods or tongue cleaning.

As well, Mr. X. was educated about his clinical oral condition and received individual oral hygiene instruction and skills training for optimal OHB. The patient was instructed to use the Bass method of tooth brushing (16) and daily interdental cleaning, (in this case, the use of interdental brushes), tongue cleaning and mouthwash were also recommended (9, 13–17). Mr. X. required extensive periodontal treatment however was unable to receive it because of dental insurance reasons. Consequently, the main focus of the sessions was to promote oral hygiene self-care; therefore, the patient received a professional dental polishing treatment.

Three weeks later in the second session, the dental hygienist assessed if Mr. X. had performed the recommended OHB effectively. Mr. X.'s oral health was assessed by a simple visual inspection, and this showed a reduction of plaque in general; the colour of the gingiva was pink instead of dark red; there was less swelling of the gingiva, and the strong breath odour was reduced. The difference between the observations of sessions 1 and 2 was shown to Mr. X. visually with a hand mirror.

### Semi-structured interview

Directly after the second session, Mr. X. was interviewed by the dental hygienist to explore his family background, his dental history and evaluate his self-perception. In a relatively short time, after Mr. X. had received the individual oral hygiene instruction and skills training in the first session, he showed a respectable oral hygiene behavioural change. The main focus

of this interview was the aspects that might have played a role in his behavioural change (e.g. a change in attitudes towards oral hygiene self-care and the influence of specific important individuals on Mr. X's oral health behaviour). The interview took place in a separate room at Mr. X's department and lasted for about 45 min. A checklist was used to make sure that all relevant topics were covered.

## Measures

First, Mr. X. answered several demographic and dental history questions. For example, the age of his first dental visit, his perceived oral condition (i.e. condition affecting structure of the mouth such as teeth, gums, lips, tongue and cheeks) and his dental health status, including the judgement made by the dentist.

### OHIP-14-NL (OH-QoL)

To assess Mr. X's perceived OH-QoL, he completed an adapted version of the OHIP-14-NL, a validated Dutch short version of the OHIP-NL (8, 9, 18, 19), that includes 14 items organized in seven dimensions: function limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability and handicap. Responses ranged from 0 = 'never' to 4 = 'very often'. Higher sum scores (ranging from 0 to 56) represent a lower OH-QoL (20).

### Expected social outcomes (ESO)

In addition, Mr. X. filled out a six-item scale on the expected social outcomes for having healthy teeth (9, 13–15). This included items such as 'People judge each other in part on the basis of their teeth', 'In social contacts well maintained teeth are important', 'It is embarrassing when someone has badly maintained teeth', 'Someone's teeth are important for the first impression he or she makes', 'I appreciate it when people with whom I socialize have well maintained teeth' and 'In social contacts fresh breath is important'. Responses ranged from 1 = *disagree* to 5 = *agree*, and a sum score (ranging from 6 to 30) was computed by summing up scores on all six items that measured the concept ESO. A higher sum score indicates a higher importance of the social outcomes of good oral health.

### Dental Anxiety Scale (DAS)

Mr. X also filled out the four-item Dental Anxiety Scale, a self-report scale measuring fear for dental treatment (21). Items were scored on a scale of 1–5, and higher sum scores (ranging from 4 to 20) indicate more dental anxiety.

## Attitude

Finally, to assess Mr. X's attitude towards oral health behaviour, he was asked to indicate on nine dimensions, how he evaluated the recommended OHB, e.g. 1 = unimportant to

7 = important and so on: unpleasant–pleasant unhealthy–healthy, negative–positive, annoying–not annoying, not useful–useful, boring–exciting, painful–painless and stupid–smart. Higher sum scores (ranging from 9 to 63) indicate a more positive attitude towards an optimal OHB (13–15).

### Modified OHIP-14-NL

A third session was scheduled 2 months after the second session, and the dental hygienist checked the maintenance of Mr. X's OHB. A modified version of OHIP-14-NL scale was used to retrospectively assess the perceived improvement after the intervention. The original items were preceded by the introduction, 'in comparison to the period before the intervention (3 months ago) by the dental hygienist', and the responses of the participant were scored 'fewer' to 'more', resulting in a sum score potentially ranging from 0 (no improvement at all) to 56 (much improvement), and 28 means no changes. Similarly, patient's perceived change in attitudes and opinions towards OHB were assessed.

### Oral hygiene treatment

Finally, the dental hygienist performed a professional oral hygiene treatment, including a simple SRP and polishing. Because dental insurance does not cover more extensive oral health care in this type of centre for imprisoned forensic patients, the focus of dental and oral hygiene treatment was mainly on reducing pain and other oral discomfort.

## Results

At the first session, the dental hygienist noted that Mr. X. was extremely obese, with a BMI over 40 kg/m<sup>2</sup> and with a physically unhealthy and slightly neglected appearance. He was sloppily dressed and had a pungent odour. However, he was calm and did not show anxiety or any other obvious emotions.

He had positive experiences with his dental visits (twice a year) and had five different dentists till now. Mr. X.'s total score of 4 on the Dental Anxiety Scale is indicative of no dental anxiety. During childhood, he had tried to use orthodontic removable night braces, but was unsuccessful. Throughout adolescence, he was no longer motivated for orthodontic treatment and he quit using the night braces.

Mr. X. was educated about his clinical oral condition to increase his knowledge and awareness regarding his oral health and was given oral hygiene instructions and demonstrations. He was sincerely motivated and willing to change his own daily oral hygiene activities as recommended.

At the second session, Mr. X. general appearance had changed; he was well dressed and cheerful. From visual inspection, it was clear that his OHB was well performed and his self-perceived oral (gingival) condition had improved. His teeth were clean, he reported less gingival bleeding and the breath odour was reduced to an acceptable level. The dental hygienist complimented Mr. X. on his regular oral hygiene self-care and also

reinforced that if he maintained his self-care the oral health benefits would be substantial. Mr. X. admitted that he felt relieved and that his clinical oral condition felt better than it had 3 weeks earlier. In addition, he was very motivated to maintain the newly learned OHB, even though it cost him about 30–45 min per brushing session. Mr. X. daily cleaned his tongue, brushed his teeth four times a day, used interdental brushes before he went to sleep and used the mouthwash several times a day.

In the interview immediately following the second session, Mr. X. evaluated his perceived OH-QoL very positively; he did not experience eating problems or pain (OHIP-14-NL; sum score = 5). Sometimes, he had trouble speaking because of the lisping. He indicated that he experienced some psychological discomfort, and that he avoided being in close proximity to other people because of his foetor-ex-ore. Most of all, when he noted resistant behaviour of others, he tended to withdraw socially and to experience some increased tension. Eventually, he admitted feeling 'very ashamed' of his bad breath odour. He attached a high value to the positive social outcomes of having healthy teeth (ESO; sum score = 25) and wondered whether others would notice that he had improved his OHB.

The patient valued the newly learned OHB very positively (attitude; sum score = 50); however, he found the recommended OHB extremely boring, a little bit annoying and between painful–painless. In answer to the final question why he had changed his OHB, Mr. X. answered: 'Because now at last I know what I should do and how'.

Three months after the intervention, the dental hygienist assessed the maintenance of Mr. X.'s OHB. Mr. X. still was motivated and willing to maintain his new daily oral hygiene activities. Furthermore, Mr. X. evaluated his perceived OH-QoL in comparison with the period before the intervention more positively; he reported much improvement on several items of the OHIP 14-NL (sum score = 38). He experienced less social–psychological discomfort, felt much more secure, reported less tension and felt less ashamed. Moreover, he felt that he was able to function more normally and that life in general was more satisfying. Mr. X.'s attitudes and opinions towards oral hygiene self-care were also much more positive.

## Discussion

The present case report documents a forensic psychiatric patient, Mr. X, with serious halitosis that was negatively affecting his OH-QoL and was interfering with his social interactions. A tailored oral hygiene self-care intervention by a dental hygienist included three sessions over a period of 3 months and showed a substantial decrease in halitosis, an increase in the patient's self-reported OH-QoL and an obvious improvement in OHB. Indeed, a retrospective assessment showed that the patient's attitude towards OHB as well as his self-perceived OH-QoL had positively increased. These effects are particularly noteworthy as forensic psychiatric patients tend to have a low awareness of their own OHB, and of the conse-

quences such behaviour may have for their oral health and well-being (8, 9). In general, individuals with a psychiatric diagnosis tend to experience more problems with their oral health, and the present study illustrates how such individuals may be assisted to improve their oral health by a dental hygienist (9, 22, 23).

While it is not completely clear why the intervention was successful, it is assumed that the combination of personal attention and very specific behavioural instructions may have accounted for the effects. The patient was very motivated to change his behaviour as he frequently experienced the negative social consequences of his bad breath. In part, the fact that he was cognitively challenged and imprisoned may have affected his motivation to change his behaviour. This case report concerns a particular patient in a very specialized setting and it is believed that the improvement in Mr. X.'s oral health resulted from the dental hygiene interventions that were tailored for Mr. X. Such a case report emphasizes the importance of interventions provided by a dental hygienist tailored to individual needs (11, 12, 24).

This study may assist all oral health professionals working with specific types of patients in what are referred to be 'the most dignified tasks' of these professionals, i.e. educating these persons in oral health and changing their OHB (25). In addition, as dentists are at times not primarily focussed on educating patients in effective OHB, preferring to treat rather than prevent oral diseases (26), dental hygienists may play a central role in promoting desired OHB by effective professional communication (27). Finally, this report demonstrates the added value of using questionnaires to supplement work by dental hygienists. By assessing patients' attitudes towards OH-QoL (8, 9, 18) pretreatment and post-treatment, this allows dental hygienists to evaluate the effects of their interventions, and obtain information to foster reflection on their work.

## Acknowledgements

Special thanks to Mr. X. for his invaluable information and willingness for taking part in this case report. The author is particularly grateful to Abraham P. Buunk, Arie Dijkstra and to Ashley D. Hoben for their invaluable and enthusiastic support.

## References

- 1 Kay E, Locker D. *Effectiveness of Oral Health Promotion: A Review*. London: Health Education Authority; 1997.
- 2 Locker D. Measuring oral health: a conceptual framework. *Community Dent Health* 1988; **5**: 3–18.
- 3 Bosy A. Oral malodor: philosophical and practical aspects. *J Can Dent Assoc* 1997; **3**: 196–201.
- 4 McKeown L. Social relations and breath odour. *Int J Dent Hyg* 2003; **4**: 213–217.
- 5 Slade GD. Derivation and validation of a short form oral health impact profile. *Community Dent Oral Epidemiol* 1997; **25**: 284–290.
- 6 Elias MS, Feriani MG. Historical and social aspects of halitosis. *Rev Lat Am Enfermagem* 2006; **5**: 821–823.

- 7 Locker D. Oral health and quality of life. *Oral Health Prev Dent* 2004; **1**: 247–253.
- 8 Werkhoven YAB, Spreen M, Buunk AP, Schaub RMH. Mondzorg in de Dr. S. van Mesdagkliniek heeft meer om het lijf. [Oral Health care in Dr. S. van Mesdag Forensic Psychiatric Centre: more than oral health care alone]. *GGzet Wetenschappelijk* 2004; **8**: 36–40.
- 9 Buunk-Werkhoven YAB, Dijkstra A, Schaub RMH, Van der Schans CP, Spreen M. Oral health-related quality of life among imprisoned Dutch forensic psychiatric patients. *J Forensic Nurs* 2010; **6**: 137–143.
- 10 Heidari E, Dickinson C, Wilson R, Fiske J. Oral health of remand prisoners in HMP Brixton, London. *Br Dent J* 2007; **202**: E5.
- 11 McGrath C. Oral health behind bars: a study of oral disease and its impact on life quality of an older prison population. *Gerodontology* 2002; **19**: 109–114.
- 12 Mixson JM, Elpee HC, Fell PH, Jones JJ, Rico M. Oral health status of a federal prison population. *J Public Health Dent* 1990; **50**: 257–261.
- 13 Buunk-Werkhoven YAB, Dijkstra A, Van der Schans CP. Determinants of oral hygiene behavior: a study based on the theory of planned behavior. *Community Dent Oral Epidemiol* 2011; **39**: 250–259.
- 14 Buunk-Werkhoven YAB, Dijkstra A, Van der Schans CP, Jaso ME, Acevedo S, Parodi Estellano G. Evaluación y promoción de la actitud hacia la higiene oral en pacientes de la Facultad de Odontología de la Universidad Católica del Uruguay [Evaluation and promotion of patients' oral hygiene behavior in the faculty of Odontology of the Catholic University in Uruguay]. *Actas Odontológicas* 2008; **2**: 13–20.
- 15 Buunk-Werkhoven YAB, Dijkstra A, Van der Wal H *et al.* Promoting oral hygiene behavior in recruits in the Dutch Army. *Mil Med* 2009; **174**: 971–976.
- 16 Bass CC. An effective method of personal oral hygiene. *J La State Med Soc* 1954; **106**: 100–112.
- 17 Soldani FA, Young L, Jones K, Walsh T, Clarkson JE. One-to-one oral hygiene advice provided in a dental setting for oral health (Protocol). *Cochrane Database Syst Rev* 2008; **Issue 4**: Art. No.: CD007447. Doi:10.1002/14651858.CD007447.
- 18 Buunk-Werkhoven YAB, Dijkstra A, Van der Schans CP. Oral health-quality of life predictors depend on population. *Appl Res Qual Life* 2009; **4**: 283–293.
- 19 Van der Meulen MJ, John MT, Naeije M, Lobbezoo F. The Dutch version of the Oral Health Impact Profile (OHIP-NL): translation, reliability and construct validity. *BMC Oral Health* 2008; **8**: 11.
- 20 Slade GD, Spencer AJ. Development and evaluation of the oral health impact profile. *Community Dent Health* 1994; **11**: 3–11.
- 21 Corah NL, Gale EN, Illig SJ. Assessment of a dental anxiety scale. *J Am Dent Assoc* 1978; **97**: 816–819.
- 22 Buckley S, Sacks B. Oral health problems and quality of life. *Downs Syndr Res Pract* 2007; **1**: 17.
- 23 Matevosyan NR. Oral health of adults with serious mental illnesses: a review. *Community Ment Health J* 2009; **46**: 553–562.
- 24 Mirza I, Day R, Phelan M, Wulff-Cochrane V. Oral health of psychiatric in-patients. *Psychiatr Bull* 2001; **25**: 143–145.
- 25 Özcan M. *Clinical Dental Biomaterials: Dentists wealthy – Patients healthy?* Groningen: Facilitair Bedrijf, University of Groningen; 2008.
- 26 The Lancet Editorial. Oral health: prevention is key. <http://www.thelancet.com> Vol 373 No 9657 January 3, 2009; 1.
- 27 Hovius M. President's address. *Int J Dent Hyg* 2009; **3**: 157–158.

# Appendix I

## Index for Oral Hygiene Behavior (OHB index) ©

The following questions are about your oral hygiene self-care practices.

### 1. How often do you brush your teeth?

- ☐ Not every day
- ☐ Once a day
- ☐ Twice a day
- ☐ More than twice a day

### 2. When do you brush your teeth?

- Morning before breakfast** ☐ Yes ☐ No
- Morning after breakfast** ☐ Yes ☐ No
- Noon** ☐ Yes ☐ No
- After dinner in the evening** ☐ Yes ☐ No
- Before going to sleep** ☐ Yes ☐ No

### 3. How do you brush your teeth?

I brush my teeth

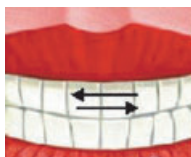
- Softly 1 2 3 4 5 6 7 Forcefully
- ☐ ☐ ☐ ☐ ☐ ☐ ☐

### 4. How much time do you spend on brushing your teeth?

I brush my teeth for

- ☐ Less than one minute
- ☐ One minute
- ☐ Two minutes
- ☐ Three minutes
- ☐ More than three minutes

### 5. I brush my teeth as follows:



- ☐ Back-and-forth movement ('horizontal' method)



- ☐ Up-and-down movement ('vertical' method)



- ☐ Circular movement ('circular' method)



- ☐ Brushing softly with a massing movement near the gum (Bass-method of tooth brushing)

### 6. What do you use to clean your teeth?

Mostly I use:

- ☐ Toothpaste **with** fluoride
- ☐ Toothpaste **without** fluoride
- ☐ I don't know

### 7. Do you clean your tongue?

- ☐ Never
- ☐ Sometimes
- ☐ Every day

### 8. Which of the following interdental tools do you use?

	Never	Not every day	Once a day	Twice or more times a day
Dental floss	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tooth sticks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Interdental brushes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Copyright of International Journal of Dental Hygiene is the property of Wiley-Blackwell and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.