Questionnaire-Based Study on Sleep-Disordered Breathing Among Edentulous Subjects in a University Oral Health Center

Hiroko Tsuda, DDS, PhD^a/Fernanda R. Almeida, DDS, PhD^b/Joanne N. Walton, DDS^c/ Alan A. Lowe, DMD, PhD^c

The aim of this study was to evaluate the prevalence of sleep-disordered breathing (SDB) and its relationship with nocturnal denture wear in edentulous subjects. Sixty-two edentulous subjects completed questionnaires to ascertain their risk for SDB; 25 subjects wore dentures during sleep. The prevalence of SDB was 40.3% based on the results of the Berlin Questionnaire. There was no significant difference between high- and low-risk groups with respect to age, Body Mass Index, or denture use, except for a history of self-reported high blood pressure. The prevalence of suspected SDB in edentulous subjects was higher than in the general population. *Int J Prosthodont 2010; 23:503–506.*

E dentulism affects 10% to 42% of elderly individuals.¹ Dentists generally recommend the removal of dentures during sleep since constant wear can increase denture irritation, stomatitis, and other overuse risk factors. Sleep-disordered breathing (SDB) is a common disorder,² and some reports have suggested a possible relationship between SDB and denture use.³ The advantages of denture removal during sleep should be measured against the increased risk of upper airway collapse, since edentulism may lead to impairment of upper airway function.⁴ The aim of this study was to estimate the prevalence of patients at a high risk for SDB in an edentulous population and the relationship between SDB risk and denture use during sleep.

Materials and Methods

Subjects were edentulous participants in the dental clinic at the University of British Columbia undergraduate complete denture module for which students fabricated new maxillary and mandibular complete dentures. All subjects were asked to complete an entry SDB questionnaire, which included questions regarding age, sex, height, weight, and denture use during sleep (both maxillary and mandibular dentures, maxillary or mandibular dentures, or no dentures), and the Berlin Questionnaire as part of their routine clinical examination.⁵ The Berlin Questionnaire contains 10 questions concerning SDB, such as snoring, stops in breathing, tiredness, sleepiness, and high blood pressure. Using the Berlin Questionnaire criteria,⁵ subjects were divided into two groups: high and low risk.

Statistical analysis was performed using SPSS 10.0 software (SPSS), and the Student t and chi-square tests were used to compare the two groups. A P value of less than .05 was considered significant.

Results

A total of 62 edentulous subjects (50% men) completed the questionnaire. No one refused to answer the questionnaire since it was included as part of their routine clinical examination. Subject demographic data are provided in Table 1. Twenty-five (40.3%) patients wore their dentures during sleep, while 37 patients (59.7%) slept without their dentures (Fig 1). The questionnaire suggested that 40.3% of participants had an increased chance of exhibiting SDB. The distribution of responses is provided in Table 2. After dividing the subjects based on the questionnaire results, 11 (29.7%) subjects in the low-risk group used their dentures during sleep, while the same was noted for only 5 patients (20.0%) in the high-risk group. There was no significant difference between groups with regard to age, Body Mass Index (BMI), and denture use during sleep. However, a significant difference was noted for self-reported high blood pressure (Table 1).

503

^aPostdoctoral Fellow, Department of Oral Health Sciences, University of British Columbia, Vancouver, BC, Canada.

^bClinical Assistant Professor, Department of Oral Biological and Medical Sciences, University of British Columbia, Vancouver, BC, Canada.

^cProfessor, Department of Oral Health Sciences, University of British Columbia, Vancouver, BC, Canada.

Correspondence to: Dr Hiroko Tsuda, 3-1-1 Maidashi, Higashiku, Fukuoka, Japan. Fax: +81-92-642-6520. Email: htsuda@dent. kyushu-u.ac.jp

	Total	High-risk	Low-risk	Р
N (%)	62	25 (40.3)	37 (59.7)	
Mean age ± SD (y)	70.8 ± 10.4	69.6 ± 9.0	71.5 ± 11.2	NS
Sex (%)				NS
Male	31 (50.0)	14 (56.0)	17 (45.9)	
Female	31 (50.0)	11 (44.0)	20 (54.1)	
Mean BMI ± SD (kg/m²)	27.7 ± 5.7	29.3 ± 4.5	26.7 ± 6.3	NS
High blood pressure (%)				< .01
Yes	31 (50.0)	19 (76.0)	12 (32.4)	
No	30 (48.4)	6 (24.0)	24 (64.9)	
Not reported	1 (1.6)	0 (0.0)	1 (2.7)	
Denture use during sleep (%)				NS
Maxillary and mandibular	16 (25.8)	5 (20.0)	11 (29.7)	
Maxillary or mandibular	9 (14.5)	4 (16.0)	5 (13.5)	
None	37 (59.7)	16 (64.0)	21 (56.8)	

 Table 1
 Subject Demographic Data and Characteristic Differences Between

 High- and Low-Risk Groups
 Fight State

NS = not significant; SD = standard deviation.



Fig 1 Denture use during sleep. Each variable shows the number and percentage of subjects in each subgroup. "No denture" refers to a patient who did not have a denture during the survey period.

Discussion

This study suggests that the prevalence of suspected SDB in edentulous subjects is 40.3%, which is higher than has been reported previously for not only a younger population, but also an elderly population considered to be at high risk for SDB.² Most edentulous subjects tend to be elderly. The mean age of the subjects in this study was 70.8 years.

Since self-reported high blood pressure and a BMI of more than 30 are included as scoring items in the Berlin Questionnaire, it is not surprising that the highrisk group would have a higher rate of self-reported elevated blood pressure than the low-risk group. However, there was no significant difference in BMI, generally considered a risk factor for SDB, between groups (Table 2). Self-reported high blood pressure may be a more significant factor for SDB risk than high BMI in these subjects.

Denture wear during sleep did not appear to affect the risk of SDB. Previous reports suggested the possibility that denture wear during sleep could cause a compensation of airway patency.⁴ However, in this study, only 31.3% of those who wore both dentures during sleep were at risk for SDB.

© 2010 BY QUINTESSENCE PUBLISHING CO, INC. PRINTING OF THIS DOCUMENT IS RESTRICTED TO PERSONAL USE ONLY. NO PART OF THIS ARTICLE MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM WITHOUT WRITTEN PERMISSION FROM THE PUBLISHER.

Table 2Distribution of Questionnaire Responses Between High- and Low-Risk Groups

Question	High-risk, n (%)	Low-risk, n (%)	Р
Do you snore?			< .01
Yes	19 (76.0)	6 (16.2)	
No	2 (8.0)	24 (64.9)	
Do not know	4 (16.0)	7 (18.9)	
Snoring loudness			NS
Slightly louder than breathing	6 (37.5)	3 (60.0)	
As loud as talking	5 (31.3)	1 (20.0)	
Louder than talking	3 (18.8)	1 (20.0)	
Very loud, can be heard in adjacent rooms	2 (12.5)	0 (0.0)	
Snoring frequency			< .001
Nearly every day	13 (72.2)	0 (0.0)	
3-4 times a week	1(5.6)	0 (0.0)	
1-2 times a week	0 (0.0)	3 (100.0)	
1–2 times a month	3 (17.6)	0 (0.0)	
Never or nearly never	1 (5.6)	0 (0.0)	
Does your snoring bother other people?			NS
Yes	12 (63.2)	4 (66.7)	
No	4 (21.1)	2 (33.3)	
Do not know	3 (15.8)	0 (0.0)	
How often have your breathing pauses been noticed?			NS
Nearly every day	1 (4.3)	0 (0.0)	
3-4 times a week	0 (0.0)	0 (0.0)	
1-2 times a week	2 (8.7)	0 (0.0)	
1-2 times a month	1 (4.3)	0 (0.0)	
Never or nearly never	19 (82.6)	36 (100.0)	
Are you tired after sleeping?			< .001
Nearly every day	12 (48.0)	3 (8.3)	
3-4 times a week	5 (20.0)	2 (5.6)	
1-2 times a week	1 (4.0)	2 (5.6)	
1-2 times a month	3 (12.0)	5 (13.9)	
Never or nearly never	4 (16.0)	24 (66.7)	
Are you tired during wake time?			< .001
Nearly every day	10 (40.0)	3 (8.1)	
3-4 times a week	6 (24.0)	1 (2.7)	
1-2 times a week	4 (16.0)	4 (10.8)	
1-2 times a month	1 (4.0)	6 (16.2)	
Never or nearly never	4 (16.0)	23 (62.2)	
Have you ever fallen asleep while driving?			NS
Yes	1 (4.0)	0 (0.0)	
No	24 (96.0)	37 (100.0)	
Do you have high blood pressure?			< .01
Yes	19 (76.0)	12 (33.3)	
No	6 (24.0)	24 (66.7)	

NS = not significant.

Conclusion

Since this study was purely observational, the causal relationship between edentulism, denture use, and SDB risk could not be determined. Further evaluation is required to understand the mechanism of SDB induced by tooth loss and to identify a possible treatment option for edentulous patients, such as wearing dentures during sleep.

Acknowledgments

The authors would like to thank Mrs Ingrid Ellis for her editorial assistance during the final preparation of this manuscript. Financial support for this study was received from MITACS Graduate Research Internship Program and from Klearway royalties (an oral appliance commercialized for snoring and SDB management) paid to the University of British Columbia.

References

- Centers for Disease Control and Prevention (CDC). Total tooth loss among persons aged > or = 65 years—Selected states, 1995-1997. MMWR Morb Mortal Wkly Rep 1999;48:206–210.
- Bixler EO, Vgontzas AN, Ten Have T, Tyson K, Kales A. Effects of age on sleep apnea in men: I. Prevalence and severity. Am J Respir Crit Care Med 1998;157:144–148.
- Endeshaw YW, Katz S, Ouslander JG, Bliwise DL. Association of denture use with sleep-disordered breathing among older adults. J Public Health Dent 2004;64:181–183.
- 4. Bucca C, Cicolin A, Brussino L, et al. Tooth loss and obstructive sleep apnoea. Respir Res 2006;7:8.
- Netzer NC, Stoohs RA, Netzer CM, Clark K, Strohl KP. Using the Berlin Questionnaire to identify patients at risk for the sleep apnea syndrome. Ann Intern Med 1999;131:485–491.

Copyright of International Journal of Prosthodontics is the property of Quintessence Publishing Company Inc. 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.