

A STUDY ON THE CHANGE IN ORAL ENVIRONMENT AS A RESULT OF OPERATING A DENTAL HYGIENE COURSE (ADPE) PROGRAM FOR SUBJECTS VISITING THE INTRAMURAL LABORATORY

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ABSTRACT

Dental hygiene diagnosis statements focus attention on the behavioral aspects as well as deviations from normal oral health. The present study conducted analysis on 320 patients who consented to and finished the dental hygiene course (dental hygiene assessment, diagnosis, planning, implementation and assessment) at one university in Busan. The inspection process of the present study involved conducting a self-administered survey, which included questions on bad breath awareness, oral healthcare, living habits, and snack intake, on patients visiting for the dental hygiene course. Environmental change in accordance with oral healthcare behavior revealed change in plaque control at 26.33 for subjects who brushed for one minute, and 19.03 for subjects who brush for more than three minutes, indicating a statistically significant difference ($P = 0.012$). Furthermore, subjects who used floss scored 25.62, while subjects that did not scored 19.80, indicating a statistically significant increase ($P = 0.026$).

Keywords: Dental hygiene course, Environmental change, tooth brushing time.

INTRODUCTION

The dental hygiene diagnosis identifies those patient needs for which the dental hygienist will provide interventions. Interventions within the scope of dental hygiene practice are implemented to solve the problems identified by the diagnostic statements. The current change in the perception toward health has also brought about a change in the perception toward oral health so that it has become necessary to establish the treatment of oral diseases as well as the comprehensive management of their prevention and oral health promotion. The active attitude and the sustained and systematic management of the patient are important for effectively managing chronically recurring periodontal diseases, so the need for clinical dental hygiene care courses are being emphasized more and more.

The purpose of the dental hygiene process of care is to provide a framework where the individualized needs of the patient can be met; and to identify the causative or influencing factors of a condition that can be reduced, eliminated, or prevented by the dental hygienist (Darby and Walsh, 2015). Various dental hygiene textbooks such as the American Dental Hygienists' Association (ADHA), the six components of the dental hygiene process of care include assessment, dental hygiene diagnosis, planning, implementation, evaluation, and documentation (Henry and Goldie, 2016; Wilkins, 2016). A dental hygiene care course involves five stages—dental hygiene assessment, diagnosis, planning, implementation, and evaluation—which refer to a systematically sustained care process performed by the dental hygienist in the form of treating the patient and providing the patient with the necessary solutions. It is process that aims at suggesting essential solutions through behavioral change along with the active participation of the patient. Hence, the present analyzes the effect of the dental hygiene

course by examining change in oral status and aims at being used as basic data for developing programs to effectively carry out education at school and in the clinic.

METHODOLOGY

Research Subjects

The present study conducted analysis on 320 patients who consented to and finished the dental hygiene course (dental hygiene assessment, diagnosis, planning, implementation and assessment) at D University in Busan between March and October, 2014.

Research Methodology

The inspection process of the present study involved conducting a self-administered survey, which included questions on bad breath awareness, oral healthcare, living habits, and snack intake, on patients visiting for the dental hygiene course. The study then comparatively analyzed change in bad breath and change in plaque control.

Analysis Methodology

The collected data was analyzed using SPSS Window Ver. 20.0, and the detailed analysis method is as follows: general characteristics of the research subjects, bad breath awareness, and oral healthcare underwent frequency analysis. The change in bad breath and plaque control was obtained using frequency analysis and descriptive statistics, while opinions related to the change in oral environment, in accordance with living habits, snack intake and oral healthcare, were obtained using t-testing, and ANOVA. Correlation analysis was conducted to confirm the correlation between oral environment changes in accordance with oral healthcare behavior.

RESULTS

The Oral Health Conditions of Subjects

The general characteristics of the research subjects are shown in Table 1. By gender, 174 (54.4%) were male and 146 (45.6%) were female. At the age level, the group of 21-25 ages was 199 (62.2%), followed by 75 (23.4%) aged group with twenty or younger, and 46 (14.4%) aged group with 26 ages or older.

Table 1. Breath awareness of subjects

Variable	No. (%)
How did you know that the Halitosis?	
myself	182(57.2)
Point out others	31(9.7)
Via hospital care	17(5.3)
How often feels normal?	
very little	162(50.6)
Sometimes	154(48.1)
Always	4(1.3)
Do you feel the Halitosis to get up in the morning?	
Yes	201(62.8)
No	119(37.2)
What is written in the nerve action due to Halitosis?	
Yes	102(31.9)
No	218(68.1)

You have experienced problems because of Halitosis?	
No	285(89.1)
I am afraid to talk to others	17(5.3)
If other person is uncomfortable near	18(5.6)

The Bad Breath Awareness of Subjects

The bad breath awareness characteristics of the subjects were indicated by Table 2. 57.2% of subjects were aware of their bad breath; 50.6% were slightly aware of their bad breath 62.8% were aware in the morning when they woke up; 31.9% stated they were concerned with their behavior due to their bad breath; and 89.1% stated that they experienced no problems due to bad breath.

Change in Oral Environment

In terms of change in oral environment, subjects in the first measurement scored 43.46 and in the second measurement 35.98, indicating a change of 7.48 (Table 2). The first measurement of change in plaque control resulted in 36.46, while the second resulted in 57.14, a difference of 20.68.

Table 2. Changes in the oral environment

Oral environmental change	Before	After	Change
Halitosis change	43.46±22.80	35.98±21.14	7.48±23.94
Plaque control change	36.46±19.11	57.14±19.22	20.68±16.52

Change in Oral Environment in accordance with Living Habits

In terms of change in oral environment in accordance with living habits, non-smokers displayed a change in bad breath with a score of 7.85, while smokers displayed change in plaque control with a score of 23.04 (Table 3). Subjects with a smoking period between 2-5 years displayed change in bad breath with a score of 8.55, while subjects with a smoking period of less than two years displayed change in plaque control with a score of 24.3, although this was not statistically significant. Drinkers displayed change in bad breath with a score of 7.52, and non-drinkers displayed change in plaque control with a score of 22.05. Subjects that drank three times a week indicated change in bad breath with a score of 14.66. Change in plaque control increased in accordance with the decrease in drinking frequency. However, no statistically significant difference was indicated.

Table 3. Changes in the oral environment and lifestyle

Variable		No. (%)	Halitosis change		Plaque control change	
			Mean±SD	P-value	Mean±SD	P-value
Smoking	No	228(71.3)	7.82±23.50	0.687	19.73±16.43	0.105
	Yes	92(28.8)	6.63±25.11		23.04±16.86	
Smoking period (year)	Never	228(71.23)	7.82±23.50	0.878	19.73±16.48	0.349
	<2	23(7.2)	7.26±22.56		24.35±15.40	
	2~5	33(10.3)	8.55±18.85		21.18±20.28	
	≥6	36(11.3)	4.47±31.39		23.92±13.60	
Drinking	No	77(24.1)	7.36±23.48	0.961	22.05±16.13	0.405
	Yes	243(75.9)	7.52±24.13		20.25±16.65	

Drinking consumption	Never	77(24.1)	7.36±23.48	0.115	22.05±16.13	0.716
	≥1/week	162(50.6)	7.91±21.68		20.81±17.47	
	≥2/week	49(15.30)	1.57±23.83		19.59±17.32	
	≥3/week	32(10.0)	14.66±33.38		18.41±10.33	

Change in Oral Environment in accordance with Oral Healthcare Behavior

The change in oral environment in accordance with oral healthcare behavior was changing with years (Table 4). Tooth brushing frequency (<2 times), tooth brushing time (one minute), and tooth brush replacement period were 6.95, 11.35, and 8.53 respectively. It indicated great changes in bad breath, despite not being statistically significant. Subjects who replaced toothbrushes every three months scored 8.53; subjects who used floss scored 8.53; and subjects who cleaned their tongue scored 7.81, showing that change in bad breath was greater when toothbrush replacement was shorter and when subjects used floss and cleaned their tongue. Change in plaque control was 26.33 for subjects who brushed for one minute, and 19.03 for subjects who brush for more than three minutes, indicating a statistically significant difference ($P = 0.012$). Furthermore, subjects who used floss scored 25.62, while subjects that did not scored 19.80, indicating a statistically significant increase ($P = 0.026$).

Table 4. Changes in the oral environment oral care

Variable		Halitosis change		Plaque control change	
		Mean±SD	P-value	Mean±SD	P-value
Tooth brushing frequency	≤2 times	6.95±24.82	0.707	21.71±15.71	0.290
	≥3 times	7.96±23.16		19.75±17.22	
Tooth brushing time	One minute	11.35±19.63	0.251	26.33±15.96	0.012*
	Two minutes	8.00±25.52		19.76±16.31	
	≥Three times	5.28±24.09		19.03±16.53	
Tooth brush replacement period	3 months	8.53±23.09	0.866	21.02±16.15	0.830
	6 months	7.55±20.22		19.46±17.92	
	Toothbrush gaped at a space	6.88±25.54		20.90±16.32	
Dental floss	Yes	8.53±20.67	0.745	25.62±16.90	0.026*
	No	7.30±24.48		19.8±16.33	
Auxiliary oral products	Yes	7.39±24.48	0.970	20.7±16.48	0.884
	No	7.51±23.83		20.4±16.80	
Tongue cleaning	Yes	7.81±24.21	0.522	20.9±16.85	0.537
	No	5.24±22.15		19.2±14.12	

The Relevance of Oral Care Behavior with Change in Oral Health Environment

In order to comprehend the relevance of oral healthcare behavior with change in oral environment, a correlation analysis was conducted (Table 5). It revealed that change in bad breath ($r = 0.142$, $p < 0.05$) and change in plaque control ($r = 0.156$, $p < 0.01$) were correlated to the average weekly amount of eating snacks with sugar, while they displayed a negative correlation with toothbrushing time ($r = -0.143$, $p < 0.05$) and floss use ($r = -0.124$, $p < 0.05$).

Table 5. Relevance of the oral environment and oral care behavior change

No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	1	.068	.032	-.002	.142*	.021	-.093	-.030	-.018	-.002	-.036	-.023	-.032	.003	.026
2		1	.082	.048	.156**	-.059	-.143*	.001	.124*	-.008	-.035	.091	.084	-.047	-.065
3			1	.230**	.155**	-.079	-.045	-.037	-.026	-.036	.046	.063	.065	.127*	.077
4				1	.225**	-.011	-.058	.039	.000	-.053	.047	.083	.078	.117*	.000
5					1	-.033	-.118*	-.022	-.051	-.096	.071	-.044	-.016	.013	-.042
6						1	.074	-.083	-.026	.083	-.064	-.180**	-.159**	-.027	-.098
7							1	.010	-.012	-.004	-.108	.023	.051	-.009	-.045
8								1	-.039	.081	-.061	.001	.007	-.056	.010
9									1	-.058	-.105	.030	.016	.118*	.133*
10										1	.069	.015	.014	-.038	-.042
11											1	.161**	.135*	-.025	.004
12												1	.917**	.180**	.255**
13													1	.162**	.287**
14														1	.709**
15															1

1: Halitosis change, 2: Plaque control change, 3: Snack intake, 4: Sugar-free food check, 5: Snack sugar intake per week, 6: Tooth brushing frequency, 7: Tooth brushing time, 8: Toothbrush replacement period, 9: Dental floss, 10: Auxiliary oral products, 11: Tongue cleaning, 12: Smoking, 13: Smoking period, 14: Drinking, 15: Drinking consumption.

DISCUSSION

Change in oral environment before and after performing the dental hygiene course showed that bad breath decreased by 7.48, and plaque control increased by 20.68, indicating that the course effected change in oral environment. Change in bad bread and plaque control in accordance with living habits revealed that change in plaque control for the smoking group increased by 23.04 after conducting the course, while bad breath decreased by 14.66 for the group that drank three times a week, which was a greater change than the non-drinking group. Drinking is known to increase bad breath by creating flammable sulfide (Suzuki et al., 2009), which corresponds to the research results that indicate a decrease for the drinking group and no difference for the non-drinking group (Park et al., 2014). However, although

smoking has been reported to be deeply related to bad breath, no significant difference between smoker and non-smoker was revealed in the present study.

In terms of change in oral environment in accordance with oral healthcare behavior, the study shows a statistically significant difference in plaque control depending on tooth brushing time, with the greatest change displayed by the group brushing for less than a minute, which is regarded as a result of the continuous education for four weeks. The tooth brushing training using plaque coloring was reported to be effective when compared to simple repetitive and temporary education (Chang and Kim, 1987). Tooth brushing education provided as one-off during scaling had almost no effect for actual plaque control, and subjects were reported as returning to their original state after a month (Woo and Kim, 2010). When oral healthcare education is repeatedly conducted, plaque control ability does not return to the initial stage but is maintained (Jo et al., 2015). Such research results show that temporary education fails to sustain oral healthcare ability and that repetitive education and training are necessary after the education. In order to increase plaque control ability, subjects were instructed to use floss and oral care products, and to clean their tongues and were recommended and trained on the method to do so. In the present study, the group using floss displayed a high level of change in plaque control, which was statistically significant. However, the results were different from the study in which subjects who were instructed to use floss did not display a difference in plaque control ability from those that did not receive such an instruction Jo et al., 2015). However, in order to increase the oral healthcare ability of individuals, it is necessary to adequately conduct interdental space care (Dental Prevention Study Group, 2010; Lee, 2013), so instructing subjects to adequately use floss must be highlighted regardless of tooth brushing method.

The present study reveals that there were slight differences in bad breath and plaque control, but not at a level of statistically significant difference. An increase in the number of tongue cleaning displayed a decrease in bad breath, disclosing the importance of tongue cleaning (Heo et al., 2005), so accurately educating how to clean the tongue can considerably reduce the level of bad breath. Although a statistically significant difference from results that show a relation between bad breath and tongue cleaning was not displayed in this study, the tongue cleaning group did show a high level of change in bad breath (Jeong et al., 2011; Chun and Lee, 2014).

As displayed by studies (Chawla et al., 1975; Lembariti et al., 1998) that claim no actual improvement for oral health when implementing treatments like scaling without oral healthcare education, the improvement in oral environment requires change in the method of training that is capable of achieving actual behavioral change and an oral healthcare education that accompanies oral healthcare treatment. The oral healthcare education performed in the doctor's office must faithfully and systematically implement the stages of assessment, diagnosis, planning, implementation, and evaluation in order to increase and maintain the oral health of patients. An oral healthcare education customized to the patient (Jo et al., 2015), which reflects the unique characteristics of the education, can increase the oral environment control ability and oral healthcare education methods must change into such a form.

The present study failed to adequately control outside confusion factors as it examined residents from certain areas as visiting patients, and the limited age group of subjects is limited in adequately detecting the improvement of oral healthcare ability in all age groups. Furthermore, the study lacked consideration in terms of the measurement error when

evaluating the O'leary index. However, by performing a systematic dental hygiene course for four weeks on actual patients, the study was able to increase the ability to manage the oral environment and to highlight the importance of the dental hygiene course. The study also is deemed as useful data for effective application in future dental hygiene courses because it confirms the evaluation on how oral health aggravation factors like living and eating habits and the proper habits of oral healthcare behavior affect the oral environment.

CONCLUSIONS

The present study conducted analysis on 320 patients who consented and finished the dental hygiene course (dental hygiene assessment, diagnosis, planning, implementation and assessment) at D University in Busan between March and October, 2014. They were participated in the effective skills education program for dental hygiene courses. The results of the study are as follows.

First, bad breath in accordance with living habits displayed much change when the frequency of drinking was higher, and smokers displayed a high level of change in plaque control, indicating a statistically significant increase.

Second, environmental change in accordance with oral healthcare behavior revealed change in plaque control at 26.33 for subjects who brushed for one minute, and 19.03 for subjects who brush for more than three minutes, indicating a statistically significant difference ($P = 0.012$). Furthermore, subjects who used floss scored 25.62, while subjects that did not scored 19.80, indicating a statistically significant increase ($P = 0.026$).

Third, in order to comprehend the relevance of oral healthcare behavior with change in oral environment, a correlation analysis was conducted, revealing that change in bad breath ($r = 0.142$, $p < 0.05$) and change in plaque control ($r = 0.156$, $p < 0.01$) were correlated to the average weekly amount of eating snacks with sugar, while they displayed a negative correlation with tooth brushing time ($r = -0.143$, $p < 0.05$) and floss use ($r = -0.124$, $p < 0.05$). Therefore the present study, after performing a systematic dental hygiene course and having analyzed the change in oral environment, confirms the assessment of how the proper habits in terms of snack intake and oral health management behavior during one's 20s positively affects one's oral environment and deems itself to be useful data for effective application in future dental hygiene courses.

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