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## Association between Use of Auxiliary Oral Hygiene Products and Sexual Function on Adult Males

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**Abstract** The aim of this study was to investigate the association between use of auxiliary oral hygiene products and sexual function on adult males. Five hundred adult males participated in this study living at Deagu-ci and Gyeongsangnamdo province in Korea. All the participants surveyed the socio-demographic characteristics, use of auxiliary oral hygiene products and international index of erectile function (IIEF) using self-administrated questionnaire. The sexual function was positively correlated with Use of Auxiliary Oral Hygiene products. Therefore the result of this study was expected to provide basic material to improve healthy sexual function through periodontal management with auxiliary oral hygiene products.

**Keywords** Adult Males, Auxiliary Oral Hygiene Products, Sexual Function

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### Introduction

Oral health for adults is to study principles and methods to improve and maintain adults' oral health and to study reality and environmental factors of oral health of adult population and the effect of oral health on adults' psychological phenomena. Especially, adult group suffers from physical pain and psychological contraction as they cannot receive regular checkup due to social condition, lack of time and economic burden and do not effectively manage oral health at home. Thus, with the rapid growth of economy and industries after 1970s, oral health management system for adults has been established with the help of oral health insurance coverage and national health insurance system [1].

Chronic periodontal diseases which mainly occur as major oral diseases in adult group form plaque and biofilm on tissues around teeth and, by inflammation responses, cause gingival recession, formation of periodontal pocket and gingival hemorrhage and destroy periodontal ligament and alveolar bone, eventually causing the loss of teeth. In addition, periodontal diseases have been reported to cause cardiovascular and systemic diseases by bacterial disease in the oral cavity [2].

According to 2014 report of Health Insurance Review & Assessment Service, patients treated for gingivitis and periodontitis were 12.9 million in Korea, which is a radical increase of 53.0% over only 2 years from 8.43 million in 2012. In addition, prevalence rate of periodontal diseases have also increased over 50% for 2 years and according to 2014 National Health Statistics released by Korea Center for Disease Control and Prevention, prevalence rate of periodontal diseases for adults over the age of 19 is 29.2% and 3 out of 10 adults suffer from serious periodontal diseases which require urgent treatment [3].

Over the last few years, studies on the association between periodontal diseases and systemic diseases have been actively conducted and recently, study results on their association with impotence or erectile dysfunction, a men's disease, are also being published. In Taiwan, 12% of 200,000 adult males surveyed suffers from periodontal diseases among whom 27% have impotence and especially, patients in their 30s and younger with periodontal diseases have high rate of impotence. In a domestic study by Lee et al. in Korea also reported that adults with periodontal diseases had 1.5 times more risk of impotence than those without them [4].

Studies of the effect of periodontal diseases on impotence explain that bacterial inflammation in oral cavity affects blood flow in phallus or penis, causing erectile dysfunction, and chronic periodontal diseases can lead to



serious vascular diseases and accumulate cholesterol in the blood vessel, causing atherosclerosis and blocking arterial blood in corpus spongiosum penis, which ultimately lead to erectile dysfunction. In addition, inflammatory substances generated by periodontal diseases trigger damage on endothelial cells in the blood vessel, causing damage to corpus spongiosum penis which leads to erectile dysfunction [5]. In Kim's analysis on reality of oral health, prevalence rate of periodontal diseases in Korean workers was as high as 62.2% and as for use of auxiliary oral hygiene products, 49.5% of the subjects used dental floss, 15.7% antiseptic gargle and 7.0% interdental brush, which demonstrates that the use of auxiliary oral hygiene products is deficient compared to prevalence rate of periodontal diseases, which calls for more recommendations for use of auxiliary oral hygiene products [6]. Although there are some overseas studies on the association between sexual function and oral health management, there are few such studies in Korea. Thus, this study aims to study the association between sexual function and use of auxiliary oral hygiene products and to provide a basic material to improve oral health by enhancing the use of male adults' use of auxiliary oral hygiene products.

## **Materials and Methods**

### **Study subjects**

In order to investigate the association between the use of auxiliary oral hygiene products and sexual function, this study conducted a self-administered questionnaire survey on 550 male adults in Deagu-ci and Gyeongsangnamdo province selected by convenience sampling from July 1 through 30, 2014. As the questionnaire included sensitive and private information due to the characteristic of this study, only the subjects who signed agreement on anonymity and confidentiality were allowed to participate in this study. A total of 500 questionnaires were finally analyzed except for 50 ones with incomplete and unnecessary data. This study was conducted after the authorization (IRB NO: DHUMC-D-14009-PRO-01) by Research Ethics Committee of Daegu Korean Medicine Hospital affiliated to Daegu Haany University.

### **Study method**

A total of 23 questions including socio-demographic characteristics questions and questions on the use of auxiliary oral hygiene products (8 questions) and questions on sexual function (15 questions) were used to analyze the effect of the use of auxiliary oral hygiene products on the sexual function of adult males.

### **Socio-demographic characteristics**

Five questions were based on socio-demographic characteristics, which were on age (ages 30-39, 40-49, and 50-59), level of education (high school graduates, college graduates, university graduate and over), monthly income (1.0-1.99 million won, 2.0-2.99million, 3.0-3.99 million, 4.0 million won and over), whether or not the subjects have systemic diseases and whether or not subjects have health supplement food.

### **Measurement of male sexual functions**

For male adults' sexual function, study was applied to the questionnaire for Korean males with the modified International Index of Erectile Function (IIEF), an internationally approved assessment index for erectile dysfunction. This self-administered questionnaire is divided into 5 independent domains related to sexual function (erectile function, orgasm, sexual desire, satisfaction with sexual intercourse and overall satisfaction with sexual life) with a total of 15 questions. Questions on sexual function were in 5-point Likert scale and total score ranged from lowest 5 points to maximum 75 points and the higher the score, the better the sexual function. Mean score of this study was 50.70 and reliability coefficient (Cranach's  $\alpha$ ) for questions in the measuring tool of sexual function was 0.967 [7].

## **Results**

### **Distribution of subjects according to the general socio-demographic characteristics**

As for distribution of socio-demographic characteristics, subjects in 30~39 years of age was the largest in number with 147 (29.4%) followed by 40~49 years of age with 184 subjects (36.8%) and 50~59 years of age with 169 subjects (33.8%). As for level of education, 143 subjects were high school graduates and lower (28.6%) and 112 subjects were graduates of junior college (22.4) while 245 subjects were university graduates and over (49.0). As for monthly income, 44 subjects were with 2 million won and less (8.8%), 107 with 2.00~2.99 million (21.4%), 155 with 3.00~3.99 million (31.0%) and 194 made 4.00 million won and over (38.8%). 161 subjects 'had' systemic diseases (32.2%) while 339 'didn't have' systemic diseases (67.8%) and 145 subjects 'ingested' health supplement food (29.0%) while 339 'did not' (67.8%). As for auxiliary oral hygiene products, 143 subjects (28.6%) 'used' dental floss while 357 'didn't use it' (71.4%). 132 subjects 'used'



interdental brush (26.4%) while 368 'didn't use it' (73.6%) and 163 subjects 'used' antiseptic gargle (32.6%) while 337 'didn't use it' (67.4%) (Table 1).

**Table 1:** Distribution of subjects according to the general socio-demographic characteristics

Characteristics	N (%)
Total	500 (100.0)
Age	
30-39	147 (29.4)
40-49	184 (36.8)
50-59	169 (33.8)
Education	
≤ High school	143 (28.6)
College	112 (22.4)
≥ University	245 (49.0)
Household income (\$/Month)	
< 2,000	44 (8.8)
2,000-2,999	107 (21.4)
3,000-3,999	155 (31.0)
≥4,000	194 (38.8)
Systemic disease	
Yes	161 (32.2)
No	339 (67.8)
Health supplement food	
Yes	145 (29.0)
No	355 (71.0)
Dental floss	
Yes	143 (28.6)
No	357 (71.4)
Interdental brush	
Yes	132 (26.4)
No	368 (73.6)
Mouth rinse	
Yes	163 (32.6)
No	337 (67.4)

**Table 2:** Mean difference sexual activity (IIEF) according to the socio-demographic

Characteristics	IIEF		
	Mean±SD	T/F	<i>p</i>
Age			
30-39	50.35±21.40 <sup>ab</sup>	6.418	0.002
40-49	54.24±16.85 <sup>b</sup>		
50-59	47.14±17.96 <sup>a</sup>		
Education			
High-school	46.94±19.92 <sup>a</sup>	4.068	0.018
College	51.78±19.01 <sup>ab</sup>		



above University	52.40±17.91 <sup>b</sup>		
Household income (\$/Month)			
1000-1999	40.18±22.33 <sup>a</sup>	8.713	<0.001
2000-2999	46.86±22.17 <sup>ab</sup>		
3000-3999	52.23±16.47 <sup>b</sup>		
above 4000	53.97±16.62 <sup>b</sup>		
Systemic disease			
Yes	49.58±17.93	0.909	0.364
No	51.22±19.29		
Health supplement food			
Yes	54.06±8.89	-2.559	0.008
No	49.32±19.35		
Dental floss			
Yes	53.45±17.34	2.077	0.038
No	49.59±19.35		
Interdental brush			
Yes	52.27±18.12	1.114	0.266
No	50.13±19.11		
Mouth rinse			
Yes	50.29±19.66	-0.331	0.741
No	50.89±18.49		
Sexual ability	50.70±18.86		

Values are mean±standard deviation

p-values were determined by independent t-test or one-way ANOVA procedure

a,b The same letter denoted that there was no significant difference between groups by Scheffe's multiple comparison(p>0.05).

**Table 3:** Correlation between socio-demographic and auxiliary oral hygiene products of sexual function

	Sexual function	Age	Education	Household income	Systemic disease	Health supplement food	Dental floss	Interdental brush	Mouth rinse
Sexual function	1	-.074	.118**	.214**	-.041	.114*	-.093*	-.050	.015
Age		1	-.275**	.103*	.285**	.076	-.015	-.155**	.227**
Education			1	.232**	.011	.146**	-.009	-.016	-.103*
Household income				1	.045	.137**	-.019	-.048	.108*
Systemic disease					1	.078	-.085	-.063	.068
Health supplement food						1	-.083	-.067	-.035
Dental floss							1	.414**	.117**
Interdental brush								1	.087
Mouth rinse									1



\*  $p < 0.05$ , \*\*  $p < 0.01$ .

### Sexual function according to the Socio-demographic characteristics

Differences in sexual function based on subjects' socio-demographic characteristics are presented in Table 2. Mean sexual function was  $50.70 \pm 18.86$  points and had statistically significant difference depending on age, level of education, average monthly household income, ingestion of health supplement food and use of dental floss ( $p < 0.05$ ). Sexual function was the highest in the group of 40~49 years of age and the group with education level of university and over and was the lowest in the high school graduates. Sexual function was also the highest in the group with average monthly household income of 4 million won and over and the lowest in the group with 1.00 million through 1.99 million won. Subjects 'without' systemic diseases had higher sexual function than those 'with' them and subjects who 'ingested' health supplements were higher. As for the use of auxiliary oral hygiene products, subjects who 'used' dental floss and interdental brush were higher than otherwise and subjects who 'did not' use antiseptic mouthwash were more or less higher than otherwise.

### Correlation between socio-demographics characteristics and auxiliary oral hygiene products of sexual function

Results of analysis on the association between general characteristics and sexual function are presented in Table 3. There was statistically significant negative association between sexual function and use of dental floss ( $r = -0.093$ ,  $p < 0.05$ ). In addition, although age, systemic disease and use of interdental brush had significantly negative association with sexual function, they were not statistically significant ( $r = -0.074$ ,  $-0.041$ ,  $-0.05$ ). On the other hand, level of education, monthly average household income and ingestion of health supplement food had statistically significantly negative association ( $r = 0.118$ ,  $p < 0.01$ :  $0.214$ ,  $p < 0.01$ :  $0.114$ ,  $p < 0.05$ ) and although the use of antiseptic gargle had negative association, it was not statistically significant ( $r = 0.015$ ).

### Discussion

One of the problems middle-aged adults face is impotence which is an important cause of dissatisfactory sex life. Impotence, a direct cause of disorder in sexual function, is caused by various and complex reasons such as physical, psychological, biological, environmental and emotional ones. In addition, complication of neurological, endocrinal and cardiovascular system may trigger sexual dysfunction [8].

As lifestyle diseases, periodontal diseases are related with disorders of endothelial cells and blood vessels and can worsen sexual dysfunction in adult males, which needs to be managed since it can lower quality of life greatly [9].

Males with unhealthy periodontium or chronic periodontal diseases have higher probability of chronic systemic diseases and a study on 1,025,340 males conducted from 2002 through 2013 reported that periodontal diseases have significant association with lifestyle diseases such as cardiovascular diseases (angina pectoris, cerebral infarction, and myocardial infarction), rheumatic arthritis, diabetes, osteoporosis and sexual dysfunction. Patients with periodontal diseases had 1.21 times more osteoporosis, 1.18 times more angina pectoris and 1.17 times more rheumatic arthritis and especially 1.5 times more sexual dysfunction [10].

In this study, subjects who used dental floss and interdental brush had higher scores in sexual function than those who did not. This result implies that sexual function has association with the use of auxiliary oral hygiene products, which may help improve sexual function in a complementary way. The surest way to eliminate dental plaque and calculus which cause periodontal diseases is to brush teeth in the right way every day, and use of auxiliary oral hygiene products can improve sexual dysfunction. Thus, thorough management of oral hygiene can improve sexual function by preventing sexual dysfunction and although people can receive treatment in dental clinics, it is expected that auxiliary oral hygiene products at home can help manage periodontium and oral cavity. In order to prevent periodontal disease and maintain healthy periodontal state, right use of brush and dental floss is especially required among diverse auxiliary oral hygiene products [11].

Therefore, this study aimed to explore the association between male adults' use of auxiliary oral hygiene products and sexual function, the results of which corresponds with those of overseas studies. Hence, the results of this study are expected to provide basic material to improve healthy sexual function through periodontal management with auxiliary oral hygiene products. The limitation of this study is that it is difficult to generalize that the Korean adults' use of auxiliary oral hygiene products has association with sexual function as this study selected its subjects on convenience sampling. This study could not objectively investigate the direct association of subjects' use of auxiliary oral hygiene products with sexual function by judging questions related with sexual function as subjective symptoms. In addition, study did not reflect various uses of auxiliary oral hygiene products precisely with more detailed questions. Thus, following studies are required to measure the use of auxiliary oral hygiene products and sexual function with more objective survey methods and, as for study method, more meticulous researches needs to be conducted with in-depth interviews in addition to questionnaire



survey. In spite of these limitations, this study has a significant meaning in that it conducted research on the association between the use of auxiliary oral hygiene products and sexual function which is rarely studied in oral hygiene area.

### Conclusions

Though it is difficult to generalize that the Korean adults' use of auxiliary oral hygiene products has association with sexual function as this study selected its subjects on convenience sampling, male sexual function has association with the use of auxiliary oral hygiene products, which may help improve sexual function in a complementary way.

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