

## Relevance between oral health life practices and oral discomforts in elderly school participants in W urban-rural complex city

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## 도농복합도시 W시 노인대학생의 구강건강생활 실천도와 구강불편감과의 관련성

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**Abstract** This study aims to analyze the relevance between oral health practices and oral discomforts of the elderly in an urban-rural area by surveying the elderly in welfare centers for the Elderly-continued oral health care program. The result shows that the elderly brush their teeth under regular oral care, and practice oral health life by scaling for the prevention of periodontal disease. Most of the elderly who drink alcohol have experienced implant care and tend to quit drinking after the treatment, and seemed to get their oral discomfort relieved. However, no relevance is found between implant experiences and social discomfort. Furthermore, the elderly who had bad breath expressed pronunciation, taste, pain and chewing discomfort, and social discomfort ( $P>.05$ ). The educational level of the elderly did not have an impact on oral discomfort, but smoking, chewing and bad breath discomfort seemed to be related to social discomfort ( $P>.05$ ). Therefore, since oral discomfort of the elderly causes social discomfort which decreases their quality of living, we recommend oral health departments of local governments to help the elderly maintain happy lives by continuing to study the practical use of reducing oral discomfort.

**Key Words** : Oral Health, Elderly People, Chewing Discomfort, Implant, Social Discomfort

**요약** 본 연구는 도농복합지역 복지센터 노인들을 대상으로 구강불편감과 구강건강생활 실천도와의 관련성을 분석한 결과 계속구강건강생활습관이 있는 대상자는 정기구강검진과 스케일링, 식사 후와 잠자기 전에 칫솔질을 하는 것으로 나타났다. 임플란트 치료를 받은 경우 음주와 관련이 있었으며, 치료 후에는 절주를 하게 되고, 저작이나 식사 불편감이 낮아지는 것으로 나타났다. 반면 구취발생은 사회적 불편감과 관련이 있었으며, 발음불편감은 미각이나, 동통, 저작불편을 호소하는 것으로 나타났다( $P>.05$ ). 노인들의 구강불편감은 교육수준과는 차이가 없었으나, 흡연, 저작불편감, 구취불편감 등이 사회적 불편감과 관련이 있었다( $P>.05$ ). 결과적으로 노인들의 구강불편감은 사회적 불편감을 발생시켜 삶의 질을 저하시키기 때문에 계속구강건강관리를 실시하여 노년기의 삶을 행복하게 유지할 수 있도록 지역사회 구강보건 팀이 공동으로 노력해야 할 것으로 사료되었다.

**주제어** : 구강건강, 노인, 저작불편감, 임플란트, 사회적 불편감

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Received April 4, 2019

Accepted June 20, 2019

Revised May 8, 2019

Published June 28, 2019

## 1. Introduction

According to the report on "Future Population Estimation" from the Korea National Statistical Office, the elderly population over age 65 increased 11% in 2011, 14% in 2018, and it will reach 20% in 2025 which means to enter an aging society (2016 National Statistical Office). With the growth of the elderly population, the desires for education and economic activity for the elderly as well as the requirement to welfare policies of local and national governments has also increased.

Elderly people spend their time with other elderly people of similar ages by regularly visiting senior schools, welfare centers, and senior community centers. Dr. Hyo Seob Han[1] established the Haneol elderly school, the first Korean elderly school, and developed the elderly schools by promoting education and social participation, and by improving awareness of the elderly. The classes for elderly people at the senior welfare center, an affiliated organization of the Korean Senior Citizens Association, offer various programs for entertainment and leisure time. Recently, health care programs supervised by public health centers teaching geriatric and chronic disease managements are the most active programs at senior welfare facilities or senior community centers. The elderly welfare act, which was promulgated as law no. 3453 on June 5th, 1981, was an act to take necessary measures to maintain the health of the mind and body of the elderly and to stabilize their lives. The law was revised to law in 1993, which prescribes health promotion and the right use of leisure for senior citizens[2]. The majority of elderly people in the urban-rural area spend their leisure time at senior community centers or welfare centers and access cultural activities by participating in health care, yoga, or singing classes supervised by local governments.

The elderly school participants of the senior

welfare center in W city usually participate in festivals or events provided by local communities, volunteer work supervised by cities or provinces, lifelong education programs of universities in neighborhoods, or health care classes and medical service activities during the day.

Oral health is closely related to whole-body health for the elderly. Especially, since the mouth is the first stage of the digestive tract, oral health is highly connected to whole-body health according to the tooth retention rate. In terms of Oral Health Policy for the Elderly of South Korea[3], efforts has been made to extend tooth life by maintaining the number of natural teeth up to 20 by 2020, to resolve discomforts when the elderly chew food by reducing complaint rate of chewing discomfort to 45%, and to enhance oral health of the elderly by increasing the regular oral examination rate to 30%. Since the oral health condition, socio-economic characteristics and chewing function of the elderly people are related to the awareness of oral health[4], and most elderly only receive dental care when oral symptoms appear, oral health behavior needs to be improved by developing regular oral examinations and oral care education programs as well as institutional support[5]. Prevention and management of oral diseases are important, given that lifestyle-related diseases also affect oral health depending on the degree of care[6].

The elderly in South Korea were provided relatively fewer opportunities to take professional personal oral care such as oral health education or preventive treatments in comparison with their interest in oral health. Therefore, they have to live with chronic oral discomforts. Most of the elderly have a strong desire to live healthy lives. However, considering that the poor oral health of the elderly has been induced by family, local community organizations, and the government, refusing to accept the elderly's health care problem as an issue is problematic. Research in Korea also

shows that tooth loss of the elderly influences their oral health and quality of life[7]. It says that the fewer number of teeth remaining, the lower the quality of life[4]. In terms of the oral conditions of the South Korean elderly in 2015, the average numbers of remaining teeth was 17.5, the ratio of patients without natural teeth was 9.2%, the ratio of patients in need of denture was 22.7%, which indicates poor oral conditions compared to national economic growth rate[8]. Due to the biological characteristics of the elderly, which cause decreased myocardial function, reduced salivation, and decreased oral health care ability, they suffer from chewing discomfort, taste discomfort, bad breath, and dry mouth. In this oral condition, if a person wears dentures or has few remaining teeth, lives in an edentulous state without dentures, these ultimately cause several oral discomforts. Therefore, the oral discomfort of elderly people work as vital factors to aggravate quality of life, since they usually accompany daily discomfort as well as social discomfort[9]. As a result, the oral health of the elderly is the most significant factor to maintain health and improve quality of life. Thus, identifying the influence of oral discomfort by researching oral health life practices which show oral health conditions and habits of the elderly is meaningful. In this context, this study aims to develop a program which helps to enhance oral health of the elderly in local community by identifying the relevance among the following factors: what causes oral discomfort of the elderly school participants in local communities where they are enter an aging society; and how important oral health life practices are in reducing oral discomforts.

## 2. Research subjects and methods

### 2.1 Research subjects and tools

This study surveyed 127 participants, 28 male participants (23.1%), 93 female participants (76.9%), of senior welfare centers and elderly schools in M county, Wonju-si, from September to October of 2017. Among them, we used 121 responses as a resource, except for 6 reponses which did not respond or gave insufficient responses. We chose subjects from participants of Elderly Continued Oral Health Care of university by using G\*Power 3.1.9.2 program and applying odds ratio(OR) to 2.0. For this study, we produced samples with the power of the test ( $1-\beta$ )=.95, significant level  $\alpha$ =.05, effect size=0.3 (KDU IRB no.1041455-2017-06-HR-002-01).

### 2.2 Research method and data analysis

For the analysis of this research, we used SPSS software program(SPSS 20.0, SPSS Inc., Chicago, USA). We used t-test for analyzing regular oral examinations, one-way ANOVA for oral health care practices and oral discomforts, and Scheffe multiple range test for post-analysis. The reliability of the statistics was Cronbach  $\alpha$  .646.

## 3. Results

### 3.1 Regular oral examination and oral care life practices

Among subjects who take regular examinations, the most meaningful difference appeared in brushing after meals and brushing before sleep( $P>.05$ ). In terms of the gender difference, female respondents showed the biggest differences in brushing after meals, brushing to prevent periodontal disease, scaling to prevent periodontal disease, and plaque removal and scaling to prevent periodontal disease( $P>.05$ ).

Table 1. Regular examination and oral health care practices

Classification	F	p-value	t	df	p-value (both)	Mean Difference	Std. Error	OR(95% CI)	
								Low	High
Brushing after Meals	40.749	.000	-3.072	92.717	.003	-.152	.049	-.250	-.054
Brushing before Sleep	6.222	.014	-1.242	117.683	.217	-.082	.066	-.214	.049
Oral Hygiene care devices experience	2.035	.156	-.983	119	.327	-.090	.092	-.272	.091
Knowledge of Interdental Cleanliness	.027	.870	1.763	105.733	.081	.440	.250	-.055	.935
Knowledge of Tongue Cleanliness	1.681	.197	1.284	119	.202	.327	.255	-.177	.832
Preventing periodontal disease and Gums	.387	.535	1.866	119	.064	.390	.209	-.024	.803
Scaling and periodontal disease	.024	.876	4.969	106.812	.000	1.096	.220	.658	1.533
Prevention and Scaling	2.174	.143	2.974	119	.004	.583	.196	.195	.971
Bacterial membranes and Calculus cause periodontal disease	.002	.963	2.922	110.528	.004	.603	.206	.194	1.011

### 3.2 Oral health life practices according to implant experience

In respect to implant experience, the responses of drinking habits, brushing after meals, and intention to be involved in the Continued Oral Health program showed statistically meaningful differences ( $P > .05$ ). In terms of the gender difference, subjects who experienced implants did not show differences between brushing after meals and intention to involve in Continued oral health program, whereas a meaningful gender difference is shown in oral health life practices in case of temperance for implant care and intention to involve in Continue oral health program ( $P > .05$ ).

### 3.3 Oral discomfort according to implant experience

Oral discomforts according to implant experience shows meaningful differences in pronunciation discomfort, pain discomfort, meal discomfort, bad breath, dry mouth, and social discomfort ( $P > .05$ ). However, there are no significant differences shown in taste discomfort or chewing discomfort according to implant experience. Also, pronunciation discomfort, meal discomfort, and social discomfort show meaningful difference according to implant experience and gender difference ( $P > .05$ ).

Table 2. Oral health life practices according to implant experience

Classification	F	p-value	t	df	p-value (both)	Mean Difference	Std. Error	OR(95% CI)	
								Low	High
Drinking alcohol experience	23.269	.000	2.715	118.941	.008	.130	.048	.035	.225
Smoking experience	1.562	.214	.613	119	.541	.032	.052	-.071	.134
After meals TBI	7.883	.006	-1.524	103.492	.131	-.080	.052	-.184	.024
Before sleep TBI	.551	.459	.376	119	.707	.028	.073	-.118	.173
Oral Hygiene care devices experience	.154	.696	-2.986	119	.003	-.282	.095	-.469	-.095
Continue to Program	10.106	.002	-1.657	98.648	.101	-.102	.061	-.224	.020

Table 3. Oral discomfort according to implant experience

Classification	F	p-value	t	df	p-value (both)	Mean Difference	Std. Error	OR(95% CI)	
								Low	High
Pronunciation Discomfort	12.349	.001	-2.175	98.425	.032	-.506	.233	-.968	-.044
Taste Discomfort	3.743	.055	-.140	119	.889	-.039	.279	-.591	.513
Pain Discomfort	4.890	.029	-1.148	83.977	.254	-.298	.259	-.814	.218
Chewing Discomfort	1.754	.188	-1.157	119	.250	-.398	.344	-1.080	.283
Social Discomfort	6.017	.016	-1.987	87.886	.050	-.458	.231	-.916	.000
Meal Social Discomfort	10.905	.001	-2.143	98.015	.035	-.466	.217	-.897	-.034
Bad breath Discomfort	3.995	.048	-1.228	84.187	.223	-.305	.249	-.800	.189
Oral dryness Discomfort	7.741	.006	-.537	88.765	.592	-.147	.273	-.690	.396

### 3.4 Oral discomfort according to bad breath

Oral discomforts according to the experience of bad breath show meaningful differences in taste discomfort, social discomfort, oral hygiene care devices experience, and knowledge of tongue cleanliness ( $P>.05$ ).

### 3.5 Oral discomforts according to meal discomfort

Oral discomforts according to meal discomfort show significant differences in taste discomfort, pain discomfort, and chewing discomfort ( $P>.05$ ), there is no differences in oral discomforts according to gender, bilateral chewing, bleeding and periodontal disease.

### 3.6 Trigger factors of social discomfort

In terms of trigger factors for social discomfort, it is found that educational level, implant experience, and chewing discomfort do not have strong relevance, whereas smoking, chewing discomfort, meal discomfort, bad breath, taste discomfort, pain discomfort, and social discomfort have meaningful relevances ( $P>.05$ ). Furthermore, oral discomforts from pronunciation discomfort, taste discomfort, pain discomfort, and chewing discomfort show meaningful differences ( $P>.05$ ).

Table 4. Oral discomfort according to bad breath

Classification	F	p-value	t	df	p-value (both)	Mean Difference	Std. Error	OR(95% CI)	
								Low	High
Taste Discomfort	5.580	.021	-2.113	39.885	.041	-.679	.321	-1.329	-.029
Pain Discomfort	3.556	.064	-.718	64	.476	-.220	.306	-.831	.392
Social Discomfort	5.676	.020	-2.725	38.463	.010	-.516	.189	-.899	-.133
Oral dryness Discomfort	.384	.538	-3.168	64	.002	-1.196	.378	-1.950	-.442
Oral Hygiene care devices experience	5.050	.028	-1.160	53.190	.251	-.143	.124	-.391	.105
Knowledge of interdental cleanliness	.007	.933	1.217	64	.228	.396	.326	-.254	1.046
Knowledge of tongue cleanliness	3.990	.050	1.341	43.687	.187	.480	.358	-.242	1.202

Table 5. Oral discomforts according to meal discomfort

Classification		sum of squares	df	mean square	F	p-value
Sex	Intergroup	.417	4	.104	.572	.683
	With the collective	21.104	116	.182		
	Total	21.521	120			
Taste Discomfort	Intergroup	88.824	4	22.206	16.871	.000
	With the collective	152.680	116	1.316		
	Total	241.504	120			
Pain Discomfort	Intergroup	99.847	4	24.962	20.847	.000
	With the collective	138.897	116	1.197		
	Total	238.744	120			
Chewing Discomfort	Intergroup	103.554	4	25.889	11.200	.000
	With the collective	268.132	116	2.311		
	Total	371.686	120			
Bilateral Chewing Discomfort	Intergroup	1.286	4	.321	1.358	.253
	With the collective	27.458	116	.237		
	Total	28.744	120			
Bleeding and Periodontal Disease	Intergroup	9.625	4	2.406	1.911	.113
	With the collective	146.094	116	1.259		
	Total	155.719	120			
Implant Experience	Intergroup	1.262	4	.315	1.475	.214
	With the collective	24.804	116	.214		
	Total	26.066	120			

Table 6. Trigger factors of social discomfort

Classification		sum of squares	df	mean square	F	p-value
Education	Intergroup	24.413	4	6.103	2.229	.070
	With the collective	317.669	116	2.739		
	Total	342.083	120			
Smoking	Intergroup	.881	4	.220	3.431	.011
	With the collective	7.449	116	.064		
	Total	8.331	120			
Chewing Discomfort	Intergroup	75.762	4	18.940	7.425	.000
	With the collective	295.924	116	2.551		
	Total	371.686	120			
Meal Discomfort	Intergroup	97.112	4	24.278	29.317	.000
	With the collective	96.061	116	.828		
	Total	193.174	120			
Bad breath Discomfort	Intergroup	103.044	4	25.761	25.572	.000
	With the collective	116.857	116	1.007		
	Total	219.901	120			
Implant Experience	Intergroup	1.241	4	.310	1.450	.222
	With the collective	24.825	116	.214		
	Total	26.066	120			
Taste Discomfort	Intergroup	83.618	4	20.905	15.359	.000
	With the collective	157.886	116	1.361		
	Total	241.504	120			
Pain Discomfort	Intergroup	93.703	4	23.426	18.735	.000
	With the collective	145.041	116	1.250		
	Total	238.744	120			
Bilateral Chewing Discomfort	Intergroup	.793	4	.198	.822	.513
	With the collective	27.951	116	.241		
	Total	28.744	120			

## 4. Discussion

Most of the elderly people living in an urban-rural area work for family farms during farming season. During non-farming season, they spend their leisure times participating in various programs run by local society. Such an environment helps the elderly people to maintain regular living patterns as well as to keep physically and mentally healthy life. Particularly, oral health and whole-body health of the old age are closely related to quality of life. The elderly people in an urban-rural area usually visit health center or health clinic for their health care.

It needs to approach with whole-body health perspective, since oral health, like the health of other organs, is influenced by physical, mental, and social impact[10]. The social support system also gives major impact to health behaviors or health levels of the elderly[11].

In this research, we found that elderly people who receive oral examinations regularly are highly aware of oral health; they brush after meals and before sleep( $P>.05$ ). and brush after meals or do scaling to prevent periodontal disease. Especially, given that the elderly people who take regular oral examinations have prevented periodontal disease by dental plaque and calculus removal, the elderly in an urban-rural area form proper oral health care practices( $P>.05$ ).

The oral health of the elderly is highly relevant to whole-body health[12]. Especially, since tooth decay or periodontal disease are classified as chronic disease such as high blood pressure or diabetes, whole-body health and oral diseases need to be related when the elderly are diagnosed or suggested health care management.

As we analyze oral care life practices of patients who have received implant care for recovering missing teeth from tooth loss, obvious gender difference is shown in temperance and continuous care. Most of the patients who experienced implant care have drinking habits

and begin temperance only after implant care. Moreover, the people with implant care experience have brushing habits after meals and intend to keep participating in the Continue to Oral Health Program by life cycle( $P>.05$ ). It is considered that the difficulty of recovery of perfect function of missing teeth equal to that of natural teeth by implant care and the maintenance after the implant care becomes the motivation to recognize the importance and necessity of continuous dental and oral health care.

Oral discomforts, depending on implant care experience, show differences in pronunciation discomfort, pain discomfort, meal discomfort, bad breath discomfort, oral dryness discomfort, social discomfort; female patients show bigger differences than male patients( $P>.05$ ). As a research evaluating chewing ability of patients after implant surgery indicates that the masticatory forces of those patients is improved[13], the result of this study also discovered that patients show improved chewing ability but reduced meal discomfort after implant surgery. However, given that implant experience does not trigger social discomfort, implant care is considered as a symbol of economic prosperity, since prosthesis is only afforded to the elderly with economic ability.

The result of comparative research on oral discomforts, which included taste discomfort, knowledge of tongue cleanliness, social discomfort, and whether to use oral care products or not, shows meaningful difference( $P>.05$ ). Bad breath is an unpleasant smell that occurs both in healthy and unhealthy persons depending on their physical and mental status. Among several causes of bad breath, there is senile bad breath[14].

As our comparative research by gender on the incidence of bad breath of the elderly people, female elders show meaningful differences in pronunciation discomfort, meal discomfort, and social discomfort( $P>.05$ ); oral discomfort according to pronunciation discomfort causes

taste discomfort, pain discomfort, and chewing discomfort ( $P > .05$ ).

The oral discomforts accompanied with aging of the elderly rapidly increases. Oral pain caused by missing teeth, dry mouth, prosthesis, and periodontal disease leads to meal discomfort and chewing discomfort, which worsen oral discomforts. Also, oral pain causes social discomfort and makes daily life inconvenient, and finally decreases quality of life. Thus, Kim[15] insists that the elderly with oral tooth decay or dentures have increased chewing or pronunciation discomforts, while subjective oral health level of the elderly with periodontal disease appears to be low, which generally affects the quality of life of the elderly people.

The trigger factors of oral discomforts of the elderly relate to smoking, chewing discomfort, meal discomfort, bad breath discomfort, and social discomfort, but show no relevance to educational level ( $P > .05$ ). According to the analysis of the relevance between drinking habits and bad breath by N. Suzuki et. al. [16], bad breath is more likely to occur when a person has periodontal disease or a drinking habit. Also, since most of the elderly have low oral hygiene management ability, the occurrence of periodontal disease is increased. As the more the people smoke, the worse the oral condition, as well as increased tooth loss and denture prosthesis ratio [15]. Particularly, the possibility of bad breath becomes greater because of the physiological reason to oral dryness and life habits of the elderly.

Even though oral diseases can be prevented or treated easily by everyday oral care, most of the elderly often let the disease go untreated or unprevented, considering that their poor oral condition is a natural phenomenon of old age. Especially, the elderly in urban-rural area are left untreated even when proper treatments are required because of the lack of time due to their farming responsibilities, losing self-confidence

because of old age, feeling anxiety from life expectancy, and economic hardship. Therefore, to solve oral discomforts of the elderly, oral care of those people need to be promoted by regular oral examinations identifying and analyzing the degree of recognition of examination by dentists and personal oral care methods on the remaining teeth and prosthetic treatment. Also, as we consider the particularity of the urban-rural complex city, common efforts of neighboring universities, public health centers, and oral health workers of rural public health centers are necessary under cooperation of local dentists in order to provide oral health promotion services to local senior citizens. Therefore, to enhance the oral health and quality of life of the local elderly, effective projects such as the Continue to Oral Health Program need to be operated continuously with multilateral reflections.

## 5. Conclusion

This study aims to provide basic data in order to operate Continued oral health program targeting elderly people in a certain area. Following are the result from analyzing the relevance between oral discomfort and oral health practices of 127 participants of senior welfare centers.

1. Most of the elderly who take regular oral examinations brush after meals as well as before sleep ( $P > .05$ ). They brush after meals in order to prevent periodontal disease and to do scaling for plaque and dental calculus removals ( $P > .05$ ).
2. Most of the elderly who experienced implant have drinking habits, brush after meals, and do temperance for implant care. Also, people who received implant care are more likely to participate in the Continue to Oral Health Program ( $P > .05$ ).



3. Most of the elderly who underwent implant surgery show decreased chewing discomfort or meal discomfort ( $P > .05$ ), however, there is no relevance between implant experience and social discomfort.
4. Bad breath influences pronunciation discomfort, meal discomfort, and social discomfort ( $P > .05$ ), while oral discomforts depending on pronunciation discomfort cause taste discomfort, pain discomfort, and chewing discomfort ( $P > .05$ ).
5. Oral discomforts and educational levels of the elderly do not show any relevance. However, smoking, chewing discomfort, meal discomfort, bad breath and social discomfort show meaningful differences ( $P > .05$ ).

As a result, to improve oral health and quality of life of the elderly in an urban-rural area, joint efforts of local societies are necessary to enhance oral health practices and to make senior oral health plans and oral health programs by identifying the trigger factors of oral discomforts which include pronunciation discomfort, chewing discomfort, meal discomfort, bad breath, and social discomfort. It is important to continue oral health care

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