

# 스케일링이 치아손실 예방에 미치는 영향

## Association between scaling and tooth loss in Korean adults: a matched cohort study

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### INTRODUCTION

The use of scaling has soared in Korea since it became covered in July 2013 by the National Health Insurance Services (hereafter the NHIS). The tooth loss has been steadily increasing, despite dental health-care policies to expand public health-insurance coverage. It is necessary to identify how systemic changes have affected oral-health improvement and disease prevention. The purpose of this study was to identify the effect of regular scaling on tooth loss using propensity score matching (hereafter PSM). We also identify the effect of regular scaling on tooth loss by income level.

### METHODS

This study used a Medical check-up cohort database released by the NHIS. The cohort consisted of 514,866 Koreans as an initial group and followed the subjects for 14 years, up to 2015. There is a question about “Have you had a scaling in the last year?” in the check-up questionnaire. Scaling, which is an interesting variable, was defined by the questionnaire. Tooth loss was defined as including all teeth except for the third molars until 2015. The procedure codes for extraction are U4412, U4413, and U4414. After the oral check-up, the extraction code was checked in the dental-care details of all the subjects.

We did the applicable statistical analyses using the chi-squared test to investigate the differences in socio-economic, comorbidity, and lifestyle factors. After doing the preliminary analyses, we used a Cox proportional hazard model to identify the effect of scaling on tooth loss while adjusting for confounders. We calculated hazard ratios (HRs) and 95% confidence intervals (CIs) to identify the risk factors associated with tooth loss.

### Results

Scaling, which is an interesting variable, showed conflicting result in univariate and multi-variate analyses. In univariate analysis, those who received scaling were more likely to lose teeth. After adjusting for confounders, however, those who didn’t receive scaling were more likely to lose teeth in multi-variate analysis.

DM is a major factor affecting tooth loss. We identified the effect of scaling on tooth loss depending on DM. Scaling did not affect tooth loss in the diabetic groups, but scaling in non-diabetic groups had a significant effect on tooth loss.

Table. Characteristics of the study population and the results of Cox proportional regression

Variables	TOTAL	Scaling							
		No		Yes		p-value	a.HR	95% CI	
		N	(%)	N	(%)				
Gender	Male	31,017	65.5	31,013	65.5	0.9782	1(ref)		
	Female	16,352	34.5	16,356	34.5		1.131	1.101	- 1.161
Age	40's	26,648	56.3	26,647	56.3	1	1(ref)		
	50's	13,982	29.5	13,984	29.5		1.286	1.263	- 1.309
	60's	5,558	11.7	5,557	11.7		1.933	1.884	- 1.984
	70's	1,181	2.5	1,181	2.5		2.537	2.404	- 2.678
Income level	Low	7,495	15.8	7,496	15.8	0.9997	1(ref)		
	Medium	12,179	25.7	12,176	25.7		1.017	0.992	- 1.043
	High	27,695	58.5	27,697	58.5		0.804	0.785	- 0.823
Social security	Industrial worker	35,815	75.6	35,815	75.6	0.9938	1(ref)		
	Self-employee	11,514	24.3	11,513	24.3		1.484	1.455	- 1.514
	Medical aid	40	0.1	41	0.1		1.289	0.973	- 1.707
Presence of disability	Normal	47,206	99.7	47,203	99.6	0.8684	1(ref)		
	Present	163	0.3	166	0.4		1.016	0.886	- 1.166
CCI	0 point	26,110	55.1	26,108	55.1	0.9999	1(ref)		
	1 point	13,608	28.7	13,610	28.7		0.979	0.961	- 0.997
	≥ 2 points	7,651	16.2	7,651	16.2		0.991	0.968	- 1.014
DM	No	45,433	95.9	45,183	95.4	<.0001	1(ref)		
	Yes	1,936	4.1	2,186	4.6		1.069	1.027	- 1.113
BMI	< 18.5	993	2.1	916	1.9	<.0001	1(ref)		
	18.5~22.9	16,842	35.6	16,209	34.2		0.965	0.909	- 1.025
	23~24.9	13,203	27.9	13,594	28.7		1.051	1.029	- 1.072
	≥ 25	16,331	34.5	16,650	35.1		1.128	1.106	- 1.150
Smoke	Non-smoker	28,679	60.5	28,151	59.4	0.0005	1(ref)		
	Ex- or Current smoker	18,690	39.5	19,218	40.6		1.147	1.124	- 1.170
Alcohol	None	23,205	49.0	23,263	49.1	<.0001	1(ref)		
	< 3 time / week	18,683	39.4	19,063	40.2		0.977	0.958	- 0.996
	≥ 3 times / week	5,481	11.6	5,043	10.6		1.063	1.033	- 1.094
Physical activity	None	25,033	52.8	21,505	45.4	<.0001	1(ref)		
	1~2 times / week	13,173	27.8	15,187	32.1		0.983	0.965	- 1.002
	3~4 times / week	5,093	10.8	6,240	13.2		1.014	0.988	- 1.041
	5~7 times / week	4,070	8.6	4,437	9.4		1.008	0.979	- 1.037
Periodic dental visits	None	33,407	70.5	6,752	14.3	<.0001	1(ref)		
	Yes	13,962	29.5	40,617	85.7		1.108	1.086	- 1.130
Periodic Scaling	None						1(ref)		
	Yes						0.973	0.954	- 0.992
TOTAL		47,369	100	47,369	100				

### Discussion

Based on the results of this study, we have proven that scaling is a treatment that improves dental health. Numerous studies have confirmed that education is closely associated with prevention of tooth loss, with a low education level being an important risk factor for tooth loss. We need to encourage regular scaling to prevent tooth loss. In addition, elements that obstruct scaling should be removed. These evidence-based results could help dental-policy adoption and development. Currently, scaling is limited to once a year for adults aged 20 or older. Since the effect of scaling has been verified, it is necessary to increase the number of subjects and the number of times. It could be considered to reduce the financial burden in order to improve accessibility to dental care. Meaningful results could thereby be obtained if we continue to assess continuing trends in the incidence of tooth loss between before and after introduction of scaling in a further study.