

## The Dentists' View of Dental Hygienist Duties in Korea

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**Background:** The number and curriculum of dental hygienists in Korea have dramatically increased. Controversies have since resulted from insufficient job descriptions of the work performed by a dental hygienist. A dentist's perception was examined to legally reflect the actual work of dental hygienists.

**Methods:** Four hundred and nineteen dentists were surveyed about the duties of a dental hygienist. Their views on the career and availability of each job were examined. The duties of the dental hygienist include 13 items in dental treatment preparation, 14 items of radiography, 21 items of preventive dentistry, 6 items of periodontal treatment, 12 items of oral medicine, 12 items of conservative dentistry, 8 items of prosthetics, 10 items of orthodontics, 7 items of oral and maxillofacial surgery, 6 items of implantation, 6 items of impression taking and model fabrication, 5 items of anesthesia and injection, 11 items of management and administrative, and 3 items of self-development.

**Results:** Most of the duties were doable by a dental hygienist. Many dentists reported that managing implants, oral hygiene of special patients, some duties in oral medicine, teeth brightening, making temporary crowns, making individual trays, selecting shades, ligaturing, and precision impressions need  $\geq 3$  years of experience. Duties perceived by dentists not to be performed by dental hygienists were reading radiographs (55.4%), suture and stitch out (48.0%), intramuscular injection (36.0%), root planning (27.2%), cementation and removal of prostheses (23.2%), and examining pulp vitality (22.0%).

**Conclusion:** Current laws are to be revised to include, the care provided by dental hygienists and under a physician's supervision. Flexibility is also needed to cope with rapidly changing dental technology.

**Key Words:** Dental hygienists, Dentists, Task performance and analysis

### Introduction

Korean dental hygienist education, which began in 1965, has improved for the past 50 years; it has been organized into a three-year professional and a four-year Bachelor's degree curriculum. In 2020, the number of licensed dental hygienists reached 89,993. In addition, the quality of education improved after a Master and Doctorate degrees in dental hygiene were initiated. In

order to enhance the professionalism and job of dental hygienists, the dental hygiene education community has been working to establish new educational goals and standardized curricula<sup>1,2</sup>.

Despite the development of the education system for dental hygienists, controversies over their duties continue. Dental hygienists should perform only the tasks specified in the Act for medical technicians. However, Korean dental hygienists perform medical and dental support

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services in addition to those specified under the law and in addition to those done under the direction and supervision of a dentist. Since these are not specified in the law, the criteria for judging the legitimacy of the relevant actions are ambiguous, and in fact, the number of administrative determinations has increased<sup>3)</sup>. In addition, the inconsistency between the duty actually performed by the dental hygienist at the dental clinic or hospital and that performed by the dental hygienist prescribed in the law can lead to an increase in work stress and turnover in the dental field<sup>4-7)</sup>.

Korean dentists and hygienists are experiencing chronic labor shortages<sup>3)</sup>. Thus, most private dentists require that a dental hygienist be able to perform basic dental care preparation, consultation and guides for patients, perform intra- or extra-oral x-ray imaging, and provide preventive dental care and routine chair-side dental assistance<sup>8)</sup>. However, there are objections to this from academic professors and dentists who oppose such transfer of duties to the hands of dental hygienists. This disagreement can be a barrier for revising the existing law regarding the role of dental hygienists in practice. In addition, previous research has reported that the role of dental hygienists is not systematic, and therefore, there is a lack of awareness on the part of dentists regarding the scope of a dental hygienist duty<sup>8-11)</sup>. Due to insufficient legal description of the role of dental hygienists, potential conflicts between patients and dentists are bound to occur. Furthermore, in some cases, the Ministry of Health and Welfare had to obtain a vote on defining the role of dental hygienists. The purpose of this study was to examine the opinions of dentists on the role of dental hygienists. The data obtained can be used as a basis to enact revisions to the existing laws on the role of dental hygienists.

## Materials and Methods

### 1. Research subject

We planned to investigate about 500 dentists through stratified sampling by region and institution. Because it was difficult to get the cooperation of the society for dentists, we proceeded with the convenience extraction method by using seven researchers who included three dentists and four dental hygienists. Korea was divided into

the metropolitan area, Gyeongsang area, Jeolla area, Chungcheong area, and Gangwon area, and designated each area. The initial survey method was e-mail; however, the response rate by researchers was only 3 to 8%. Then, face to face surveys were added, and the response rate went up to about 30 to 40%. The total number of response was 419. The general characteristics are shown in Table 1. The questionnaire was identified as selecting non-response items that were considered difficult for personal in-

**Table 1.** General Characteristics of the Dentist Studied

Variable	Category	n (%)
Working place	College hospital	26 (6.2)
	General hospital	16 (3.8)
	Private dental hospital	45 (10.7)
	Dental clinic	324 (77.3)
	Public health center	2 (0.5)
	No response	6 (1.4)
Sex	Male	333 (79.5)
	Female	79 (18.9)
	No response	7 (1.7)
Position	Owner	286 (68.3)
	Employee of private dental clinic or hospital	65 (15.5)
	Official or employee of college or general hospital	41 (9.8)
	No response	27 (6.4)
Age	20s	20 (4.8)
	30s	81 (19.3)
	40s	114 (27.2)
	50 years old or older	132 (31.5)
Area	No response	72 (17.2)
	Metropolitan city	252 (60.1)
	Small cities	143 (34.1)
	Rural area	9 (2.1)
Location	No response	15 (3.6)
	Seoul, Incheon, Gyeonggi area	161 (38.4)
	Gyeongsang area	39 (9.3)
	Jeolla area	44 (10.5)
	Chungcheong area	115 (27.4)
	Gangwon area	32 (7.6)
	No response	28 (6.7)
Specialist training	Yes	185 (44.2)
	No	210 (50.1)
	No response	24 (5.7)
Degree	Bachelor	121 (28.9)
	Master	143 (34.1)
	Doctor	132 (31.5)
	No response	23 (5.5)
Total		419 (100)

formation or judgment, and no response was included in the analysis.

## 2. Questionnaire content

The survey was conducted on the duties of dental hygienists extracted from the 2nd job analysis of dental hygienists at the Korea National Institute of Health in 2012<sup>12)</sup>. The dental hygienist's duties include dental treatment preparation, radiography, preventive dentistry, oral medicine, periodontal treatment, conservative dentistry, prosthetics, orthodontics, oral and maxillofacial surgery,

implantation, impression taking and model, anesthesia and injection, management and administrative, and self-development. Some jobs had overlapping classifications, making the description vague. In order to strictly follow the classification of the 2nd job analysis of the dental hygienist, the classification was used for the investigation without modification according to the intention of this researcher. The response was to write on whether dental hygienists could perform each duty and how much experience was required. We surveyed the necessary clinical experience for duty performance because it could

**Table 2.** Dentist's View of the Duties of Dental Hygienists in Dental Treatment Preparation

Duty	Clinical experience required			Possible in the future	Impossible	No response
	Beginners available	3 years or more	5 years or more			
Receiving patients	314 (74.9)	71 (16.9)	21 (5.0)	1 (0.2)	8 (1.9)	4 (1.0)
Adjusting position of patients	309 (73.7)	89 (21.2)	15 (3.6)	1 (0.2)	4 (1.0)	1 (0.2)
Dealing with infectious diseases	238 (56.8)	142 (33.9)	23 (5.5)	4 (1.0)	9 (2.1)	3 (0.7)
Managing clinical clothes	335 (80.0)	63 (15.0)	12 (2.9)	1 (0.2)	3 (0.7)	5 (1.2)
Personal protection	305 (72.8)	91 (21.7)	18 (4.3)	1 (0.2)	3 (0.7)	1 (0.2)
Managing preoperative operators and assistants	259 (61.8)	133 (31.7)	20 (4.8)	1 (0.2)	3 (0.7)	3 (0.7)
Managing preoperative patients	250 (59.7)	144 (34.4)	19 (4.5)	1 (0.2)	3 (0.7)	2 (0.5)
Preventing equipment infection	336 (80.2)	73 (17.4)	8 (1.9)	1 (0.2)	0 (0.0)	1 (0.2)
Disinfection	381 (90.9)	31 (7.4)	5 (1.2)	1 (0.2)	0 (0.0)	1 (0.2)
Sterilizing the operating room	309 (73.7)	92 (22.0)	13 (3.1)	3 (0.7)	1 (0.2)	1 (0.2)
Using the sterilizer	328 (78.3)	77 (18.4)	10 (2.4)	1 (0.2)	2 (0.5)	1 (0.2)
Using chemical disinfectants	324 (77.3)	76 (18.1)	12 (2.9)	0 (0.0)	4 (1.0)	3 (0.7)
Disposal of medical waste	330 (78.8)	78 (18.6)	9 (2.1)	0 (0.0)	1 (0.2)	1 (0.2)

**Table 3.** Dentist's View of the Duties of Dental Hygienists in Radiography

Duty	Clinical experience required			Possible in the future	Impossible	No response
	Beginners available	3 years or more	5 years or more			
Preparing for intraoral radiography	394 (94.0)	20 (4.8)	2 (0.5)	1 (0.2)	1 (0.2)	1 (0.2)
Taking peri-apical radiography	373 (89.0)	37 (8.8)	2 (0.5)	1 (0.2)	5 (1.2)	1 (0.2)
Taking bite-wing radiography	323 (77.1)	73 (17.4)	5 (1.2)	1 (0.2)	13 (3.1)	4 (1.0)
Taking occlusal radiography	306 (73.0)	84 (20.0)	8 (1.9)	1 (0.2)	15 (3.6)	5 (1.2)
Taking radiography of special patients	184 (43.9)	167 (39.9)	33 (7.9)	3 (0.7)	20 (4.8)	12 (2.9)
Localization radiography	226 (53.9)	136 (32.5)	20 (4.8)	3 (0.7)	17 (4.1)	17 (4.1)
Preparing for extraoral radiography	369 (88.1)	33 (7.9)	3 (0.7)	0 (0.0)	7 (1.7)	7 (1.7)
Taking panorama radiography	364 (86.9)	37 (8.8)	4 (1.0)	1 (0.2)	12 (2.9)	1 (0.2)
Taking cephalometric radiography	274 (65.4)	78 (18.6)	10 (2.4)	6 (1.4)	36 (8.6)	15 (3.6)
Taking computed tomography	241 (57.5)	85 (20.3)	15 (3.6)	16 (3.8)	48 (11.5)	14 (3.3)
Developing films	358 (85.4)	26 (6.2)	2 (0.5)	0 (0.0)	16 (3.8)	17 (4.1)
Managing radiographs	367 (87.6)	30 (7.2)	3 (0.7)	0 (0.0)	8 (1.9)	11 (2.6)
Dealing with digital radiation devices	323 (77.1)	72 (17.2)	8 (1.9)	1 (0.2)	6 (1.4)	9 (2.1)
Reading radiographs	51 (12.2)	69 (16.5)	50 (11.9)	12 (2.9)	232 (55.4)	5 (1.2)

represent insufficient training in the curriculum of dental hygiene or indicate the necessity of conservative education due to each task' difficulty and professional dental hygienist system. We showed the overall opinion of dentists about the duties of dental hygienists. The data was entered into

Excel 2010 (Microsoft, Redmond, WA, USA) and frequency analysis was performed.

**Table 4.** Dentist's View of the Duties of Dental Hygienists in Oral Disease Prevention

Duty	Clinical experience required			Possible in the future	Impossible	No response
	Beginners available	3 years or more	5 years or more			
Charting preventive treatment records	291 (69.5)	97 (23.2)	7 (1.7)	5 (1.2)	14 (3.3)	5 (1.2)
Examining dental plaque	279 (66.6)	106 (25.3)	8 (1.9)	3 (0.7)	18 (4.3)	5 (1.2)
Examining oral bacteria	223 (53.2)	109 (26.0)	13 (3.1)	9 (2.1)	60 (14.3)	5 (1.2)
Examining dental caries activity	226 (53.9)	119 (28.4)	16 (3.8)	4 (1.0)	46 (11.0)	8 (1.9)
Managing oral hygiene by subject	263 (62.8)	127 (30.3)	7 (1.7)	3 (0.7)	10 (2.4)	9 (2.1)
Professional tooth brushing	245 (58.5)	129 (30.8)	16 (3.8)	2 (0.5)	21 (5.0)	6 (1.4)
Managing hypersensitivity	229 (54.7)	125 (29.8)	22 (5.3)	5 (1.2)	34 (8.1)	4 (1.0)
Flouride application	326 (77.8)	74 (17.7)	12 (2.9)	2 (0.5)	2 (0.5)	3 (0.7)
Sealants	221 (52.7)	127 (30.3)	34 (8.1)	8 (1.9)	26 (6.2)	3 (0.7)
Smoking control	227 (54.2)	108 (25.8)	25 (6.0)	16 (3.8)	38 (9.1)	5 (1.2)
Consulting diet	235 (56.1)	108 (25.8)	24 (5.7)	14 (3.3)	33 (7.9)	5 (1.2)
Managing eating or swallowing disorder	181 (43.2)	129 (30.8)	31 (7.4)	16 (3.8)	51 (12.2)	11 (2.6)
Oral muscular exercise training	243 (58.0)	111 (26.5)	15 (3.6)	12 (2.9)	25 (6.0)	13 (3.1)
Managing multiple dental caries	167 (39.9)	161 (38.4)	42 (10.0)	10 (2.4)	32 (7.6)	7 (1.7)
Scaling	336 (80.2)	61 (14.6)	10 (2.4)	2 (0.5)	5 (1.2)	5 (1.2)
Using manual scaler	268 (64.0)	118 (28.2)	17 (4.1)	3 (0.7)	10 (2.4)	3 (0.7)
Using ultrasonic scaler	347 (82.8)	55 (13.1)	9 (2.1)	1 (0.2)	3 (0.7)	4 (1.0)
Managing implant	134 (32.0)	191 (45.6)	40 (9.5)	10 (2.4)	39 (9.3)	5 (1.2)
Oral hygiene of special patients	149 (35.6)	188 (44.9)	56 (13.4)	5 (1.2)	13 (3.1)	8 (1.9)
Oral prophylaxis	279 (66.6)	109 (26.0)	13 (3.1)	1 (0.2)	12 (2.9)	5 (1.2)
Managing scaler or curette	246 (58.7)	122 (29.1)	23 (5.5)	2 (0.5)	20 (4.8)	6 (1.4)

**Table 5.** Dentist's View of the Duties of Dental Hygienists in Oral Medicine

Duty	Clinical experience required			Possible in the future	Impossible	No response
	Beginners available	3 years or more	5 years or more			
Managing the TMD patients	127 (30.3)	176 (42.0)	37 (8.8)	13 (3.1)	54 (12.9)	12 (2.9)
Physical therapy on head and neck	165 (39.4)	135 (32.2)	35 (8.4)	19 (4.5)	53 (12.6)	12 (2.9)
Hot pack on head and neck	200 (47.7)	120 (28.6)	27 (6.4)	19 (4.5)	39 (9.3)	14 (3.3)
Ultrasonic therapy on head and neck	157 (37.5)	123 (29.4)	30 (7.2)	16 (3.8)	78 (18.6)	15 (3.6)
Exercise training of TMD patients	151 (36.0)	147 (35.1)	35 (8.4)	17 (4.1)	51 (12.2)	18 (4.3)
Managing bruxism	138 (32.9)	151 (36.0)	40 (9.5)	20 (4.8)	57 (13.6)	13 (3.1)
Managing snore	131 (31.3)	151 (36.0)	40 (9.5)	18 (4.3)	65 (15.5)	14 (3.3)
Managing oral soft tissue disease	124 (29.6)	147 (35.1)	42 (10.0)	16 (3.8)	74 (17.7)	16 (3.8)
Managing dry mouth	132 (31.5)	154 (36.8)	38 (9.1)	15 (3.6)	63 (15.0)	17 (4.1)
Treating bad breath	159 (37.9)	132 (31.5)	35 (8.4)	12 (2.9)	66 (15.8)	15 (3.6)
Understanding maxillofacial pain	105 (25.1)	152 (36.3)	52 (12.4)	15 (3.6)	78 (18.6)	17 (4.1)
Handling laser equipment	140 (33.4)	152 (36.3)	28 (6.7)	9 (2.1)	70 (16.7)	20 (4.8)

TMD: temporomandibular disorder.

## Results

With respect to jobs related to dental treatment, more than half of the respondents were able to perform their jobs, including beginners (Table 2). With regards to radiography tasks, 55.4% of the dentists answered that reading radiography was not the job of a dental hygienist and more than half of the dentists answered that radiography jobs, except special patients, could be done by beginners (Table 3). With regards to preventive treatments, more than half answered that most of the tasks could be performed by beginners except managing eating or swallowing disorders (43.2%), managing multiple dental caries (39.9%), managing implants (32.0%), and oral hygiene of special patients (35.6%) (Table 4). Between 12.2 to 18.6% of the dentists answered that all tasks in oral medicine could not be performed by a dental hygienist

except for a hot pack (Table 5). In the case of root planning, 34.1% of respondents answered that the dental hygienists with more than 3 years of experience could perform the task, while 27.2% responded that it was not a task meant for dental hygienists (Table 6). With regards to the duties of conservative dentistry, 22.0% and 17.9% of the respondents responded that examination of pulp vitality and treatment for teeth whitening were not tasks for dental hygienists (Table 7). In prosthetic dentistry, 16.9 to 23.2% of the dentists responded that making individual trays, selecting tooth shades, and attaching and removing prostheses were not tasks meant for dental hygienists (Table 8). More than 10% of respondents responded that orthodontic diagnosis procedure, separating for band, and using elastics were not tasks meant for dental hygienists (Table 9). With regards to Oral and Maxillofacial Surgery (Table 10), 48.0% of dentists said

**Table 6.** Dentist's View of the Duties of Dental Hygienists in Periodontal Treatment

Duty	Clinical experience required			Possible in the future	Impossible	No response
	Beginners available	3 years or more	5 years or more			
Managing individual oral hygiene	275 (65.6)	103 (24.6)	12 (2.9)	2 (0.5)	15 (3.6)	12 (2.9)
Examination of periodontal pockets	203 (48.4)	124 (29.6)	18 (4.3)	11 (2.6)	5 (1.2)	5 (1.2)
Root planing	110 (26.3)	143 (34.1)	27 (6.4)	20 (4.8)	114 (27.2)	5 (1.2)
Managing periodontal patients	187 (44.6)	172 (41.1)	24 (5.7)	3 (0.7)	26 (6.2)	7 (1.7)
Assisting periodontal treatment or surgery	259 (61.8)	130 (31.0)	15 (3.6)	2 (0.5)	9 (2.1)	4 (1.0)
Application of periodontal pack	192 (45.8)	148 (35.3)	12 (2.9)	5 (1.2)	55 (13.1)	7 (1.7)

**Table 7.** Dentist's View of the Duties of Dental Hygienists in Conservative and Pediatric Dentistry

Duty	Clinical experience required			Possible in the future	Impossible	No response
	Beginners available	3 years or more	5 years or more			
Rubber dam application	251 (59.9)	103 (24.6)	11 (2.6)	6 (1.4)	42 (10.0)	6 (1.4)
Matrix application	228 (54.4)	108 (25.8)	12 (2.9)	9 (2.1)	49 (11.7)	13 (3.1)
Temporary filling	248 (59.2)	111 (26.5)	15 (3.6)	6 (1.4)	34 (8.1)	5 (1.2)
Assisting conservative treatment	298 (71.1)	90 (21.5)	10 (2.4)	1 (0.2)	14 (3.3)	6 (1.4)
Examining pulp vitality	182 (43.4)	118 (28.2)	15 (3.6)	7 (1.7)	92 (22.0)	5 (1.2)
Assisting endodontic treatment	297 (70.9)	83 (19.8)	12 (2.9)	1 (0.2)	19 (4.5)	7 (1.7)
Teeth brightening	137 (32.7)	158 (37.7)	33 (7.9)	9 (2.1)	75 (17.9)	7 (1.7)
Assisting extraction of deciduous teeth	334 (79.7)	50 (11.9)	7 (1.7)	2 (0.5)	19 (4.5)	7 (1.7)
Assisting SS crown treatment	291 (69.5)	90 (21.5)	13 (3.1)	2 (0.5)	17 (4.1)	6 (1.4)
Assisting window opening	278 (66.3)	100 (23.9)	14 (3.3)	1 (0.2)	16 (3.8)	10 (2.4)
Explaining preventive orthodontic treatment	237 (56.6)	133 (31.7)	21 (5.0)	4 (1.0)	17 (4.1)	7 (1.7)
Assisting control of pediatric patient behavior	250 (59.7)	132 (31.5)	18 (4.3)	2 (0.5)	10 (2.4)	7 (1.7)

SS: stainless steel.

**Table 8.** Dentist's View of the Duties of Dental Hygienists in Prosthetic Treatment

Duty	Clinical experience required			Possible in the future	Impossible	No response
	Beginners available	3 years or more	5 years or more			
Gingival retraction	194 (46.3)	172 (41.1)	15 (3.6)	5 (1.2)	29 (6.9)	4 (1.0)
Making temporary crown	170 (40.6)	185 (44.2)	22 (5.3)	11 (2.6)	26 (6.2)	5 (1.2)
Assisting crown & bridge treatment	283 (67.5)	107 (25.5)	13 (3.1)	2 (0.5)	8 (1.9)	6 (1.4)
Assisting denture treatment	268 (64.0)	114 (27.2)	20 (4.8)	1 (0.2)	8 (1.9)	8 (1.9)
Making individual tray	117 (27.9)	174 (41.5)	31 (7.4)	14 (3.3)	77 (18.4)	6 (1.4)
Selecting tooth shade	127 (30.3)	150 (35.8)	51 (12.2)	9 (2.1)	71 (16.9)	11 (2.6)
Cementation and removal of prostheses	152 (36.3)	126 (30.1)	26 (6.2)	11 (2.6)	97 (23.2)	7 (1.7)
Managing prostheses	210 (50.1)	150 (35.8)	26 (6.2)	6 (1.4)	17 (4.1)	10 (2.4)

**Table 9.** Dentist's View of the Duties of Dental Hygienists in Orthodontic Treatment

Duty	Clinical experience required			Possible in the future	Impossible	No response
	Beginners available	3 years or more	5 years or more			
Understanding orthodontic diagnosis process	158 (37.7)	138 (32.9)	52 (12.4)	6 (1.4)	48 (11.5)	17 (4.1)
Photo taking for orthodontic patients	231 (55.1)	130 (31.0)	22 (5.3)	1 (0.2)	19 (4.5)	16 (3.8)
Using elastic separator	166 (39.6)	139 (33.2)	21 (5.0)	5 (1.2)	69 (16.5)	19 (4.5)
Assisting orthodontic treatment	237 (56.6)	126 (30.1)	19 (4.5)	3 (0.7)	20 (4.8)	14 (3.3)
Ligaturing	148 (35.3)	181 (43.2)	30 (7.2)	4 (1.0)	40 (9.5)	16 (3.8)
Assisting mini-screw application	238 (56.8)	126 (30.1)	19 (4.5)	3 (0.7)	18 (4.3)	15 (3.6)
Using elastics	183 (43.7)	140 (33.4)	24 (5.7)	3 (0.7)	50 (11.9)	19 (4.5)
Managing orthodontic pliers	286 (68.3)	92 (22.0)	13 (3.1)	1 (0.2)	13 (3.1)	4 (1.0)
Managing orthodontic patients	241 (57.5)	126 (30.1)	20 (4.8)	3 (0.7)	14 (3.3)	15 (3.6)
Managing oral hygiene of orthodontic patients	284 (67.8)	94 (22.4)	11 (2.6)	1 (0.2)	11 (2.6)	18 (4.3)

**Table 10.** Dentist's View of the Duties of Dental Hygienists in Oral and Maxillofacial Surgery

Duty	Clinical experience required			Possible in the future	Impossible	No response
	Beginners available	3 years or more	5 years or more			
Assisting tooth extraction	376 (89.7)	34 (8.1)	3 (0.7)	0 (0.0)	2 (0.5)	4 (1.0)
Assisting biopsy	262 (62.5)	105 (25.1)	14 (3.3)	0 (0.0)	26 (6.2)	12 (2.9)
Assisting oral and maxillofacial surgery	263 (62.8)	129 (30.8)	15 (3.6)	0 (0.0)	7 (1.7)	5 (1.2)
Managing patients with cleft lip and palate	127 (30.3)	169 (40.3)	49 (11.7)	11 (2.6)	45 (10.7)	18 (4.3)
Managing patients with jaw reconstruction	113 (27.0)	154 (36.8)	70 (16.7)	15 (3.6)	51 (12.2)	16 (3.8)
Managing patients with oral cancer	92 (22.0)	134 (32.0)	91 (21.7)	20 (4.8)	64 (15.3)	18 (4.3)
Suture and stitch out	107 (25.5)	75 (17.9)	15 (3.6)	14 (3.3)	201 (48.0)	7 (1.7)

that suturing and stitching out were not tasks meant for a dental hygienist. More than half of the respondents responded that all jobs related to implants are available for beginners (Table 11). Most respondents responded that precision impression and digital impression required more than three years of experience (Table 12). Meanwhile, 36.0% of the respondents stated that intramuscular injection was not their job, while the highest percentage of re-

spondents stated that emergency treatment is possible over three years (Table 13). Most respondents stated that dental hygienists with more than three years of experience could claim national insurance and counsel patients, and those with more than 5 years of experience could manage employees in a dental clinic (Table 14). With regards to self-development jobs, the response rate that beginners could perform such duties was highest for one or more

**Table 11.** Dentist's View of the Duties of Dental Hygienists in Implant Treatment

Duty	Clinical experience required			Possible in the future	Impossible	No response
	Beginners available	3 years or more	5 years or more			
Understanding implant procedure	279 (66.6)	117 (27.9)	10 (2.4)	0 (0.0)	7 (1.7)	6 (1.4)
Assisting implant surgery	270 (64.4)	130 (31.0)	13 (3.1)	0 (0.0)	2 (0.5)	4 (1.0)
Assisting bone augmentation	217 (51.8)	172 (41.1)	17 (4.1)	2 (0.5)	6 (1.4)	5 (1.2)
Assisting implant prostheses	235 (56.1)	154 (36.8)	22 (5.3)	0 (0.0)	4 (1.0)	4 (1.0)
Managing implant instrument	233 (55.6)	158 (37.7)	21 (5.0)	0 (0.0)	3 (0.7)	4 (1.0)
Managing oral hygiene of implant patients	232 (55.4)	157 (37.5)	15 (3.6)	1 (0.2)	8 (1.9)	6 (1.4)

**Table 12.** Dentist's View of the Duties of Dental Hygienists in Impression Taking, Model Fabrication, and Cement Mixing

Duty	Clinical experience required			Possible in the future	Impossible	No response
	Beginners available	3 years or more	5 years or more			
Bite registration	195 (46.5)	162 (38.7)	14 (3.3)	3 (0.7)	41 (9.8)	4 (1.0)
Alginate impression	305 (72.8)	93 (22.2)	10 (2.4)	2 (0.5)	6 (1.4)	3 (0.7)
Rubber impression	129 (30.8)	198 (47.3)	29 (6.9)	5 (1.2)	53 (12.6)	5 (1.2)
Digital impression	104 (24.8)	184 (43.9)	34 (8.1)	13 (3.1)	67 (16.0)	17 (4.1)
Mixing cement or filling material	350 (83.5)	59 (14.1)	4 (1.0)	1 (0.2)	3 (0.7)	2 (0.5)
Model fabrication	267 (63.7)	111 (26.5)	8 (1.9)	6 (1.4)	25 (6.0)	2 (0.5)

**Table 13.** Dentist's View of the Duties of Dental Hygienists in Anesthesia, Injection etc.

Duty	Clinical experience required			Possible in the future	Impossible	No response
	Beginners available	3 years or more	5 years or more			
Topical anesthesia	330 (78.8)	46 (11.0)	9 (2.1)	3 (0.7)	27 (6.4)	4 (1.0)
Preparing local anesthesia	368 (87.8)	35 (8.4)	5 (1.2)	2 (0.5)	7 (1.7)	2 (0.5)
Intramuscular injection	103 (24.6)	99 (23.6)	21 (5.0)	33 (7.9)	151 (36.0)	12 (2.9)
Dealing with emergency in dental clinic	92 (22.0)	146 (34.8)	85 (20.3)	16 (3.8)	73 (17.4)	7 (1.7)
Dealing with dental emergency	92 (22.0)	151 (36.0)	85 (20.3)	12 (2.9)	70 (16.7)	9 (2.1)

years of experience (Table 15).

## Discussion

The role of a dental hygienist was created for the purpose of preventing oral disease and promoting oral health care and education. However, in Korea, unlike in Europe or the United States, dental hygienists performed more dental assistance and dental clinic management duties<sup>8,13</sup>. Kim and Kim<sup>6</sup>, in a survey of 214 dental hygienists, found that the most common duty was dental treatment assistance. Choi et al.<sup>14</sup> surveyed 612 dental hygienists and found that their duties included, from most common to least, dental clinic management, oral disease

prevention, patient consultation & reception, and dental treatment assistance. Kim et al.<sup>15</sup> noted that the highest frequency of duties was dental clinic management in a survey of 144 dental hygienists, followed by preventive treatment, dental treatment assistance, and oral health education. Kwon and Lee<sup>16</sup> also reported that dental hygienists with more than 11 years of experience performed a lot of managerial duties, and those with 6 to 10 years of experience usually provided dental treatment assistance. In the same context as in their previous studies, this study included not only oral disease prevention and education as the original duties of dental hygienists but also the duties related to the clinical field.

The dentists who participated in this study stated that

**Table 14.** Dentist's View of the Duties of Dental Hygienists in Management and Administration

Duty	Clinical experience required			Possible in the future	Impossible	No response
	Beginners available	3 years or more	5 years or more			
National insurance claim	120 (28.6)	189 (45.1)	87 (20.8)	4 (1.0)	14 (3.3)	5 (1.2)
Maintaining facilities	246 (58.7)	111 (26.5)	22 (5.3)	3 (0.7)	34 (8.1)	3 (0.7)
Maintaining equipments	245 (58.5)	110 (26.3)	25 (6.0)	4 (1.0)	32 (7.6)	3 (0.7)
Managing prosthesis	269 (64.2)	128 (30.5)	17 (4.1)	1 (0.2)	2 (0.5)	2 (0.5)
Managing materials	289 (69.0)	110 (26.3)	15 (3.6)	1 (0.2)	2 (0.5)	2 (0.5)
Managing purchase	273 (65.2)	122 (29.1)	18 (4.3)	1 (0.2)	2 (0.5)	3 (0.7)
Managing documents	236 (56.3)	135 (32.2)	40 (9.5)	2 (0.5)	4 (1.0)	2 (0.5)
Infection control	236 (56.3)	144 (34.4)	31 (7.4)	1 (0.2)	4 (1.0)	3 (0.7)
Patient consultation	138 (32.9)	173 (41.3)	103 (24.6)	2 (0.5)	1 (0.2)	2 (0.5)
Clinic promotion	169 (40.3)	135 (32.2)	79 (18.9)	5 (1.2)	28 (6.7)	3 (0.7)
Managing employee	100 (23.9)	110 (26.3)	188 (44.9)	3 (0.7)	14 (3.3)	4 (1.0)

**Table 15.** Dentist's View of the Duties of Dental Hygienists in Self Development

Duty	Clinical experience required			Possible in the future	Impossible	No response
	Beginners available	3 years or more	5 years or more			
Understanding professionalism	238 (56.8)	118 (28.2)	48 (11.5)	5 (1.2)	6 (1.4)	4 (1.0)
Gaining new knowledge and skills	257 (61.3)	105 (25.1)	44 (10.5)	3 (0.7)	6 (1.4)	4 (1.0)
Social contribution	300 (71.6)	60 (14.3)	36 (8.6)	9 (2.1)	9 (2.1)	5 (1.2)

most of the duties, from preventive treatment to dental treatment assistance, are can be performed by dental hygienists. In some cases, the current legal duties of a dental technician, radiologist, or physiotherapist were recognized as equal to that of a dental hygienist work. Many respondents recognized that dental computed tomography, digital radiography, and oral scanners should be performed by dental hygienists. The dentists thought that dental hygienists should oversee dental laboratories, radiography, and physical therapy in the dental clinic. Lee et al.<sup>3)</sup> said that the need for range expansion of dental hygienists' work was agreed by 91.1% of dentists and 95.5% of dental hygienists. As for the detailed duty items that need to be expanded, both dentists and dental hygienists responded in the order of temporary crown making and setting, surgery assistance, and dental treatment assistance. Han et al.<sup>17)</sup> noted that some dentists insisted that the current legal practice of dental hygienists does not fit the time and tasks that can be performed through education and training are often excluded from legal work.

The duties of dental hygienists not perceived by the

dentists were reading radiography (55.4%), suture and stich out (48.0%), intramuscular injection (36.0%), root planning (27.2%), cementation and removal of prostheses (23.2%), examining pulp vitality (22.0%), etc. In a study by Hwang et al.<sup>18)</sup>, the tasks considered by dentists not to be the duty of dental hygienists included infiltration anesthesia investigation, filling in cavities, intramuscular injection, canal irrigation, setting crown and bridge, and making individual tray. This result is similar to our survey.

Although this study has a limitation of convenience extraction that does not consider the area or age group, it can be said that this study has a significant number of dentists who surveyed opinions on the duties of dental hygienists. In this study, there were certain tasks whereby the opinions of the dentists were different; however, most of the tasks were thought could be performed by dental hygienists. Hwang and Han<sup>19)</sup> stated that it is necessary for the law to include the duties that many dental hygienists perform under the supervision of a dentist. Han et al.<sup>17)</sup> insisted that the law should state the duties that dental hygienists should not do, not those which they could do.



Considering the rapidly changing dental equipment and the contribution of dental hygienists in the field, a more careful listing of the legal duties of dental hygienists is expected to be amended. Therefore, there is a need for flexibility when such amendments are made, especially for dental hygienists who can keep up with the rapid changes in dental technology.

## Notes

### Conflict of interest

No potential conflict of interest relevant to this article was reported.

### Ethical approval

This study was approved by the Institutional Bioethics Committee of Daejeon Health Institute of Technology in 2017 (IRB no. 1041490-20170118-HR-001).

### Author contributions

Conceptualization: Yang-Keum Han. Data acquisition: Yang-Keum Han, Ji-Su Yu, Seung-Hee Kim, Jin-Young Yang, Soo-Myoung Bae, Soo-Jeong Hwang. Formal analysis: Ji-Su Yu, Soo-Jeong Hwang. Funding: Korea Dental Hygienists Association. Supervision: Yang-Keum Han. Writing-original draft: Ji-Su Yu, Soo-Jeong Hwang. Writing-review & editing: Yang-Keum Han, Ji-Su Yu, Seung-Hee Kim, Jin-Young Yang, Soo-Myoung Bae, Soo-Jeong Hwang.

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