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, 12 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 ≥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 curricula¹,².

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
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\(^3\). 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\(^4-7\).

Korean dentists and hygienists are experiencing chronic labor shortages\(^3\). 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\(^9\). 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\(^8-11\). 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-

| 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) |
|                  | No response                       | 72 (17.2) |
| Area             | Metropolitan city                 | 252 (60.1) |
|                  | Small cities                      | 143 (34.1) |
|                  | Rural area                        | 9 (2.1) |
|                  | No response                       | 15 (3.6) |
| Location         | 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 201212). 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 3. Dentist’s View of the Duties of Dental Hygienists in Radiography |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Duty                        | Clinical experience required |                |                |                |                |
|                             | Beginners available | 3 years or more | 5 years or more | Possible in the future | Impossible | No response |
| 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 |                               |                               |                               |                               |                               |
|-----------------------------------------------------------|------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
|                                                            | Beginners available          | 3 years or more                | 5 years or more                | Possible in the future         | Impossible                     | No response                    |
| 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)                        |
| Fluoride 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)                        | 1 (0.2)                        | 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 |                               |                               |                               |                               |                               |
|-----------------------------------------------------------|------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
|                                                            | Beginners available          | 3 years or more                | 5 years or more                | Possible in the future         | Impossible                     | No response                    |
| 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 disorde.
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. Dentists’ View of the Duties of Dental Hygienists in Prosthetic Treatment

| Duty                               | Beginners available | 3 years or more | 5 years or more | Possible in the future | Impossible | No response |
|------------------------------------|---------------------|-----------------|-----------------|------------------------|------------|-------------|
| 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. Dentists’ View of the Duties of Dental Hygienists in Orthodontic Treatment

| Duty                                 | Beginners available | 3 years or more | 5 years or more | Possible in the future | Impossible | No response |
|--------------------------------------|---------------------|-----------------|-----------------|------------------------|------------|-------------|
| 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              | 148 (35.6)          | 139 (33.2)      | 21 (5.0)        | 5 (1.2)                | 69 (16.5)  | 19 (4.5)    |
| Assisting orthodontic treatment      | 137 (35.6)          | 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. Dentists’ View of the Duties of Dental Hygienists in Oral and Maxillofacial Surgery

| Duty                                    | Beginners available | 3 years or more | 5 years or more | Possible in the future | Impossible | No response |
|-----------------------------------------|---------------------|-----------------|-----------------|------------------------|------------|-------------|
| 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 respondents 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[8,13]. Kim and Kim[6], in a survey of 214 dental hygienists, found that the most common duty was dental treatment assistance. Choi et al.[14] 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.[15] 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[16] 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
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Table 14. Dentists’ 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 prothesis                | 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. Dentists’ 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.3) 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.17) 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 stitch 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.18), 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 Han19) 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.17) 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).

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References

1. Cho YS: Comparison of curriculums of dental hygiene education programs for B. S degree. J Dent Hyg Sci 5: 251-258, 2005.
2. Cho YS, Lee SY: Developing a integrated curriculum for a clinical dental hygiene. J Dent Hyg Sci 5: 33-38, 2005.
3. Lee HJ, Shin SJ, Bae SM, Shin BM: A survey of dentists and dental hygienists on dental team composition and work assignments. J Korean Dent Hyg Sci 2: 51-62, 2019.
4. Gwon MY, Jung MH: Study of dental hygienist’s stress degree and adaptation method. J Dent Hyg Sci 4: 133-140, 2004.
5. Kim YS, Shin MW: A study on the current state and weight of dental hygienists’ works. J Korean Soc Dent Hyg 8: 161-175, 2008.
6. Kim JH, Kim HJ: Relationship between turnover and job stress of dental hygienists. J Dent Hyg Sci 11: 47-53, 2011.
7. Yoo EM, Han HJ: A study on the work and turnover of clinical dental hygienists. J Dent Hyg Sci 11: 41-46, 2011.
8. Park JH, Kim MS, Cho JW: Dentists’ opinions for dental hygienists’ roles in Korea. J Korean Acad Oral Health 34: 88-97, 2010.
9. Lim MH, Han SJ, Chung JY: A study on dentists’ awareness about dental hygienists’ works and duty division. J Korean Acad Dent Hyg 6: 71-86, 2004.
10. Lee SY, Yu BC: Relationship between occupational stress and work-related factors in dental hygienists. J Dent Hyg Sci 11: 553-562, 2011.
11. Park GE, Lee YM, Lee JG, Jeon HS: A survey on dental college students’ perception and understanding of dental hygienists. J Korean Soc Dent Hyg 15: 531-538, 2015.
12. Park JL, Kang KH, Kin SA, et al.: The 2nd job analysis of dental hygienists. Retrieved January 10, 2020, from https://md.kuksiwon.or.kr/last/selectLastDetail.do?MENU_ID=C-01-01&reportno=RE02-1204-15&sYear=12&sSsfc_code=12&sResearchindexcd=&researcherid=&sRsrchtasknm=&PAGE_NUM=1&PIN_PAGE=10&IS_PAGE_NEW_SEARCH=Y&TOTAL_PAGE=8(2012).
13. Luciak-Donsberger C: Origins and benefits of dental hygiene practice in Europe. Int J Dent Hyg 1: 29-42, 2003.
14. Choi HN, Bae HS, Cho YS: Effect of gap between expected job and performed job on turnover intention and job satisfaction in clinical dental hygienists. J Dent Hyg Sci 11: 463-469, 2011.

15. Kim EG, Lim SH, Kwon MY, Choi YY, Han JH: Analysis of tasks and education needs for dental hygienist for development of dental hygiene curriculum. J Dent Hyg Sci 14: 35-42, 2014.

16. Kwon JY, Lee SY: Relationship of between task performance, job satisfaction, and organizational contribution of dental hygienists. J Dent Hyg Sci 16: 302-309, 2016.

17. Han YK, Kim SH, Yang JY, Yu JS, Bae SM: A survey of dentists’ opinions on the performance of dental hygienists. J Korean Acad Dent Admin 7: 1-9, 2019.

18. Hwang SJ, Koong HS, Lee SH: Difference of perception of the duties of dental hygienist between dentists and dental hygiene students in an area. J Korean Acad Dent Admin 5: 1-12, 2017.

19. Hwang SJ, Han YK: Frequency and time of actual duties of some dental hygienists. J Korean Acad Dent Admin 7: 10-20, 2019.