The Subjective Musculoskeletal Symptoms of Dental Hygienists According to Their Treatment Posture

hyo jeong kim

Department of Dental Hygiene, Andong Science College, Andong, Korea

Objective: A self-administered questionnaire was conducted with three hundred dental hygienists. A total of three hundred questionnaire copy is collected. The copies with insincere answers or errors were excluded, and finally two hundred and 61 copies were used.

Methods: The collected data were analyzed with SPSS 12.0 (SPSS Inc., Chicago, IL, USA) program. The frequency and percentage of the study subjects' subjective pains of musculoskeletal symptoms were calculated according to the characteristics of their work conditions and their body regions related to work. In order to analyze relations between the subjective musculoskeletal symptom in the each one of body regions, and work conditions and treatment posture, Pearson's Correlation Analysis was conducted.

Results: 1) Regarding their daily treatment hours, those working 2 to 4 hours accounted for the highest rate (46.4%)-Their subjective musculoskeletal symptoms were found in the order of the shoulders (76.0%), the neck (75.2%), and the waist (71.1%). 2) Regarding the use of their hands for treatment, those using both hands accounted for 44.4%-Their subjective musculoskeletal symptoms were found in the order of the shoulders (76.7%), the neck (70.7%), the waist (64.7%), and the wrists (60.3%). Subjective musculoskeletal symptoms on the wrists were more found. 3) Regarding dental hygienists' operation position for treatment, those in the 9 o'clock position accounted for 63.6%-Their subjective musculoskeletal symptoms were found in the order of the shoulders (80.1%), the neck (75.9%), and the legs/feet (66.3%).

Conclusion: Most dental hygienist had the problem with waist and shoulder posture for direct treatment, and suffered subjective musculoskeletal symptoms mostly on the shoulders, the neck, and the waist in order.

Keywords: dental hygienists, musculoskeletal disorder, symptoms, pain

Introduction

With the enlargement and specialization of dentistry, the work conditions of dental hygienists have more been diversified, and thereby their work types have been expanded. Dental hygienists working in dental institutions or clinics are easily exposed to musculoskeletal disorders, considering their work conditions and treatment posture, and consequently more attention has been paid to them [1-3].

Corresponding author **hyo jeong kim**

E-mail: med8097@hotmail.com

<https://orcid.org/0000-0002-5407-2718>

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The purpose of this study is to find the work conditions and musculoskeletal disorders of dental hygienist working at dental hospitals or clinics, and to provide a fundamental research material for designing measures and preventive programs to resolve the problems [4-5].

Materials and Methods

1. Subjects

A self-administered questionnaire (from November 1, 2017 to May 30, 2018, from February 1, 2021 to Mar 31, 2021) was conducted with three hundred dental hygienists. A total of three hundred questionnaire copy is collected. The copies with insincere answers or errors were excluded, and finally two hundred and 61 copies were used.

2. Methods

The collected data were analyzed with SPSS 12.0 (SPSS Inc., Chicago, IL, USA) program. The frequency and percentage of the study subjects' subjective pains of musculoskeletal symptoms were calculated according to the characteristics of their work conditions and their body regions related to work.

In order to analyze relations between the subjective musculoskeletal symptom in the each one of body regions, and work conditions and treatment posture. Pearson's Correlation Analysis was conducted.

Results

1. General characteristics

Regarding a type of dental institution, 83.1% worked at dental clinics, 13.8% at dental hospitals, and 3.1% at dental university hospitals. Therefore, it was found that most of them worked at dental clinics. Regarding the body regions related to the subjective musculoskeletal pains of those working at dental clinics, 77.9% had subjective pains on the shoulders, 75.1% on the neck, and 68.7% on the waist.

Regarding a type of position, 68.2% were in the position of dental hygienist. Regarding the body regions related to their subjective musculoskeletal pains, 77.5% had subjective pains on the shoulders, 73.0% on the neck, and 63.5% on the legs [6].

Regarding service career, 72.4% worked for less than 5 years. Regarding the body regions related to the subjective musculoskeletal pains of those with a career of less than 2 years, 77.5% had subjective pains on the shoulders, 75.5% on the neck, and 74.5% on the waist. As for those with a career of 3 to 5 years, 78.9% subjective pains on the shoulders, 70.5% on the

waist, and 68.4% on the neck. As for those with a career of more than 5 years, 77.8% had subjective pains on the shoulders, 76.4% on the neck, and 61.1% on the waist. Therefore, the subjective pains on the shoulders according to their service career accounted for the highest percentage [7].

Regarding a type of work, 90.0% worked in treatment room, 44.4% in patient consultation room, and 30.2% in help desk. Regarding the body regions related to the subjective musculoskeletal pains of those working in treatment room, 79.1% had subjective pains on the shoulders, 73.6% on the neck, and 71.5% on the waist. As for those working in patient consultation room, 80.2% subjective pains on the shoulders, 72.4% on the neck, and 66.4% on the waist [8]. Table 1 shows the distribution made according to the study subject's general characteristics.

2. Characteristics of treatment

Regarding of dental hygienists' main medical subjects, 87.3% were involved in scaling, 78.5% in dental prosthetic treatment, 59.7% in oral surgery (implant and periodontal treatment, 50.9% in orthodontic treatment, 31.4% in oral health education, and 22.2% in prevention (sealant, etc.).

With regard to weekly scaling treatment, 49.0% performed the treatment 1 to 5 times, 32.1% 6 to 10 times, and 18.7% more than 11 times. Regarding the body regions related to the subjective musculoskeletal pains of those serving scaling 1 to 5 times, 78.9% had subjective pains on the shoulders, 71.1% on the neck, 73.8% on the waist, and 60.9% on the wrists. As for those serving scaling 6 to 10 times, 82.1% had subjective pains on the shoulders, 76.2% on the neck, and 73.8% on the waist. As for those serving scaling more than 11 times, 73.5% had subjective pains on the neck, 69.4% on the shoulders, and 69.4% on the waist [9].

Regarding the number of dental hygienists working in dental institutions, 38.3% had 4 to 6 dental hygienists, 24.9% had 1 to 3 dental hygienists, 15.7% had 7 to 9 dental hygienists, and 21% had more than 10 dental hygienists. Table 2 shows the distribution made according to the study subject's characteristics of treatment.

3. Characteristics of treatment posture

With regard to daily direct treatment hours, 14.9% had the treatment less than 2 hours, 46.4% 2 to 4 hours, 38.7% and more than 4 hours [10].

Regarding the body regions related to the subjective musculoskeletal symptoms of those who had the treatment less than 2 hours, 87.2% had subjective musculoskeletal symptoms on the shoulders, 66.7% on the neck, and 76.9% on the waist. As for those who had the treatment 2 to 4 hours, 76.0% had subjective musculoskeletal symptoms on the shoulders, 75.2% on

Table 1. General characteristics

	Variable	N	Eye	Neck	Shoulder	Arm/elbow	Hand	Wrist	Finger	Waist	Leg/foot
Type of dental institution	Dental clinics	217	89 (41.0)	163 (75.1)	169 (77.9)	70 (32.3)	80 (36.9)	140 (64.5)	75 (34.6)	149 (68.7)	130 (59.9)
	Dental hospitals	36	17 (47.2)	23 (63.9)	29 (80.6)	7 (19.4)	12 (33.3)	19 (52.8)	7 (19.4)	26 (72.2)	23 (63.9)
	Dental university hospitals	8	3 (37.5)	5 (62.5)	6 (75.0)	3 (37.5)	4 (50.0)	4 (50.0)	4 (50.0)	6 (75.0)	5 (62.5)
	p-value		0.759	0.292	0.915	0.277	0.675	0.307	0.118	0.857	0.897
Service career (yr)	≤2	94	38 (40.4)	71 (75.5)	73 (77.7)	30 (31.9)	40 (42.6)	61 (64.9)	36 (38.3)	70 (74.5)	63 (67.0)
	3-5	95	39 (41.1)	65 (68.4)	75 (78.9)	25 (26.3)	32 (33.7)	60 (63.2)	29 (30.5)	67 (70.5)	52 (54.7)
	≥5	72	32 (44.4)	55 (76.4)	56 (77.8)	25 (34.7)	24 (33.3)	42 (58.3)	21 (29.2)	44 (61.1)	43 (59.7)
	p-value		0.860	0.419	0.973	0.479	0.349	0.677	0.380	0.172	0.222
Type of work	Treatment room	235	101 (43.0)	173 (73.6)	186 (79.1)	73 (31.1)	89 (37.9)	150 (63.8)	80 (34.0)	168 (71.5)	146 (62.1)
	Desk	79	25 (31.6)	57 (72.2)	65 (82.3)	24 (30.4)	26 (32.9)	47 (59.5)	26 (32.9)	52 (65.8)	45 (57.0)
	Patient consultation room	116	42 (36.2)	84 (72.4)	93 (80.2)	35 (30.2)	37 (31.9)	64 (55.2)	34 (29.3)	77 (66.4)	64 (55.2)
	Clinic management	25	7 (28.0)	14 (56.0)	15 (60.0)	3 (12.0)	5 (20.0)	12 (48.0)	3 (12.0)	10 (40.0)	9 (36.0)

Values are presented as number (%).

Table 2. Characteristics of treatment

	Variable	N	Eye	Neck	Shoulder	Arm/elbow	Hand	Wrist	Finger	Waist	Leg/foot
Main medical subjects	Prosthetic	205	92 (84.4)	153 (80.5)	158 (77.8)	67 (84.8)	80 (84.2)	131 (80.9)	69 (81.2)	144 (80.0)	128 (81.5)
	Orthodontic	133	51 (46.8)	99 (52.1)	104 (51.2)	43 (54.4)	46 (48.4)	82 (50.6)	39 (45.9)	95 (52.8)	82 (52.2)
	Periodontal	172	78 (71.6)	129 (67.9)	128 (63.1)	57 (72.2)	69 (72.6)	112 (69.1)	60 (70.6)	123 (68.3)	109 (69.4)
	Oral surgery	156	64 (58.7)	118 (62.1)	115 (56.7)	51 (64.6)	63 (66.3)	102 (63.0)	54 (63.5)	110 (61.1)	97 (61.8)
	Scaling	228	96 (88.1)	168 (88.4)	179 (88.2)	70 (88.6)	84 (88.4)	150 (92.6)	76 (89.4)	162 (90.0)	137 (87.3)
	Sealant	58	29 (26.6)	44 (23.2)	46 (22.7)	21 (26.6)	28 (29.5)	41 (25.3)	23 (27.1)	43 (23.9)	40 (25.5)
	Preservation of oral health	82	33 (30.3)	56 (29.5)	68 (33.5)	26 (32.9)	33 (34.7)	56 (34.6)	38 (44.7)	55 (30.6)	52 (33.1)
Scaling (1 week)	etc.	5	2 (1.8)	3 (1.6)	5 (2.5)	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.2)	5 (2.8)	3 (1.9)
	1-5	128	58 (45.3)	91 (71.1)	101 (78.9)	43 (33.6)	49 (38.3)	78 (60.9)	41 (32.0)	85 (66.4)	82 (64.1)
	6-10	84	33 (39.3)	64 (76.2)	69 (82.1)	23 (27.4)	30 (35.7)	58 (69.0)	26 (31.0)	62 (73.8)	51 (60.7)
	≥11	49	18 (36.7)	36 (73.5)	34 (69.4)	14 (28.6)	17 (34.7)	27 (55.1)	19 (38.8)	34 (69.4)	25 (51.0)
Number of dental hygienist	p-value		0.500	0.714	0.220	0.593	0.880	0.245	0.621	0.520	0.283
	1-3	65	23 (35.4)	50 (76.9)	52 (80.0)	21 (32.3)	23 (35.4)	42 (64.6)	20 (30.8)	48 (73.8)	41 (63.1)
	4-6	100	52 (52.0)	80 (80.0)	79 (79.0)	30 (30.0)	37 (37.0)	68 (68.0)	37 (37.0)	74 (74.0)	62 (62.0)
	7-9	41	13 (31.7)	24 (58.5)	33 (80.5)	13 (31.7)	16 (39.0)	20 (48.8)	12 (29.3)	22 (53.7)	25 (61.0)
	≥10	55	21 (38.2)	37 (67.3)	40 (72.7)	16 (29.1)	20 (36.4)	33 (60.0)	17 (30.9)	37 (67.3)	30 (54.5)
	p-value		0.060	0.040	0.741	0.979	0.985	0.183	0.744	0.090	0.778

Values are presented as number (%).

the neck, and 71.1% on the waist. As for those who had the treatment more than 4 hours, 7.2% had subjective musculoskeletal symptoms on the shoulders, 73.3% on the neck, 67.3% on the wrists, and 64.4% on the waist.

Regarding the hand (s) used for treatment, 52.1% used the right hand, 3.5% used the left hand, and 44.4% used both hands. Regarding the body regions related to the subjective musculoskeletal symptoms of dental hygienists using their both hands for treatment, 76.7% had subjective musculoskeletal symptoms on the shoulders, 70.7% on the neck, 64.7% on the

waist, and 60.3% on the waist [10]. As for dental hygienists using the right hand for treatment, 79.4% had subjective musculoskeletal symptoms on the shoulders, 75.2% on the neck, 72.8% on the waist, and 64.7% on the legs/feet. The dental hygienists using one hand had more subjective musculoskeletal symptoms than those using both hands [10-11].

Regarding dental hygienists' operation position for treatment, those in the 6 o'clock position accounted for 5.7%, those in the 9 o'clock position for 63.6%, those in the 12 o'clock position for 26%, and others for 4.5%. Regarding the body regions re-

lated to the subjective musculoskeletal symptoms of those who had the 6 o'clock position, 73.3% had subjective musculoskeletal symptoms on the waist, and 66.7% on the neck, the shoulders, and the wrists. As for those who had the 9 o'clock position, 80.1% had subjective musculoskeletal symptoms on the shoulders, 75.9% on the neck, and 66.3% on the legs/feet. As for those who had the 12 o'clock position, 75.0% had subjective musculoskeletal symptoms on the shoulders, 67.6% on the neck, and 66.2% on the waist.

Regarding the question "do you bend down more than 15 degrees or twist your body in order for treatment?", 60.9% answered "Yes", 31.8% answered "Yes but not always", and 7.3% answered "No".

Regarding the body regions related to the subjective musculoskeletal symptoms of dental hygienists who answered "Yes", 79.9% had subjective musculoskeletal symptoms on the shoulders, 78% on the neck, and 66% on the wrists.

Regarding the question "do you turn your waist, or bend over in order for treatment?", 56.3% answered "Yes", 29.5% answered

"Yes, but not much", and 14.2% answered "No".

Regarding the body regions related to the subjective musculoskeletal symptoms of dental hygienists who turned the waist or bent over for treatment, 79.6% had subjective musculoskeletal symptoms on the shoulders, 78.9% on the neck, 74.8% on the waist, and 66% on the wrists.

Regarding the question "do you sit on the edge of a chair for treatment, in terms of the hip posture?", 37.9% answered "Yes", 29.5% answered "Yes, but not much", and 32.6% answered "No".

Regarding the body regions related to the subjective musculoskeletal symptoms of dental hygienists who answered "Yes", 80.8% had subjective musculoskeletal symptoms on the shoulders, 76.8% on the neck, 72.7% on the waist, and 62.6% on the wrists.

Regarding the question "do you have break time between patients?", 13% answered "Yes", 29% answered "Yes, but for a moment", and 57.5% answered "No".

Regarding the body regions related to the subjective musculoskeletal symptoms of dental hygienists whose break time

Table 3. Characteristics of treatment posture

Variable	N	Eye	Neck	Shoulder	Arm/elbow	Hand	Wrist	Finger	Waist	Leg/foot
Treatment hour										
≤2	39	22 (56.4)	26 (66.7)	34 (87.2)	12 (30.8)	12 (30.8)	25 (64.1)	17 (43.6)	30 (76.9)	17 (43.6)
2-4	121	47 (38.8)	91 (75.2)	92 (76.0)	37 (30.6)	42 (34.7)	70 (57.9)	36 (29.8)	86 (71.1)	81 (66.9)
≥4	101	40 (39.6)	74 (73.3)	78 (77.2)	31 (30.7)	42 (41.6)	68 (67.3)	33 (32.7)	65 (64.4)	60 (59.4)
p-value		0.131	0.578	0.328	1.000	0.400	0.339	0.278	0.300	0.033
The hand(s) used										
Right	136	59 (43.4)	103 (75.7)	108 (79.4)	35 (25.7)	45 (33.1)	86 (63.2)	40 (29.4)	99 (72.8)	88 (64.7)
Left	9	3 (33.3)	6 (66.7)	7 (77.8)	5 (55.6)	5 (55.6)	7 (77.8)	5 (55.6)	7 (77.8)	7 (77.8)
Both	116	47 (40.5)	82 (70.7)	89 (76.7)	40 (34.5)	46 (39.7)	70 (60.3)	41 (35.3)	75 (64.7)	63 (54.3)
p-value		0.785	0.602	0.876	0.083	0.276	0.561	0.207	0.323	0.136
Operation position										
6 o'clock	15	7 (46.7)	10 (66.7)	10 (66.7)	4 (26.7)	5 (33.3)	10 (66.7)	3 (20.0)	11 (73.3)	7 (46.7)
9 o'clock	166	71 (42.8)	126 (75.9)	133 (80.1)	54 (32.5)	65 (39.2)	107 (64.5)	56 (33.7)	117 (70.5)	110 (66.3)
12 o'clock	68	24 (35.3)	46 (67.6)	51 (75.0)	18 (26.5)	21 (30.9)	38 (55.9)	23 (33.8)	45 (66.2)	34 (50.0)
etc.	12	7 (58.3)	9 (75.0)	10 (83.3)	4 (33.3)	5 (41.7)	8 (66.7)	4 (33.3)	8 (66.7)	7 (58.3)
p-value		0.433	0.566	0.548	0.804	0.655	0.628	0.751	0.902	0.083
Body in order										
Agree	159	69 (43.4)	124 (78.0)	127 (79.9)	55 (34.6)	65 (40.9)	105 (66.0)	59 (37.1)	116 (73.0)	101 (63.5)
Neutral	83	33 (39.8)	56 (67.5)	63 (75.9)	24 (28.9)	27 (32.5)	50 (60.2)	21 (25.3)	55 (66.3)	48 (57.8)
Disagree	19	7 (36.8)	11 (57.9)	14 (73.7)	1 (5.3)	4 (21.1)	8 (42.1)	6 (31.6)	10 (52.6)	9 (47.4)
p-value		0.779	0.064	0.689	0.030	0.148	0.111	0.177	0.146	0.328
Waist posture										
Agree	147	60 (40.8)	116 (78.9)	117 (79.6)	48 (32.7)	57 (38.8)	97 (66.0)	50 (34.0)	110 (74.8)	91 (61.9)
Neutral	77	32 (41.6)	50 (64.9)	59 (76.6)	25 (32.5)	28 (36.4)	44 (57.1)	24 (31.2)	49 (63.6)	48 (62.3)
Disagree	37	17 (45.9)	25 (67.6)	28 (75.7)	7 (18.9)	11 (29.7)	22 (59.5)	12 (32.4)	22 (59.5)	19 (51.4)
p-value		0.851	0.057	0.812	0.248	0.592	0.397	0.909	0.084	0.466
Hip posture										
Agree	99	42 (42.4)	76 (76.8)	80 (80.8)	28 (28.3)	35 (35.4)	62 (62.6)	30 (30.3)	72 (72.7)	56 (56.6)
Neutral	77	32 (41.6)	51 (66.2)	58 (75.3)	28 (36.4)	32 (41.6)	43 (55.8)	24 (31.2)	51 (66.2)	48 (62.3)
Disagree	85	35 (41.2)	64 (75.3)	66 (77.6)	24 (28.2)	29 (34.1)	58 (68.2)	32 (37.6)	58 (68.2)	54 (63.5)
p-value		0.985	0.255	0.676	0.432	0.576	0.266	0.529	0.627	0.584
Break time										
Agree	34	13 (38.2)	23 (67.6)	24 (70.6)	10 (29.4)	12 (35.3)	19 (55.9)	15 (44.1)	20 (58.8)	18 (52.9)
Neutral	77	31 (40.3)	55 (71.4)	62 (80.5)	23 (29.9)	29 (37.7)	51 (66.2)	25 (32.5)	53 (68.8)	42 (54.5)
Disagree	150	65 (43.3)	113 (75.3)	118 (78.7)	47 (31.3)	55 (36.7)	93 (62.0)	46 (30.7)	108 (72.0)	98 (65.3)
p-value		0.820	0.605	0.493	0.961	0.971	0.575	0.320	0.320	0.181

Values are presented as number (%).

was short, 78.7% had subjective musculoskeletal symptoms on the shoulders, 75.3% on the neck, 72% on the waist, and 65.3% on the legs/feet [1]. Table 3 shows the distribution made according to the study subject's characteristics of treatment posture.

Discussion

This study analyzed the general treatment characteristics of dental hygienists working in dental clinical settings, the characteristics of their treatment conditions, and their posture for treatment. The analyzed results are as follows:

Regarding the characteristics of the dental institutions, they work for, most of them (83.1%) worked at dental clinics. Regarding the body regions related to the subjective musculoskeletal symptoms of the dental hygienists working at dental clinics, 77.9% had subjective musculoskeletal symptoms on the shoulders, 75.1% on the neck, and 68.2% on the waist. As for those working at dental hospitals, 80.6% had subjective musculoskeletal symptoms on the shoulders, 72.2% on the waist, and 63.9% on the neck.

Regarding service career, dental hygienists with a career of 5 years accounted for 72.4%. Among those with a career of less than 2 years, 77.7% had subjective musculoskeletal symptoms on the shoulders, 75.5% on the neck, and 74.5% on the waist. Among those with a career of 3 to 5 years, 78.9% had subjective musculoskeletal symptoms on the shoulders, 70.5% on the waist, and 68.4% on the neck. They had more subjective musculoskeletal pains on the waist, than on the neck.

Regarding of a type of work, 90.0% worked in treatment room. Among them, 79.1% had subjective musculoskeletal symptoms on the shoulders, 73.6% on the neck, and 71.5% on the waist.

Their treatment conditions were analyzed. Regarding their medical subjects in which they are directly involved for treatment, 87.3% were involved in scaling, 78.5% in dental prosthetic treatment, and 65.9% in periodontal treatment. Sealant (22.2%) as preventive treatment was relatively low. Regarding the treatment subjects directly involved in, scaling (87.3%) accounted for the highest rate. Regarding the body regions related to their subjective musculoskeletal symptoms, 92.6% had subjective musculoskeletal symptoms on the wrists, 90.0% on the waist, 89.4% on the fingers, 88.6% on the arms/elbows, 88.4% on the hands, 88.4% on the neck, 88.2% on the shoulders, 88.1% in the eyes, and 87.3% on the legs/feet. Subjective musculoskeletal symptoms were found in all body regions.

Regarding the count of weekly scaling, 49.0% performed scaling 1 to 5 times, 32.1% performed scaling 6 to 10 times, and 18.8% performed scaling more than 11 times.

In case of the groups of dental hygienists who performed scaling 1 to 5 times, and 6 to 10 times, their subjective muscu-

loskeletal symptoms were most found in the order of the shoulders, the neck, and the waist. In case of the group of those who performed scaling more than 11 times, subjective musculoskeletal symptoms were found in the order of the neck, the shoulders, and the waist. In short, subjective musculoskeletal symptoms on the neck were more found.

Milerad et al. [12] reported that dental hygienists' chronic musculoskeletal disorders were related to their repeated dental work.

Regarding their daily treatment hours, those working 2 to 4 hours accounted for the highest rate (46.4%), and their subjective musculoskeletal symptoms were found in the order of the shoulders (76.0%), the neck (75.2%), and the waist (71.1%).

Regarding the use of their hands for treatment, those using both hands accounted for 44.4%, and their subjective musculoskeletal symptoms were found in the order of the shoulders (76.7%), the neck (70.7%), and the waist (64.7%), and the wrists (60.3%). Subjective musculoskeletal symptoms on the wrists were more found.

Regarding dental hygienists' operation position for treatment, those in the 9 o'clock position accounted for 63.6%, and their subjective musculoskeletal symptoms were found in the order of the shoulders (80.1%), the neck (75.9%), and the legs/feet (66.3%).

Regarding the posture for treatment, 60.9% answered that they bent over more than 15 degrees or twisted their body. As a result, it was found that dental hygienists had the problem with posture for treatment [13].

Milerad et al. [12] reported that turning one's head in one side or lowering one's head over 20 degrees during oral treatment was the main cause of the muscle stress around the neck and waist. Regarding their waist posture for treatment, 56.3% answered that they bent over or turned their waist. As a result, it was found that dental hygienists had the problem with waist posture for treatment.

Regarding their hip posture for treatment, 37.9% answered that they sit on the edge of a chair. Dental hygienists had relatively correct hip posture more than waist posture but had the problem with other kinds of posture.

Most dental hygienist had the problem with waist and shoulder posture for direct treatment, and suffered subjective musculoskeletal symptoms mostly on the shoulders, the neck, and the waist in order.

Conclusion

1. General characteristics

1) Regarding the characteristics of the dental institutions, they

work for, most of them (83.1%) worked at dental clinics-77.9% had subjective musculoskeletal symptoms on the shoulders, 75.1% on the neck, and 68.2% on the waist. As for those working at dental hospitals, 80.6% had subjective musculoskeletal symptoms on the shoulders, 72.2% on the waist, and 63.9% on the neck.

2) Regarding of a type of work, 90% worked in treatment room-79.1% had subjective musculoskeletal symptoms on the shoulders, 73.6% on the neck, and 71.5% on the waist.

3) Regarding service career dental hygienists with a career of less than 2 years, 77.7% had subjective musculoskeletal symptoms on the shoulders, 75.5% on the neck, and 74.5% on the waist. Among those with a career of 3 to 5 years, 78.9% had subjective musculoskeletal symptoms on the shoulders, 70.5% on the waist, and 68.4% on the neck. They had more subjective musculoskeletal pains on the waist, than on the neck.

2. Characteristics of treatment

Regarding the count of weekly scaling, 49.0% performed scaling 1 to 5 times, 32.1% performed scaling 6 to 10 times, and 18.8% performed scaling more than 11 times.

In case of the group of those who performed scaling more than 11 times, subjective musculoskeletal symptoms were found in the order of the neck, the shoulders, and the waist. In short, subjective musculoskeletal symptoms on the neck were more found.

3. Characteristics of treatment posture

1) Regarding their daily treatment hours, those working 2 to 4 hours accounted for the highest rate (46.4%)-Their subjective musculoskeletal symptoms were found in the order of the shoulders (76.0%), the neck (75.2%), and the waist (71.1%).

2) Regarding the use of their hands for treatment, those using both hands accounted for 44.4%-Their subjective musculoskeletal symptoms were found in the order of the shoulders (76.7%), the neck (70.7%), and the waist (64.7%), and the wrists (60.3%). Subjective musculoskeletal symptoms on the wrists were more found.

3) Regarding dental hygienists' operation position for treatment, those in the 9 o'clock position accounted for 63.6%-Their subjective musculoskeletal symptoms were found in the order of the shoulders (80.1%), the neck (75.9%), and the legs/feet (66.3%).

4) Regarding the posture for treatment, 60.9% answered that they bent over more than 15 degrees or twisted their body.

5) Regarding their waist posture for treatment, 56.3% answered that they bent over or turned their waist.

6) Regarding their hip posture for treatment, 37.9% answered that they sit on the edge of a chair.

Dental hygienists had relatively correct hip posture more than waist posture but had the problem with other kinds of posture.

Conflict of Interest

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

ORCID

hyo jeong kim, <https://orcid.org/0000-0002-5407-2718>

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