



R Muroga  
J Tsuruta  
I Morio

**Authors' affiliations:**

R Muroga and I Morio, Dental Education  
Development Section, Graduate School of  
Medical and Dental Sciences, Tokyo  
Medical and Dental University,  
Bunkyo-ku, Japan

J Tsuruta, Center for Interprofessional  
Education, Tokyo Medical and Dental  
University, Bunkyo-ku, Japan

**Correspondence to:**

Rei Muroga

Dental Education Development Section  
Graduate School of Medical and Dental  
Sciences

Tokyo Medical and Dental University  
1-5-45, Yushima  
Bunkyo-ku

Tokyo 113-8549, Japan

Tel./Fax: +81 3 5803 4558

E-mail: murogare@gmail.com

This article was published online on 22  
August 2014. An error in Analytical  
method, Table 2 and Result section was  
subsequently identified. This notice is  
included in the online and print versions to  
indicate that both have been corrected 27  
October 2014

## Disparity in perception of the working condition of dental hygienists between dentists and dental hygiene students in Japan

**Abstract:** *Objectives:* In Japan, there continues to be a shortage of active dental hygienists. The scope of dental hygienists' practice is also considered to be unclear. One of the reasons for this is that dental hygienists find the working conditions during dental hygiene education different from those in reality. The purpose of this study was to clarify the actual working condition of dental hygienists in dental clinics, as well as evaluate the awareness of dental hygiene students and dentists regarding the working condition of dental hygienists.

*Methods:* Questionnaires were sent by post to 481 dentists and were distributed to 89 dental hygiene students. The awareness about the working condition of dental hygienists was compared between dentists and dental hygiene students. *Results:* Two hundred twenty-two dentists and 89 dental hygiene students responded to questionnaires. Dental hygiene students considered the team of 'dental hygienist, dental technician and clerk' to be more effective in providing dental care than dentists ( $P < 0.001$ ). Among the dentists, 37.1% did not find any clear distinction between hygienists and assistants in their clinics. However, 97.4% of dental hygiene students answered that dental team members should clearly inform patients of the distinction between hygienists and assistants. *Conclusions:* This study indicated that there was disparity between dentists' and dental hygiene students' perception of dental hygienists' working conditions, and dental team work was not always effective. For training high quality dental hygienists, all educational institutions related to dentistry must educate students regarding the more realistic dental hygienists' working condition, as well as benefits.

**Key words:** certified dental hygienist; dental hygiene education; dental team work; four-handed dentistry; the scope of dental hygienists' practice; working environment

**Dates:**

Accepted 28 July 2014

**To cite this article:**

*Int J Dent* 13, 2015; 213–221

DOI: 10.1111/idh.12105

Muroga R, Tsuruta J, Morio I. Disparity in  
perception of the working condition of dental  
hygienists between dentists and dental hygiene  
students in Japan.

© 2014 John Wiley & Sons A/S. Published by  
John Wiley & Sons Ltd

## Introduction

In 2010, the duration of dental hygiene education was extended from two years to three or four years in Japan. One reason was the requirement to extend community dental healthcare service to the Japanese super aged society. Actually, dental hygienists play an important role especially in preventing respiratory infections of elderly persons (1). As a result, a wider range of service are now performed by dental hygienists (2, 3). With the extension of the educational duration, more emphasis has been given to topics concerning rehabilitation, communication and systemic

illness, competencies of assessing holistic health, cooperation with other professionals and problem solving in the dental hygiene curriculum (4, 5).

In Japan, dentists, dental hygienists and dental technicians obtain a national license to work in the dental profession. Dental assistants and dental clerks (6–8) also have a license, but they do not have a national qualification to work. In a previous study, most non-healthcare undergraduate students could not distinguish between dental hygienists and dental assistants (9). There is difficulty in understanding the standards for each dental care provider, because the range of services performed by each dental team member differs from clinic to clinic. For the well-being of patients, it is essential that dental professionals be aware of the standards and know how to cooperate with other members of the dental team (10). It is also important for dental team members to promote comprehensive health care with other health care professionals, as stipulated in 'The Dental and Oral Health Promotion Law' 2011 (11). Furthermore, in 2010 the World Health Organization (WHO) recognized that collaborative practice strengthens health systems and improves health outcomes, and providing inter-professional education is required to achieve these outcomes (12).

There has been an increase in the number of applicants and enrolment of dental hygiene schools since 2009, but 47.0% of dental hygiene schools were still under-enrolled in 2011 (13). The ratio of dental hygienist job opportunities to applicants' ratio was high (13), so there continues to be a chronic shortage of active dental hygienists. Therefore, well-trained dental hygienists are essential to make the image of dental hygienists more attractive.

The employment rate of dental hygienists in Japan is very low (14). The reasons for resignation were not only 'marriage, childbirth, childcare' but also 'interest in other fields than dentistry' (15). In particular, the main problems encountered at work were 'lack of ability, scope of practice, overwork, low wage, anxiety about employment' (15). For those reasons, the number of registered dental hygienists was 234 719 as of March 2010 (16), but the number of active dental hygienists was only 103 180 (including part-time workers) as of December 2010 (17) (Table 1).

**Table 1. Number of dental team members in Japan**

	Registered	Active	Schools
Dentists	171 415	100 442	29
Dental hygienists	234 719	103 180	155
Dental technicians	112 404	35 413	53
Dental assistants	–	83 168.3*	–
Dental clerks	–	26 760.1*	–

\*Number of active dental assistants and dental clerks denoted as converted full-time workers.

(Sources: Ministry of Health, Labour and Welfare. Telephone inquiry (July 2012). Japan Dental Foundation of Dental Promotion. Telephone inquiry (July 2013). Japan Dental Hygienists' Association. URL: <http://www.jdha.or.jp> Japan Dental Technologists' Association. URL: <http://www.nichigi.or.jp>).

According to the Dental hygienist Law in Japan, a dental hygienist is described as a person who has been licensed by the Ministry of Health and Welfare to practice procedures for prevention of dental and oral diseases under instructions that are given by a dentist. Additional items included were 'assisting a dentist in treating the patient' in 1955, and 'providing oral health education with authority as a dental hygienist' in 1989 (18). However, details of dental hygienists' scope of practice have not been described in the Law, such as whether can they administer local anaesthesia. Moreover, dentists do not have sufficient understanding of the scope of dental hygienists' practice. The Japanese Association for Dental Science reported that the scope of dental hygienists' practice was not clearly distinguished from that of dental assisting (19). In Japan, 'dental assisting' includes not only assisting in a dental practice but also performing certain dental treatment under the supervision of a dentist (20). This is an important issue to be addressed to establish a higher degree of professionalism for dental hygienists.

As stated above, we postulate that there is disparity between the image dental hygiene students have of dental hygienists and the real working condition and scope of practice of dental hygienists. In educational settings, dental hygiene schools strictly adhere to textbooks and laws. However, in clinical settings, the scope of dental hygienists' practice depends on the dentist who hired them.

The aims of this study were to clarify the actual working conditions at private dental clinics and the differences between dentists and dental hygiene students in the awareness of dental hygienists' working conditions, and to discuss education concerning dental team collaboration and inter-professional education in dental schools and dental hygiene schools. Needless to say, the working condition of dental hygienists and recognition gaps of dental hygienists are complex problems; however, this article focused on the responsibility of educational institutions.

## Study population and methodology

### Participants

Participants comprised 481 dentists and 89 dental hygiene students (1st-year: 26, 2nd-year: 26, 3rd-year: 37). The dentists had a board membership of the Tokyo Dental Association and their names and addresses were obtained from a board member. The participants in the dentists' group were limited to managers of a dental clinic, including general practitioners and specialists. All the dental hygiene students were students of a Dental Hygienist School affiliated with the Tokyo Dental Association. These students were expected to work at the association members' dental clinics after graduation. The survey was conducted from March to April 2011.

Questionnaires were sent to dentists who consented to participate and return the completed questionnaires. Follow-up posts were not sent. For the dental hygiene students, questionnaires were distributed in classrooms to those who consented to return the questionnaires. Ethical approval for

this project was granted by the Ethics Committee of Tokyo Medical and Dental University (No.625).

### Questionnaire items

The questionnaire for dentists was mainly regarding the real working conditions and the scope of practice of dental hygienists in their clinics. The questionnaire for dental hygiene students was mainly regarding the image and expectation of dental hygienists, and it was intended for students of all years in order to identify differences between academic years.

To understand the disparity between the clinical setting and an educational setting, the dentists were asked about the real work environment in their dental clinics, and dental hygiene students were asked about their expected image of dental hygienists' practice after graduation. The following information was collected.

- 1 Participants' demographics
- 2 Dental team members in a dental clinic (In this study, dental clerk means a person at the reception desk and their main duty consisted of accounting and paperwork. They are also called a receptionist or a secretary.)
- 3 Correlation between the number of each dental team member in a dental clinic and the basic requirements in a dental clinic (question for only dentists)
- 4 Scope of dental practice provided by each dental team member
- 5 Dental chairs for dental hygiene care (This means dental chairs which are allotted specifically for dental hygienists' care. Dental hygienists accept an appointment separately from dentists.)
- 6 Employment duration of dental hygienists
- 7 Dental hygienists returning to work after maternity leave and childcare leave
- 8 Reasons for not employing dental hygienists (question for only dentists)
- 9 Distinction between dental hygienists and dental assistants
- 10 Salary and standard of living of dental hygienists
- 11 Certified dental hygienists (Certified dental hygienists are designated by various associations not by the Japanese Government for supporting dental hygienists wanting to advance their careers.)
- 12 Four-handed dentistry

### Analytical method

The results of dentists' characteristics were analysed by simple tabulation. Other results were implemented mainly by comparing dentists' answers with those of dental hygiene students, to clarify the disparity about working condition and the scope of practice of dental hygienists between clinical settings and educational settings.

The results were expressed in percentages of respondents for each question and were analyzed using Microsoft Excel 2010, IBM SPSS® Ver19.0 (IBM Corp., New Orchard Road, Armonk, New York).

Differences in each dental team members' duty, professional role at the reception desk, dental chairs for dental hygienists' care and each component of four-handed dentistry between dentists and dental hygiene students or between dental hygiene students of different academic years were analysed with Chi-square test. Differences in salary of a dental hygienist or dental assistant as recorded by dentists and dental hygiene students were analyzed with Mann-Whitney *U*-test. Correlations between the number of each dental team member in a dental clinic and the basic requirements in a dental clinic were analyzed with Spearman rank-correlation coefficient.

Significance probability was shown as *P*. Statistical significance was set at  $P < 0.05$ .

## Results

### Participants' demographics

#### Characteristics of dentists

The response rates were 46.2% ( $n = 222$ ) for dentists. The number of years of experience as a dentist was  $32 \pm 8.4$  years (mean  $\pm$  SD). The number of years of experience as the manager of a dental clinic was  $26 \pm 10.2$  years (mean  $\pm$  SD).

The dental clinics practiced 'only general dentistry' (38.7%), 'general dentistry and pediatric dentistry' (15.8%), 'general dentistry, pediatric dentistry and dental surgery' (15.8%), and 'only orthodontic dentistry' (2.3%).

#### Characteristics of dental hygiene students

The response rates were 100% ( $n = 89$ ) among dental hygiene students (1st-year: 26, 2nd-year: 26, 3rd-year: 37). Most of the dental hygiene students directly entered dental hygienist school after high school graduation. Some students graduated from university and some students had worked full-time or part-time.

### Dental team members in a dental clinic

Figure 1 shows which dental team members are necessary for efficient dental care in a dental clinic. Dentists answered what kinds of dental team members were employed in their clinics as full-time worker (multiple answers allowed). Dental hygiene students answered which dental team members they deemed necessary in dental clinics (multiple answers allowed).

The necessities of 'dental hygienist, dental technician, dental clerk' were significantly different between two groups, with the dental hygiene students showing a higher tendency ( $P < 0.001$ ). However, there were no significant differences between the two groups in the necessity of 'a dental assistant' ( $P = 0.897$ ).

Concerning the differences among dental hygiene students in different academic years, the 3rd-year students indicated a lower necessity of 'a dental assistant' than 1st-year students ( $P = 0.004$ ) and 2nd-year students ( $P = 0.01$ ). There were no

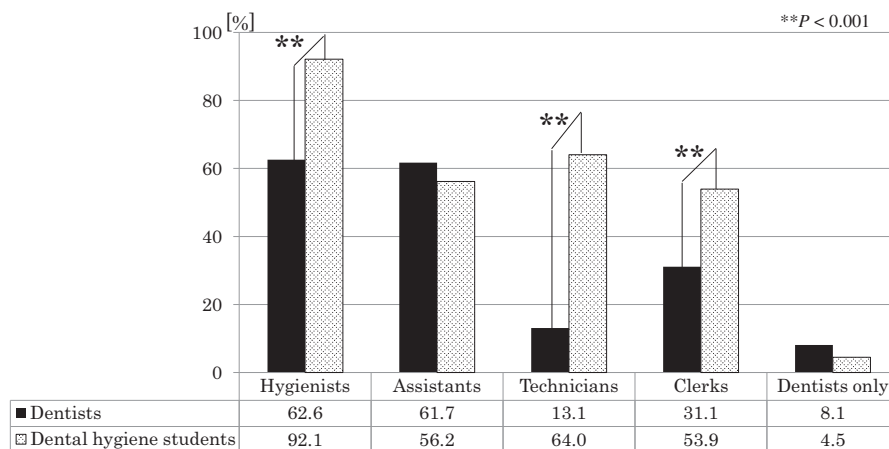


Fig. 1. Necessity of each dental team member in a dental clinic.

Dentists ( $n = 222$ ), Dental hygiene students ( $n = 89$ )

significant differences in the necessities of other dental team members.

#### Correlation between the number of each dental team member in a dental clinic and the basic requirements in a dental clinic

##### Number of patients per day

The mean number of outpatients per day was  $23.8 \pm 12.0$ . The number of patients was positively correlated to the number of dentists ( $r_s = 0.39$ ,  $P < 0.001$ ) and dental hygienists ( $r_s = 0.48$ ,  $P < 0.001$ ). However, the correlation was weakly positive to the number of dental assistants ( $r_s = 0.20$ ,  $P = 0.004$ ) and that of clerks ( $r_s = 0.22$ ,  $P = 0.001$ ). (Table 2).

##### Number of dental chairs

The mean number of dental chairs was  $3.3 \pm 1.5$  chairs. The number of dental chairs was positively correlated to the number of dentists ( $r_s = 0.39$ ,  $P < 0.001$ ) and dental hygienists ( $r_s = 0.54$ ,  $P < 0.001$ ). The correlation was weakly positive to the number of dental assistants ( $r_s = 0.15$ ,  $P = 0.025$ ) and clerks ( $r_s = 0.20$ ,  $P = 0.003$ ).

##### Percentage of dental care uncovered by the medical insurance system

Most of the dentists were licensed to provide treatment covered by the medical insurance system.

The mean percentage of dental care covered by medical insurance system was  $76.8 \pm 19.7\%$ . The percentage of uncovered medical insurance system care was weakly positively correlated to the number of dental hygienists ( $r_s = 0.22$ ,  $P = 0.001$ ). The correlation to the number of dental assistants was weakly negative ( $r_s = -0.14$ ,  $P = 0.048$ ).

##### Treatment time per patient (in case of medical insurance care)

The mean treatment time per patient was  $24.9 \pm 8.3$  min. The treatment time was weakly positively correlated to the number of dental hygienists ( $r_s = 0.17$ ,  $P = 0.015$ ). The correlation to the number of dental assistants was weakly negative ( $r_s = -0.26$ ,  $P < 0.001$ ).

##### Scope of practice of each dental team member

Participants answered which professional assumed a role at the reception desk (single answered); 24.8% of dentists and 19.1% of dental hygiene students answered 'dental hygienist', and 6.5% of dentists and 30.3% of dental hygiene students answered 'dental assistant', whereas 32.4% of dentists and 44.9% of dental hygiene students responded 'clerk'. There were no significant differences between dentists and dental hygiene students ( $P = 0.115$ ). The comparison among dental hygiene students in different academic years showed that 60.0% of 1st-year students answered 'dental assistants', whereas 41.7% of 2nd-year students and 71.4% of 3rd-year students answered 'clerks'. There were significant differences between

Table 2. Correlation between the number of each dental team member in a dental clinic and dental clinic's basic requirements

	Number of patients		Number of dental chairs		Percentage of uninsured care		Treatment time per patient	
	Correlation coefficient	P-value	Correlation coefficient	P-value	Correlation coefficient	P-value	Correlation coefficient	P-value
Dentists	0.39	<0.001	0.39	<0.001	0.01	0.946	0.09	0.211
Hygienists	0.48	<0.001	0.54	<0.001	0.22	0.001	0.17	0.015
Assistants	0.20	0.004	0.15	0.025	-0.14	0.048	-0.26	<0.001
Clerks	0.22	0.001	0.20	0.003	0.07	0.348	-0.05	0.454

3rd-year students and 1st-year students ( $P < 0.001$ ), and between 3rd-year students and 2nd-year students ( $P = 0.018$ ).

Figure 2 shows the main work performed by each dental team member in a dental clinic (multiple answers allowed). The scope of practice of each dental team member was compared. Some teams composed of dentists, dental hygienists and clerks appropriately divided their duties, but mostly, each dental team member took an overlapping role; in particular, dental assistants' work overlapped with that of dental hygienists and clerks. Similarly, Fig. 3 shows dental hygiene students' awareness of each dental team member's work description in the team composed of dental hygienists, dental assistants and clerks (multiple answers allowed). Dental hygiene students' perception resembled the dentists' answer in this item.

### Dental chairs for dental hygienists' care

The number of dentists who employed dental hygienists was 158 (71.2%). In dental clinics which employed dental hygienists, 20.5% of them allotted dental chairs for dental hygienists' care. Among the dental hygiene students, 80.5% answered that dental chairs for dental hygienists' care were necessary. There was a significant difference ( $P < 0.001$ ).

In case there were dental chairs for dental hygienists' care, the mean number of the chairs was  $1.46 \pm 0.86$ . The dental treatment provided at the chair was scaling and tooth brushing instructions in both groups. The dentists allotted dental chairs for dental hygienists' care because patients needed professional care of dental hygienists. When no dental chairs were allotted for dental hygienists' care, dentists answered that 'dental chairs were always empty' or 'dentists provided all care'.

Dental hygiene students responded 'motivation of preventive care for patients by providing divided care and treatment spaces', 'convenience of appointment and preparing instruments' and 'concentration on dental hygienists' work' as rea-

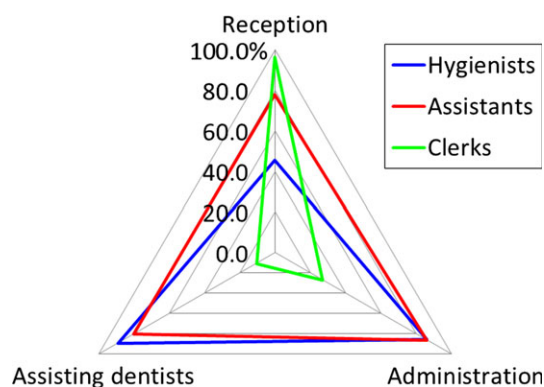


Fig. 2. Main work description of each member in a dental clinic. Reception: accounting, making appointments, telephone correspondence. Administration: supply and management of inventory, equipment cleaning. Assisting dentists: preparation for treatment, suction, cement mixing.

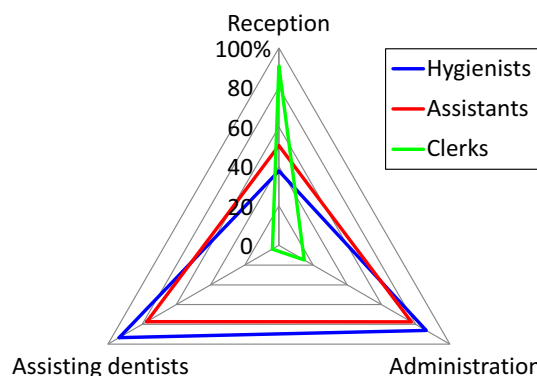


Fig. 3. Dental hygiene students' awareness of main work description of each dental team member Reception: accounting, making appointments, telephone correspondence. Administration: supply and management of inventory, equipment cleaning. Assisting dentists: preparation for treatment, suction, cement mixing.

sons for the necessity of dental chairs for dental hygienists' care. There were no differences among dental hygiene students in different academic years.

### Employment length

In the dental clinics where dental hygienists were employed, 40.8% of dentists expected a dental hygienist to work as long as possible in their dental clinic, as shown in Fig. 4. Nevertheless, 47.4% of dentists who employed dental hygienists expected dental hygienists to work for 3–10 years. The longest duration of employment of a dental hygienist in their dental clinic was  $9.7 \pm 6.9$  years.

Dental hygiene students answered that they hoped to continue working for life (77.5%). However, 67.4% of them answered that they expected to work at their first workplace for 1–5 years (Fig. 5).

In addition, 90.7% of dental hygiene students hoped to work full-time after graduation. However, 42.5% of them hoped to work part-time 15 years from graduation. Eighty-six percent of dental hygiene students expected to work at general dental clinics after graduation. After 15 years, 55.6% of them expected

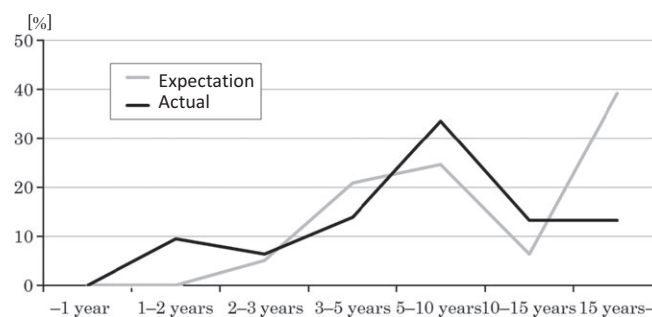


Fig. 4. Employment duration of dental hygienists. ( $n = 158$ ). Expectation: How long dentists expected dental hygienists to continue working in their clinics. Actual: How long the longest serving dental hygienist has worked in their clinics.



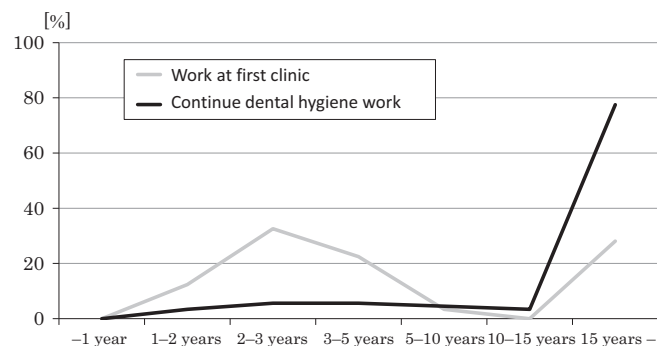


Fig. 5. How long dental hygiene students hoped to continue their work. ( $n = 89$ ).

to work at a general dental clinic, while others mentioned different workplaces, such as orthodontic dental clinics (12.3%), the public sector (7.4%) and leaving dental hygiene (8.6%).

In the same way, some dental hygiene students answered that they hoped to get another license to change their career in the future, such as a dentist, nutritionist, kindergarten teacher, care worker, long-term care support specialist or concerning beauty care.

#### Returning to work as a dental hygienist after maternity leave and childcare leave

In the dental clinics where dental hygienists were employed, dentists answered that dental hygienists hoped to return to their former post after maternity leave and child care leave (87.6%). Dental hygiene students answered that they hoped to return after maternity leave and childcare leave (96.6%), but 80.9% of them felt some inhibitions about resuming work after leaving their position.

#### Reasons for not employing dental hygienists

The most frequent responses from dentists who did not employ dental hygienists in their clinics (multiple answers allowed) were 'I can manage without dental hygienists' (50.8%), 'dental assistants are enough' (49.2%) and 'dental hygienists' salary is too high' (46.0%).

#### Distinction between dental hygienists and dental assistants

In dental clinics which employed dental hygienists ( $n = 158$ ), 62.9% of them made clear distinctions between dental hygienists and dental assistants, such as 'dental team members wore nameplates indicating their licensed qualification' (27.0%), 'dental team members introduced themselves with their license' (25.2%) and 'We didn't work with a dental assistant' (23.3%). However, in 37.1%, no clear distinction between dental hygienists and dental assistants seemed to be established.

Also, 97.4% of dental hygiene students answered that dental team members should clearly indicate the distinction between dental hygienists and dental assistants to the patient. For

example, 'dental team members should wear nameplates with their license' (91.8%), 'dental team members should wear a different type of uniform' (60.7%) and 'dental team members should introduce themselves with their license' (57.3%).

#### Salary and standard of living

We asked dentists about the salaries of dental hygienists and dental assistants. The average per-hour salary of inexperienced dental hygienists was JPY1324.2  $\pm$  229.7. The average per-hour salary of inexperienced dental assistants was JPY960.1  $\pm$  127.8. While dental hygiene students thought that the per-hour salary of inexperienced dental hygienists was JPY1446.4  $\pm$  247.1, the per-hour salary of inexperienced dental assistants was JPY950.7  $\pm$  76.6. The salary of dental hygienists was significantly higher for dental hygiene students compared with dentists ( $P < 0.001$ ). (Figs 6 and 7).

In 22.9% of dental clinics, the head of the dental clinic follows a salary scale based on the dental hygienist's school background; different salaries are paid for university graduates with a bachelor's degree and vocational school graduates.

Moreover, 74.2% of dental hygiene students answered that the standard of living of full-time dental hygienists who work in a dental clinic in Tokyo might be at a general level. On the other hand, 6.7% of dental hygiene students answered that they could not live properly only on the dental hygienists' salary.

#### Certified dental hygienists

Among the dentists, 49.7% were aware of 'Certified periodontal disease care dental hygienists (Japanese Society of Periodontology)', but most dentists did not know any other certifying system. Of the dental hygiene students, 56.6% knew 'Certified periodontal disease care dental hygienists', and 51.8% of them knew 'Whitening coordinator (Japan Academy of Esthetic Dentistry)'.

Dentists expected to employ 'Certified periodontal disease care dental hygienists' (66.0%), 'Certified dysphasia rehabilitation dental hygienists (Japan Dental Hygienists Association)' (61.3%), 'Certified home care dental hygienists (Japan Dental Hygienists Association)' (61.3%), 'Certified disabilities dental hygienists (Japan Dental Hygienists Association)'

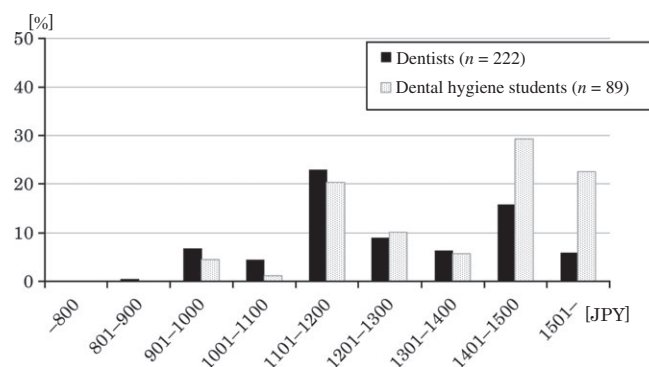


Fig. 6. Per-hour salary of inexperienced dental hygienists.

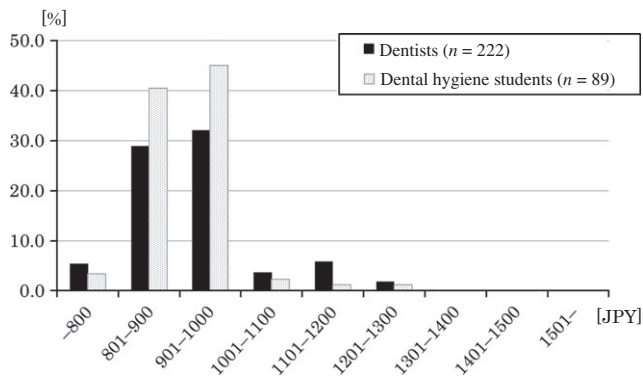


Fig. 7. Per-hour salary of inexperienced dental assistants.

(55.2%) and 'Certified lifestyle-related diseases prevention dental hygienists (Japan Dental Hygienists Association)' (53.8%).

In addition, 59.5% of dentists who expected to employ 'Certified periodontal disease care dental hygienists' gave better compensation to certified dental hygienists, as did 52.8% of dentists who expected to employ 'Certified dysphasia rehabilitation dental hygienists'. Dental hygiene students hoped to become 'Whitening coordinators' (54.3%) and 'Certified periodontal disease care dental hygienists' (53.7%), but 69.8% of students did not know any certified dental hygienists. Only 5.9% of them had received lectures from certified dental hygienists.

Ninety-two point one percent of dentists paid dental hygienists the costs of continuing education, and 67.8% of dental hygiene students expected to apply for continuing education after graduation.

#### Four-handed dentistry

Four-handed dentistry is one of the practice models for dental team work. There were significant differences in the requirements 'all dental team members should be in seated position' ( $P < 0.001$ ) and 'measures to decrease muscular strain of dental team members' ( $P < 0.05$ ) between dentists and dental hygiene students, with dentists showing a higher tendency. Both groups had poor recognition of 'assistant must be a trained and qualified person and must work full-time' and 'measures to decrease muscular strain of dental team members' (Fig. 8).

#### Discussion

Senior dental hygiene students felt the need for clerks rather than dental assistants for dental team work. They thought that dental care could be effectively and smoothly provided if dentists and dental hygienists mainly work in the treatment room and clerks in the reception area.

We found that dental assistants and dental hygienists had to move nervously between the reception area and treatment room in a dental clinic where clerks were absent. Hence, the

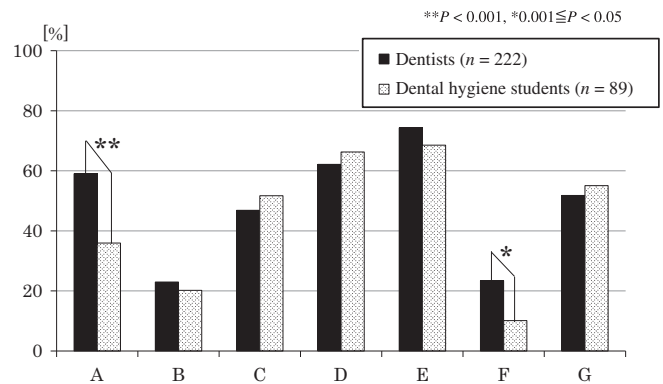


Fig. 8. Recognition of four-handed dentistry requirements. (A) All dental team members must be in a seated position. (B) Assistant must be a trained and qualified person and must work full-time. (C) Procedures must be simplified. (D) Equipment must be designed to minimize unnecessary motion. (E) Measures to increase productivity. (F) Measures to decrease muscular strain of dental team members. (G) Operator can focus on treatment.

treatment room and reception area should be separated for proper infection control and patient safety. In such occasions, we thought that clerks are necessary in a dental clinic, and they should not move between the reception area and treatment room. Dental assistants should not be allowed to perform dental care assistance such as holding the suction, because they are not qualified as dental care professionals. It would be better if dental hygienists provide chair side assistance. However, dental hygienists are mainly expected to practice preventive dentistry in view of reduction of dental decay and increasing dental awareness. Therefore, the educational system of dental assistants should include training in dental assistance.

Moreover, we consider that dental team work should be included in the curriculum of dentists' and dental hygienists' undergraduate education. 'Dental team work' indicates the involvement of not only dentists and dental hygienists but also dental assistants and clerks as dental team members.

The Ministry of Health, Labour and Welfare provides dental professional licenses to only dentists, dental hygienists and dental technicians. Other kinds of qualification are certified by various associations and not the government such as those for dental assistants and clerks. However, qualifications do not coincide with their duty for working as dental assistants or clerks. Our results showed that although dental hygienists and dental assistants worked together in many dental clinics, in most of cases there were no clear distinctions between dental hygienists and dental assistants. The scope of dental assistants' practice involved mainly assisting a dentist and clerical work. Dental hygienists also assist a dentist and perform clerical work. In the present situation, patients cannot verify the licenses of dental team members besides dentists in any manner. We consider that it is necessary in the interest of patients to indicate clear distinctions among each dental team member. All of the dental team members are required to be responsible and accountable for

their own practices and cooperate with other team members in the best interest of patients (21). From now on, dental hygienists should be allowed to keep working for a long time in order to secure high-quality dental team members. In the present condition, it is difficult to practice effective dental team work, because dental team members superficially understand each other. All educational institutions related to dental care should more clearly define each profession's scope of practice, and each educational institution should cooperate with different institutions as the key to providing efficient and safe dental practice.

Dental hygiene students thought that they could flexibly arrange their work with changes in lifestyle. At the same time, most dental hygiene students had some inhibitions about returning after maternity and childcare leave. On the other hand, many dentists expected dental hygienists to continue working at their clinic, and the result implied a growing shortage of dental hygienists. Most dental clinics might not be able to reward generous benefits because they are run by a small management. Therefore, dental hygiene schools should provide information about the common benefits of working at a dental clinic and a variety of ways of working to dental hygiene students, and dental schools should provide opportunities to learn the working conditions in a dental clinic for dental students.

There was a significant difference between dentists' and dental hygiene students' perception of the salary of dental hygienists, but recently dental hygienists have shifted dental hygiene education to higher levels, and specialize as certified dental hygienists and their work description is getting more diverse. It may be necessary to revise dental hygienists' salary and benefit according to their abilities.

Recently, dental team work has focused on the oral care and dysphagia rehabilitation for the elderly, and the relationship between dental team members and other healthcare colleagues has improved. On the other hand, the results of this survey showed that dentists, dental hygienists, dental assistants and clerks need to develop better relationships.

The findings of this research were limited to Tokyo, and the sample size was small. There might be regional differences in dental workforce supply and patients' dental care demands. A nationwide study is necessary for future reference. The follow-up research is also necessary to clarify how dental hygienists perceive their carrier.

## Conclusion

The main findings of our research showed that each dental team member's scope of practice, role and profession was not clear, and the current dental team work did not work well for the welfare of patients. For training dental hygienists to become specialists of oral prophylaxis, it is necessary to promote the dental hygiene students' awareness of their career and improve dental hygienists' working environment, including benefits.

## Clinical relevance

### Scientific rationale for study

All data analyses were conducted using statistical software package Microsoft Excel 2010, IBM SPSS® Ver19.0.

The characteristics of the working condition of dental hygienists in dental clinics were compared using descriptive analysis. The differences between dentists and dental hygiene students in the awareness of dental hygienists' scope of practice were also determined using descriptive analysis.

### Principal findings

This study indicated that there was a disparity between dentists' and dental hygiene students' awareness of dental hygienists' scope of practice. Also, this study showed that the dental team did not always work well together, because the members were not really aware of each other's role.

### Practical implications

It is important that dental team members should fully understand each other's responsibility. All educational institutions related to dentistry should modify the curriculum so that students clearly understand each professional's scope of practice.

## Acknowledgement

The authors thank the Tokyo Dental Association for its kind support in conducting the questionnaire survey.

## References

- 1 Adachi M, Ishihara K, Abe S, Okuda K. Professional oral health care by dental hygienists reduced respiratory infections in elderly persons requiring nursing care. *Int J Dent Hyg* 2004; **2**: 179–184.
- 2 Suzuki A. A study about circumstances of education of dental hygienist -from a viewpoint of the career development. Bulletin of Shizuoka Prefectural University Junior College [in Japanese] 2003. Available at: <http://oshika.u-shizuoka-ken.ac.jp/outline/research/005/upimg/200803061136361853943118.pdf> (accessed 19 April 2013).
- 3 Japan Dental Hygienists' Association. The advance of dental hygienists - sixty years' history of Japan Dental Hygienists' Association [in Japanese]. Tokyo: Japan Dental Hygienists' Association, 2012.
- 4 Yoshiizumi K, Endo K, Sugimoto K. Investigation of trends in education in Japanese dental hygiene schools in accordance with recent regulation amendment. *Int J Dent Hyg* 2010; **196**: 196.
- 5 Sato Y, Hattori Y, Watanabe M. A study on the diversification of dental hygiene curriculum. *J Jpn Dent Educ Assoc* 2007; **23**: 111–120.
- 6 Yoshimi M, Ishida M. An Introduction to Social Dentistry [in Japanese]. *Nippon Dental Review [in Japanese]* 1987; **536**: 213–220.
- 7 Ministry of Health, Labour and Welfare. Survey of Medical Institutions: The number of worker in dental clinics in Japan [in Japanese]. Available at: <http://www.mhlw.go.jp/toukei/saikin/hw/iryosd/08/dl/03.pdf> (accessed 19 April 2013).



- 8 Japan Dental Association. Dental clinics' business condition survey [in Japanese]. Available at (members only): [http://www.jda.or.jp/member/upd/file/shikaiinkeiejittachosa\\_h23.pdf](http://www.jda.or.jp/member/upd/file/shikaiinkeiejittachosa_h23.pdf) (accessed 19 April 2013).
- 9 Sato N, Watanabe A, Torii Y, Koikeguchi S. Research on the acknowledgment level of the special qualifications regarding medicine, care, and welfare systems: comparison of postgraduate dental doctors under training with general university students. *Med Biol* 2009; **153**: 540–544.
- 10 General Dental Council (UK). Standards for dental professionals. Available at: [http://www.gdc-uk.org/Newsandpublications/Publications/Publications/StandardsforDentalProfessionals\[1\].pdf](http://www.gdc-uk.org/Newsandpublications/Publications/Publications/StandardsforDentalProfessionals[1].pdf) (accessed 19 April 2013).
- 11 Kamijo H. Enactment and background for the dental and oral health promotion law in Japan. *J Natl Inst Public Health* 2011; **60**: 360–365.
- 12 World Health Organization. Framework for action on interprofessional education & collaborative practice. Available at: [http://whqlibdoc.who.int/hq/2010/WHO\\_HRH\\_HP\\_N\\_10.3\\_eng.pdf](http://whqlibdoc.who.int/hq/2010/WHO_HRH_HP_N_10.3_eng.pdf) (accessed 19 April 2013).
- 13 Shiratori T, Maki Y, Mathui K. Survey on the numbers of candidates, graduates, and allocated and actual admissions to dental hygienist schools in Japan. *JJSDHE* 2011; **2**: 1–7.
- 14 Patricia MJ. International profiles of dental hygiene 1987 to 2006: a 21-nation comparative study. *IDJ* 2009; **59**: 63–77.
- 15 Japan Dental Hygienists' Association. Reports of actual working condition of dental hygienists [in Japanese] 2010. Available at: [http://www.jdha.or.jp/pdf/dh\\_hokoku.pdf](http://www.jdha.or.jp/pdf/dh_hokoku.pdf) (accessed 19 April 2013).
- 16 Japan Dental Foundation of Dental Promotion. The number of registered dental hygienists in Japan 2010. Telephone inquiry (called 22 July 2013).
- 17 Ministry of Health, Labour and Welfare. Report on Public Health Administration and Services: The number of active dental hygienists and dental technicians in Japan [in Japanese] 2010. Available at: [http://www.mhlw.go.jp/toukei/saikin/hw/eisei/10/dl/h22\\_shika.pdf](http://www.mhlw.go.jp/toukei/saikin/hw/eisei/10/dl/h22_shika.pdf) (accessed 19 April 2013).
- 18 Ishii T, Maki Y, Hirata S. Developing role of dental hygienists in Japan. *Jpn Dent Sci Rev* 2012; **48**: 135–140.
- 19 Japanese Association for Dental Science. Investigative commission of dental hygienists' assistance works [in Japanese]. Available at (members only): [http://www2.jda.or.jp/ni/ec/\\_e20nx/\\_e200409/\\_20n0716stssace0-4/020N0716stSSAcE0303qm2x.htm](http://www2.jda.or.jp/ni/ec/_e20nx/_e200409/_20n0716stssace0-4/020N0716stSSAcE0303qm2x.htm) (accessed 19 April 2013).
- 20 Yoshida N, Endo K, Komaki M. Dental hygiene education in Japan: present status and future direction. *Int J Dent Hyg* 2004; **2**: 179–184.
- 21 General Dental Council (UK). Principles of dental team working. Available at: <http://www.gdc-uk.org/Newsandpublications/Publications/Publications/DentalTeamWorking.pdf> (accessed 19 April 2013).

Copyright of International Journal of Dental Hygiene is the property of Wiley-Blackwell and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.