

# Multisource Feedback of Work Place-Based Assessment in Dental Postgraduate Clinical Training

Hiroya Gotouda<sup>1,5</sup>, Kazutaka Kasai<sup>2,5</sup>, Yasuhiro Okamoto<sup>3,5</sup>, Seiko Osawa<sup>3,5</sup>, Mitsuhiro Ohta<sup>3,5</sup>, Chieko Taguchi<sup>1</sup>, Michiharu Shimosaka<sup>4,5</sup>, Shinichiro Aoki<sup>3,5</sup>, Takanori Ito<sup>3,5</sup>

<sup>1</sup>Departments of Preventive and Public Oral Health, Nihon University School of Dentistry at Matsudo, Matsudo, Japan, <sup>2</sup>Department of Orthodontics, Nihon University School of Dentistry at Matsudo, Matsudo, Japan, <sup>3</sup>Departments of Oral Diagnostics, Nihon University School of Dentistry at Matsudo, Matsudo, Chiba, Japan, <sup>4</sup>Department of Anesthesiology, Nihon University School of Dentistry at Matsudo, Matsudo, Japan, <sup>5</sup>Research Institute of Oral Science, Nihon University School of Dentistry at Matsudo, Matsudo, Japan

## Abstract

**Background:** The Accreditation Council for Graduate Medical Education (ACGME) requires multisource feedback (MSF) for internal medicine residents in outpatient settings owing to the number of factors involved in assessing clinical competence. While MSF of work place-based assessment (WPBA) reports are common among medical specialties, they are rare in dentistry. In addition, compared with undergraduate dentistry education, clinical performance assessment standards for postgraduate clinical training in dentistry have not been established. This study evaluates clinical performance assessments using MSF for trainee dentists. **Materials and Methods:** The supervising dentist, the dental hygienist, and the receptionist evaluated the professionalism, communication skills, patient care, and clinical practice using MSF for trainee dentists. **Results:** We found positive correlations between the total scores assigned by the supervising dentist and the dental hygienist, and between those assigned by the supervising dentist and receptionist, among the four evaluated categories. The scores for professionalism and communication were significantly higher than those for the other categories. **Conclusion:** The evaluation scores assigned by the supervising dentists and the other evaluators were all correlated. The trainee dentists in our study obtained the highest scores in the professionalism and communication categories (these are deemed especially important in medicine). We were also able to reveal different evaluation characteristics by each evaluator. Future research should determine how trainee dentists use the feedback obtained by this type of competence evaluation and the changes that they make as a result of it.

*Key Words: Clinical performance evaluation, Multisource feedback, Trainee dentists, Work place-based assessment, Behavioral science in dental practice, Dental education*

## Introduction

The Accreditation Council for Graduate Medical Education (ACGME) requires multisource feedback (MSF) for internal medicine residents [1] in outpatient settings owing to the number of factors involved in the assessment of clinical competence [2-5]. MSF was initially developed to improve quality in the manufacturing industry, especially that of individual team members. The success of the approach has led to more team-based medical care settings using MSF evaluations to provide physicians with feedback on their performance [6-11]. For example, MSF reports can be used to assess areas including interpersonal communication, professionalism, and teamwork for residency trainees in a variety of settings [12-20].

While MSF reports are common among medical specialties, they are yet to become standard in dentistry settings. In addition, while clinical performance assessment standards are the norm for undergraduates in dentistry, postgraduate clinical training education in dentistry still lacks standardization. This research was designed to evaluate the implementation of pilot MSF clinical performance assessments for trainee dentists.

## Materials and Methods

In total, 194 trainee dentists in the Nihon University Hospital at Matsudo were included in the present analysis. The Ethics Committee of the Nihon University School of Dentistry at Matsudo approved the study protocol, and all the participants

provided informed consent. The supervising dentist, dental hygienist, and receptionist assessed professionalism (5 items) and communication skills (5 items), and a supervising dentist and a dental hygienist assessed patient care (5 items), and clinical practice (5 items) of the participants (Table 1). Items used in clinical performance evaluation were a modification of those developed in past reports [1,8,21], and each item was rated on a scale 1–5 (with 1 being the lowest and 5 being the highest possible score for each item). Incomplete evaluations were excluded. A supervising dentist and dental hygienist were each assigned to assess four areas (professionalism, communication, patient care, and clinical practice) in which they could give a maximum score of 25 points for each area (100 points in total). A receptionist was assigned to assess two areas (professionalism and communication) in which the maximum score was also 25 points each, totaling to 50 points. At the end of the evaluation, the supervising dentist was in charge of providing comprehensive feedback to the participants.

## Statistical analysis

Descriptive statistics and statistical analyses were performed using a statistical software package (SPSS 22.0, Chicago, IL, USA). Spearman's correlation coefficient test was used for correlation analyses. The Mann–Whitney U test was used to compare mean values between two groups, whereas the Bonferroni test was used to compare values among the groups. Data are presented as mean values  $\pm$  standard

Corresponding author: Hiroya Gotouda, Department of Preventive and Public Oral Health, Nihon University School of Dentistry at Matsudo, Matsudo, Chiba 271-8587, Japan, E-mail: gotouda.hiroya@nihon-u.ac.jp

deviation (SD). P value <0.05 was considered to be statistically significant.

**Table 1.** Items used for clinical performance evaluation.

<b>Professionalism</b>
1. The attire and manner of the trainee dentist were appropriate
2. While communicating with patients the trainee dentist was sympathetic
3. The trainee dentist showed respect to the medical staff
4. The dentistry practices of the trainee dentist were reliable
5. The trainee dentist observed ethical principles in terms of clinical practice/ interpersonal relationships
<b>Communication</b>
1. The trainee dentist communicated effectively with patients
2. The trainee dentist communicated effectively with the staff
3. The trainee dentist settled disagreements of opinion in an appropriate and polite manner
4. The trainee dentist carefully listened to patients/colleagues/staff
5. The trainee dentist did not talk to patients using technical (unintelligible) terms
<b>Patient care</b>
1. The trainee dentist conducted medical interviews effectively
2. The trainee dentist was conscious of patient management
3. The trainee dentist provided preventive medicine/health education
4. The follow-up instructions of the trainee dentist were sufficiently clear
5. The trainee dentist acted as the member of a patient care team
<b>Clinical practice</b>
1.The trainee dentist was able to skillfully perform examinations and therapeutic techniques

2. The trainee dentist appropriately applied the principles of dentistry to specific patient needs
3. The trainee dentist performed appropriate differential diagnoses, treatment plans, and follow-ups
4.The trainee dentist was able to obtain an appropriate medical history
5.The trainee dentist kept appropriate dental records for diverse affairs including dentistry billing

### Results

Table 2-1, 2-2, 2-3, 2-4, 2-5 shows the mean scores of the 20 items in clinical performance evaluation. The supervising dentist and dental hygienist rated 20 items for a possible total maximum of 100 points each. The receptionist rated each of 10 items for a possible total maximum of 50. The average total scores (mean ± SD) were 84.92 ± 12.03 assigned by the supervising dentist, 84.61 ± 11.84 by the dental hygienist, and 43.00 ± 6.46 by the receptionist. The average scores assigned by the three reviewers for professionalism and communication skills of the participants is shown. The supervising dentist and hygienist assessed patient care and clinical practice of the trainee dentists. The score assigned for item (“the dental practices of the trainee dentist were reliable”) was significantly lower than the scores for the other items on professionalism (p<0.01, p<0.05). The score assigned for item (“the trainee dentist settled disagreements of opinion in an appropriate and polite manner”) was significantly lower than the scores for the other items on communication skills (p<0.01, p<0.05). The score assigned for the item (“The trainee dentist acted as the member of a patient care team”) was significantly higher than the scores for the other items on patient care (p<0.01, p<0.05).

**Table 2-1.** The mean scores of professionalism of clinical performance evaluation.

	Supervising dentist AV±SD	Dental hygienist AV±SD	Receptionist AV±SD
<b>Professionalism</b>			
1. The attire and manner of the trainee dentist were appropriate	4.55±0.64	4.47±0.74	4.37±0.72
2. While communicating with patients the trainee dentist was sympathetic	4.54±0.63	4.49±0.70	4.36±0.78
3. The trainee dentist showed respect to the medical staff	4.56±0.63	4.47±0.77	4.41±0.73
4. The dentistry practices of the trainee dentist were reliable	4.15±0.90	4.17±0.79	4.16±0.80
5. The trainee dentist observed ethical principles in terms of clinical practices /interpersonal relationships	4.41±0.73	4.31±0.78	4.42±0.73

\*: p< 0.05, \*\*: p< 0.01

**Table 2-2.** The mean scores of communication of clinical performance evaluation.

	<b>Supervising dentist</b>	<b>Dental hygienist</b>	<b>Receptionist</b>
	<b>AV±SD</b>	<b>AV±SD</b>	<b>AV±SD</b>
<b>Communication</b>			
1. The trainee dentist communicated effectively with patients	4.44±0.68	4.39±0.73	4.30±0.75
2. The trainee dentist communicated effectively with the staff	4.56±0.65	4.48±0.83	4.36±0.82
3. The trainee dentist settled disagreements of opinion in an appropriate and polite manner	4.28±0.83	4.17±0.81	4.02±0.82
4. The trainee dentist carefully listened to patients/colleagues/staff	4.46±0.70	4.47±0.78	4.40±0.75
5. The trainee dentist did not talk to patients using technical (unintelligible) terms	4.33±0.75	4.38±0.71	4.26±0.78

\*: p< 0.05, \*\*: p< 0.01

**Table 2-3.** The mean scores of patient care of clinical performance evaluation.

	<b>Supervising dentist</b>	<b>Dental hygienist</b>
	<b>AV±SD</b>	<b>AV±SD</b>
<b>Patient care</b>		
1. The trainee dentist conducted medical interviews effectively	4.33±0.74	4.26±0.75
2. The trainee dentist was conscious of patient management	4.04±0.81	4.06±0.84
3. The trainee dentist provided preventive medicine/health education	4.09±0.79	4.11±0.80
4. The follow-up instructions of the trainee were sufficiently clear	4.05±0.89	4.08±0.77
5. The trainee dentist acted as the member of a patient care team	4.57±0.63	4.52±0.71

\*: p< 0.05, \*\*: p< 0.01

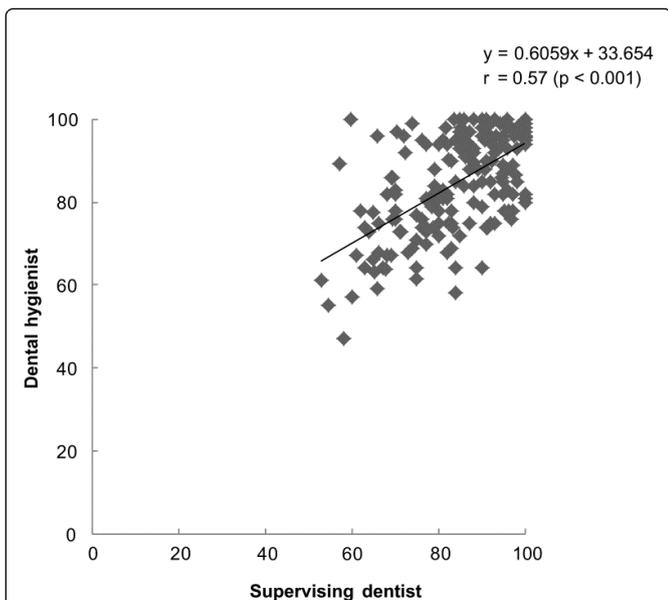
**Table 2-4.** The mean scores of clinical practice of clinical performance evaluation.

	Supervising dentist AV±SD	Dental hygienist AV±SD
<b>Clinical practice</b>		
1. The trainee dentist was able to skillfully perform examinations and therapeutic techniques	4.03±0.83	4.06±0.75
2. The trainee dentist appropriately applied the principles of dentistry to specific patient needs	4.01±0.87	4.00±0.72
3. The trainee dentist performed appropriate differential diagnoses, treatment plans, and follow-ups	3.80±0.83	3.85±0.83
4. The trainee dentist was able to obtain an appropriate medical history	4.01±0.85	4.10±0.77
5. The trainee dentist kept appropriate dental records for diverse affairs including dentistry billing	3.79±0.95	3.97±0.84
		*: p< 0.05

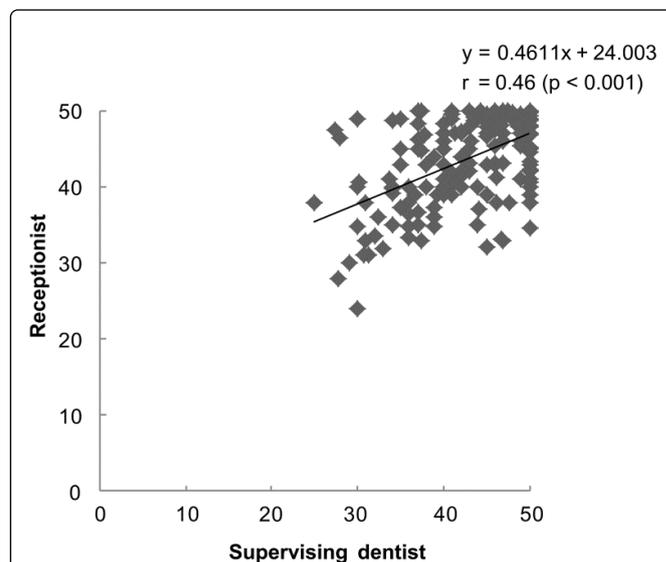
**Table 2-5.** The total mean scores of clinical performance evaluation.

	Supervising dentist AV±SD	Dental hygienist AV±SD	Receptionist AV±SD
Total scores	84.92±12.03 (20 Items)	84.61±11.84 (20 Items)	43.00±6.46 (10 Items)

We found a positive correlation coefficient between the total scores assigned by the supervising dentist and those assigned by the hygienist ( $r = 0.57, p < 0.001$ ) (Figure 1), as well as between the total scores assigned by the dentist and those assigned by the receptionist ( $r = 0.46, p < 0.001$ ) (Figure 2).



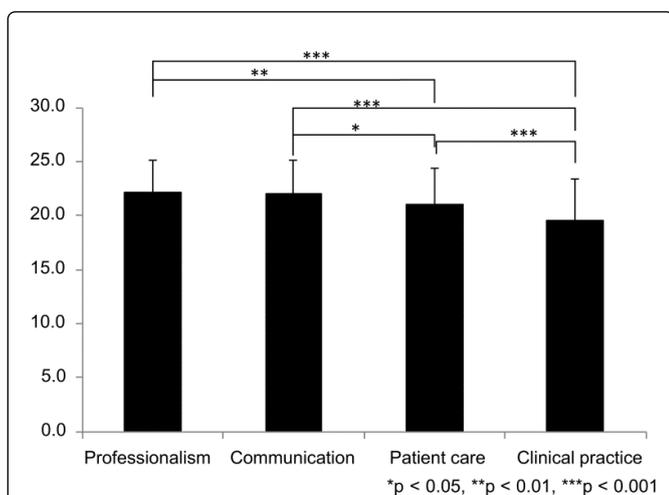
**Figure 1.** Correlation between the total scores assigned by the supervising dentist and those assigned by the dental hygienist.



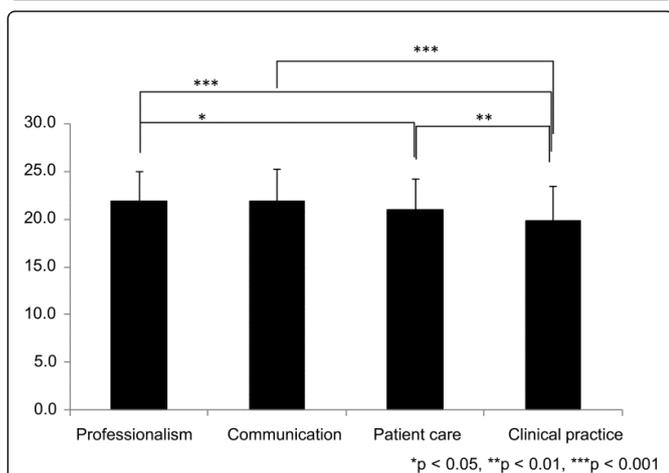
**Figure 2.** Correlation between the total scores assigned by the supervising dentist and those assigned by the receptionist.

The average scores (mean ± SD) for professionalism, communication skills, patient care, and clinical practice by supervising dentists were  $22.18 \pm 2.97$ ,  $22.05 \pm 3.10$ ,  $21.09 \pm 3.31$  and  $19.61 \pm 3.77$ , respectively, out of the 25 possible points in each area. The supervising dentist assigned significantly higher scores for professionalism and communication than for the other categories (Figure 3). The average scores for professionalism, communication skills, patient care, and clinical practice by the dental hygienist were  $21.92 \pm 3.10$ ,  $21.89 \pm 3.28$ ,  $20.99 \pm 3.27$  and  $19.77 \pm 3.60$ , respectively, showing significantly higher scores for

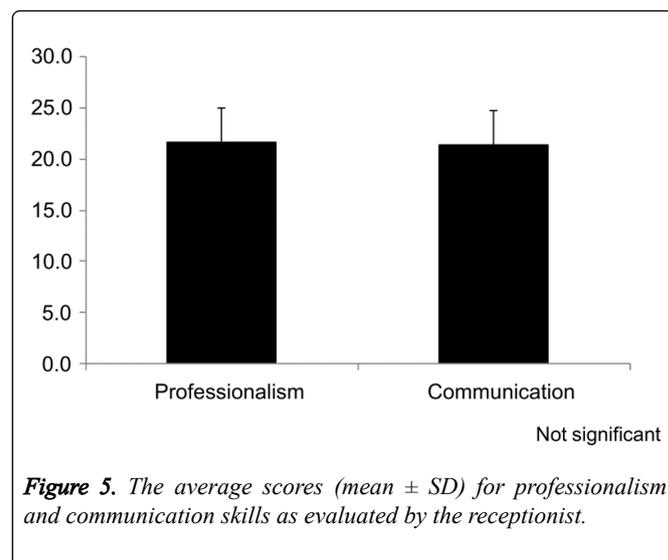
professionalism and communication also (Figure 4). The average scores for professionalism, and communication by the receptionist were  $21.64 \pm 3.28$  and  $21.36 \pm 3.37$ , respectively. We found no significant differences between the scores for the two categories rated by the receptionist (Figure 5).



**Figure 3.** The average scores (mean  $\pm$  SD) for professionalism, communication skills, patient care, and clinical practice by supervising dentist.



**Figure 4.** The average scores (mean  $\pm$  SD) for professionalism, communication skills, patient care, and clinical practice by dental hygienist.



**Figure 5.** The average scores (mean  $\pm$  SD) for professionalism and communication skills as evaluated by the receptionist.

## Discussion

The outcome projects provided by ACGME in the United States evaluate competency, including areas on patient care, medical knowledge, practice based learning, improvement, interpersonal, communication skills, professionalism and systems-based practice; which have been used for resident training and specialist training [1]. The training course for professionals in the medical field is based on their ability to learn based on practices, professionalism, and systems-based practices. Education resources on competency are provided, including presentations on the content of MSF evaluation methods for each area of competency. The ACGME requires that residents in training programs master these core competencies, resulting in the widespread use of competency-based education and outcome-based education by the resident training institutions for each specialized field. With this study, we created evaluation items based on these competencies for practical use in the dental field. According to studies in the medical field, the correlation coefficient ( $r$ ) between the evaluation points of supervising doctors and other evaluators varies from 0.2 to 0.7 [22-24]. In this study, the correlation coefficient between the total evaluation points by supervising dentists and dental hygienists, as well as those by supervising dentists and receptionists were found to be  $r = 0.57$  and  $r = 0.46$ , agreeing with the medical field results. In particular, a high correlation was found between the total evaluation points of supervising dentists and dental hygienists.

Professionalism and communication areas in our study were the highest rated (these are deemed essential by ACGME in the medical field) [1]. And, the scores for clinical practices were the lowest, and this is probably because these areas require the longest dedication time for proficiency. The evaluation points were low for item ("The dentistry practices of the trainee dentist were reliable") in the area of professionalism, as well as for item ("The trainee dentist settled disagreements of opinion in an appropriate and polite manner") in the area of communication. In the category of patient care, the evaluation points were particularly high for item ("The trainee dentist acted as the member of a patient care team") indicating a high level of proficiency in the participants. All the evaluators in our study assigned similar

scores for the items in each category; and we found only minor differences according to the evaluator. We were able to provide feedback to the trainee dentists based on average scores by all the evaluators.

The evaluation of practical skills, based on knowledge, skills and attitude, requires Work Place-Based Assessments (WPBA) [25-27]. Evaluating knowledge, skills and attitude separately is insufficient as the coordination of all these skills ultimately constitutes competency. Typical evaluation methods of WPBA include those based on the observation of performance during medical examinations (direct observation), evaluations through discussion of cases, evaluations by colleagues, and evaluations with MSF by dentistry experts such as dental hygienists. MSF strongly emphasizes formative evaluations compared to overall evaluations, and MSF feedback is effective. Constructive feedback may clarify the learners' strengths and weaknesses in addition to increasing willingness to learn. If the contents of feedback match the needs of the learner, a greater effect can be expected.

We believe that further investigations are necessary for the development of formative evaluations and feedback based on the abovementioned points. Moreover, it is necessary to construct and standardize evaluation methods by increasing the number of samples and repeating evaluations several times after providing feedback. There have been few studies on WPBA, including those on MSF in the dental field. We believe that our results can contribute to the establishment of evaluations for clinical competence at the end of clinical training. Our results can be applied to preliminary steps for the establishment of standards in the dental field based on the international trend for higher education quality assurance, according to the fields of dentistry education proposed by the World Federation for Medical Education.

## Conclusion

The present study assessed the implementation of MSF evaluations for trainee dentists, which have never been applied to dentistry. Similar to previous reports in the medical fields, we found a significant correlation between the evaluation scores assigned by supervising dentists and those by other evaluators. In addition, we found high scores for both professionalism and communication areas (deemed to be especially important in medicine). Our study also revealed the evaluator characteristics (role, job scope, specialization). Future research is required to determine how trainee dentists use feedback from these evaluations, and how effective the evaluations are for improving competency.

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