Correlation between Assignments for Professionalism of the Post-graduate Clinical Competency Evaluation and the Pre-graduate Objective Structured Clinical Achievement Test in Dental Education

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Abstract
Currently, there is a strong need to establish a clinical competency evaluation along with associated criteria, taking into consideration the international trend of quality assurance in higher education promoted in Europe, the United States, and Japan. This is based on the global standards proposed by the World Federation for Medical Education. Cross-sectional studies for each period have been reported regarding education at the pre-graduate clinical practical training and post-graduate clinical training levels. However, no studies on a clinical competency examination as an overall evaluation at the end of pre-graduate clinical practical training and at the end of post-graduate clinical training or sequential evaluations on pre- and post-graduate dental education have ever been conducted. We report the results of a pilot study on the correlations within the post-graduate clinical competency evaluation as well as the results of comparative examinations between pre-graduate objective structured clinical achievement tests. The objective of this pilot study was to establish an appropriate clinical competency evaluation for professionalism in dental education. An examination was administered to dental trainees at the end of their clinical training. Analysis of the individual evaluation scores indicated a significant correlation with the post-graduate psychomotor domain. The correlation between the total score for post-graduate assignments and the post-graduate prosthetic dentistry score was high. The correlation between the individual evaluation scores for pre- and post-graduate assessment indicated no significant correlation. The present study found no correlation between the evaluations for the same item in the same subject over time before and after graduation, whereas a correlation was observed with the evaluation of the items in the psychomotor domain after postgraduate clinical training. The specific item may represent the entire assessment.

Introduction
Currently, there is a strong need to establish a clinical competency evaluation along with associated criteria, taking into consideration the international trend of quality assurance in higher education that has been promoted in Europe, United States, and Japan. This is based on the global standards proposed by the World Federation for Medical Education (1, 2). Cross-sectional studies for each period have been reported regarding education at the pre-graduate clinical practical training and post-graduate clinical training levels (3-9). However, no studies on a clinical competency examination as an overall evaluation at the end of pre-graduate clinical practical training and at the end of
post-graduate clinical training, or sequential evaluations on pre- and post-graduate dental education have ever been conducted.

At the Nihon University School of Dentistry at Matsudo Hospital, the Objective Structured Clinical Achievement Test (OSCAT) is administered to the 5th-year students, evaluating the proficiency and achievement level of clinical competency since the prior administration of the Objective Structured Clinical Examination (OSCE) when the trainees were 4th-year students (2). We reported on the post-graduate clinical competency evaluation at the end of clinical training (10). The present study was conducted as a follow-up. We report on the correlations within the post-graduate clinical competency evaluation as well as the results of comparative examination with the pre-graduate OSCAT as a pilot study with the objective of establishing a clinical competency evaluation for professionalism in dental education.

Materials and Methods

An examination was administered to the clinical dental trainees at Nihon University Hospital at Matsudo in March 2013 at the end of their clinical training. The items for analysis included practical (skill) examinations on prosthetic dentistry, conservative dentistry, and medical interview assignments as a clinical training competency achievement confirmation test (post-graduate evaluation). Among the above-mentioned subjects, the clinical competency evaluations in terms of prosthetic dentistry, conservative dentistry, and medical interview assignments were comparatively examined among those dental trainees (59 subjects), who had taken the pre-graduate OSCAT at the end of their 5th year (pre-graduate evaluation). The study was approved by the Ethics Committee of the Nihon University School of Dentistry at Matsudo (EC09-028).

For the statistical analysis, Spearman’s correlation coefficient test was performed for correlation analysis. The Mann-Whitney U test was used to compare the median values between two groups.

Results

The medians of prosthetic dentistry, conservative dentistry and medical interview for the pre-graduate evaluation were 75.0, 84.3, and 80.0 (Fig 1). The medians of prosthetic dentistry, conservative dentistry and medical interview for the pre-graduate evaluation were 66.7, 66.0, and 77.1 (Fig 2). The medians of the total score of pre-graduate evaluation and the total score of post-graduate evaluation were 78.6 and 70.0, showing a significant difference (p<0.01) (Fig. 3).

The correlation of the individual evaluation scores between post-graduate prosthetic dentistry and conservative dentistry, conservative dentistry and medical interviews, and prosthetic dentistry and medical interviews, were $r=0.31$ (p<0.05), $r=0.04$ and $r=-0.07$, respectively, indicating a significant correlation between post-graduate prosthetic dentistry and conservative dentistry (Figs. 4, 5, and 6).

The correlation between the total score for three post-graduate assignments and the post-graduate prosthetic dentistry score was $r=0.87$ (p<0.01), while the correlation between the total score and the post-graduate conservative dentistry score was $r=0.47$ (p<0.01). The correlation between the total score and the post-graduate medical
interview score was \( r = 0.38 (p < 0.05) \) (Figs. 7, 8, and 9).

The correlations between the individual evaluation scores for pre- and post-graduate prosthetic dentistry, pre- and post-graduate conservative dentistry, and pre- and post-graduate medical interviews were \( r = 0.12 \), \( r = 0.01 \) and \( r = -0.04 \), respectively, indicating no significant correlations between those scores (Figs. 10, 11, and 12). The correlation between the individual evaluations for pre- and post-graduate total scores was 0.14, indicating no significant correlation (Fig. 13).

**Discussion**

It has been reported that in the OSCE, there is a discrepancy between the average score in medical interviews at the first visit and other domains, which reveals the specificity of this assignment (11–13). In the present study, a significant correlation was observed between the post-graduate evaluations of prosthetic dentistry and conservative dentistry, suggesting a certain level of correlation among assignments in the psychomotor domain. No significant correlation between the pre-graduate OSCAT and the score of post-graduate clinical competency was
observed for the three assignments. Regarding the cognitive domain (knowledge), a correlation over time has been reported (14,15); however, based on the present study results, we suspect that there is no high correlation between the affective domain and the psychomotor domain.

In Nihon University School of Dentistry at Matsudo, characteristic behavioral science in dental practice is taught during pre-graduate dental education with the objective of further advancing and improving dental education for professionalism. Other universities have reported difficulty in the past in evaluating the affective domain (medical interview) with respect to behavioral science in dental practice (12,13). While a detailed analysis of the evaluation content and methods is required, the present results showed
no correlation observed over time (pre- and post-graduation) for the same assignment within identical subjects; on the other hand, a correlation was observed between the evaluations of post-graduate prosthetic dentistry and conservative dentistry of the psychomotor domain. These results suggest that a higher correlation may be observed in clinical competency during the same period, rather than over time. A further detailed analysis with a larger number of subjects is required. The correlation between the overall scores for three tasks from the post-graduate clinical competency evaluation and the scores for the tasks in the conservative dentistry domain was extremely high, suggesting that the tasks in the conservative dentistry domain may represent the entire assessment. The correlation with the scores for medical interviewing was low, reconfirming the singularity of this item that is in the affective domain.

In conclusion, as a pilot study to establish an appropriate clinical competency evaluation for professionalism in dental education, we examined the correlation between the post-graduate clinical competency evaluation and the scores of the pre-graduate objective structured clinical achievement test (OSCAT). The study found no correlation between the scores for the same item in the same subject over time before and after graduation, whereas a correlation was observed with the scores for the items in the psychomotor domain after postgraduate clinical training. The specific item may represent the entire assessment.

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