

Use of a rubric for calibration among faculty members and as students' self-assessment tool



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INTRODUCTION

The practical examination is designed to evaluate periodontal instrumentation of second year dental students on typodonts before they are allowed to perform scaling and root planing for their patients.

The failure rate in the practical examination ranged from 16-31% over the past three years. An average of 32 out of 130 students failed the first practical examination. The failed students were offered to take additional examinations until they passed. Although most students passed the first practical examination, they still exhibited some deficiencies in the clinic especially early in junior year. Therefore, lack of maintaining acquired skills and scarcity of self-assessing their skills have been brought up by the faculty members in the department of periodontics at The University of Maryland School of Dentistry (UMSOD).

One of the most important skills for healthy care providers is the ability to self-assess one's competence and consequently to identify individual deficiencies and the needs for further learning. Thus, the importance of self-assessment has been highlighted by the Commission on Change and Innovation in Dental Education. However, a self-assessment has not been introduced to dental students in the periodontics courses at the UMSOD.

A new rubric was developed for second year dental students to define the categories for each point value and to emphasize the critical failure. **If a student uses the incorrect end of the instrument at all times (without self-correction), the student will receive 0 point in that particular instrument.** The new rubric was also intended to be used as a self-assessment tool for students in preparation for the practical examination.

The purpose of this study is to calibrate faculty members and to compare scores between the self-assessments and faculty evaluation before implementing a new rubric as a self-assessment tool for the second year dental students.

MATERIALS AND METHODS

The exemption from IRB (HP-00070384) was attained. The calibration for the evaluating faculty members was conducted to ensure the reliability, the accuracy, and the consistency in evaluating periodontal instrumentation at the practical examination before the new rubric was implemented. Third year dental students volunteered to participate in two calibration sessions. Twenty students in the first and twelve students in the second calibration session performed periodontal instrumentation on typodonts.

Universal 204S				
Modified pen grasp		2	1	0
Fulcrum			2	0
Proper cutting edge		4	2	0
Insertion point			2	0
Demo effective stroke	6	4	2	0
Points earned				
Universal 13/14				
Modified pen grasp		2	1	0
Fulcrum			2	0
Proper cutting edge		4	2	0
Insertion point			2	0
Demo effective stroke	6	4	2	0
Points earned				
1/2 Gracey				
Modified pen grasp		2	1	0
Fulcrum			2	0
Proper cutting edge		4	2	0
Insertion point			2	0
Demo effective stroke	6	4	2	0
Points earned				
11/12 Gracey				
Modified pen grasp		2	1	0
Fulcrum			2	0
Proper cutting edge		4	2	0
Insertion point			2	0
Demo effective stroke	6	4	2	0
Points earned				
13/14 Gracey				
Modified pen grasp		2	1	0
Fulcrum			2	0
Proper cutting edge		4	2	0
Insertion point			2	0
Demo effective stroke	6	4	2	0
Points earned				

Modified Pen Grasp					
2	Four points of contact at all times				
1	Less than four points of contact at all times				
0	Total improper grasp				
Fulcrum					
2	Must have a fulcrum on a hard surface (on the teeth) at all times				
0	No fulcrum present				
Proper Cutting Edges					
4	Student uses the correct end of the instrument for the surface identified to instrument				
2	Student uses the incorrect end but corrects him/herself				
0	Student uses the incorrect end and/or the incorrect instrument at all times				
Insertion Point					
2	Student inserts the instrument at the distolingual or distobuccal line angle				
0	Student does not insert the instrument at the distolingual or distobuccal line angle				
Demo Effective Stroke					
Five stroke motions: 1) pull, 2) short, 3) over-lapping, 4) continuous, and 5) adapted to the tooth surface.					
	Pull	Short	Over-lapping	Continuous	Adapted to the tooth surface
6:	student demonstrates all five stroke motions				
4:	Student demonstrates 4 out of five stroke motions.				
2:	Student demonstrates 3 out of five stroke motions.				
0:	Student has a poor adaptation and poor stroke with significant flaws.				

A Rubric of PERI528 Practical Examination

The three faculty members met and reviewed the rubric before each calibration session. The same three faculty members evaluated students in the two calibration sessions. All students submitted self-assessments at the end of the calibration sessions.

Statistical Analysis

Intraclass correlation coefficient (ICC) was used to test reliability among faculty members. Pearson's correlation and a paired t-test were used to compare the self-assessments and faculty evaluation.

RESULTS

Calibration among the faculty members

Regarding faculty reliability, ICC was 0.75 at the first calibration and 0.97 at the second calibration, showing a strong correlation among the faculty members. Figure 1 depicts the results from the second calibration.

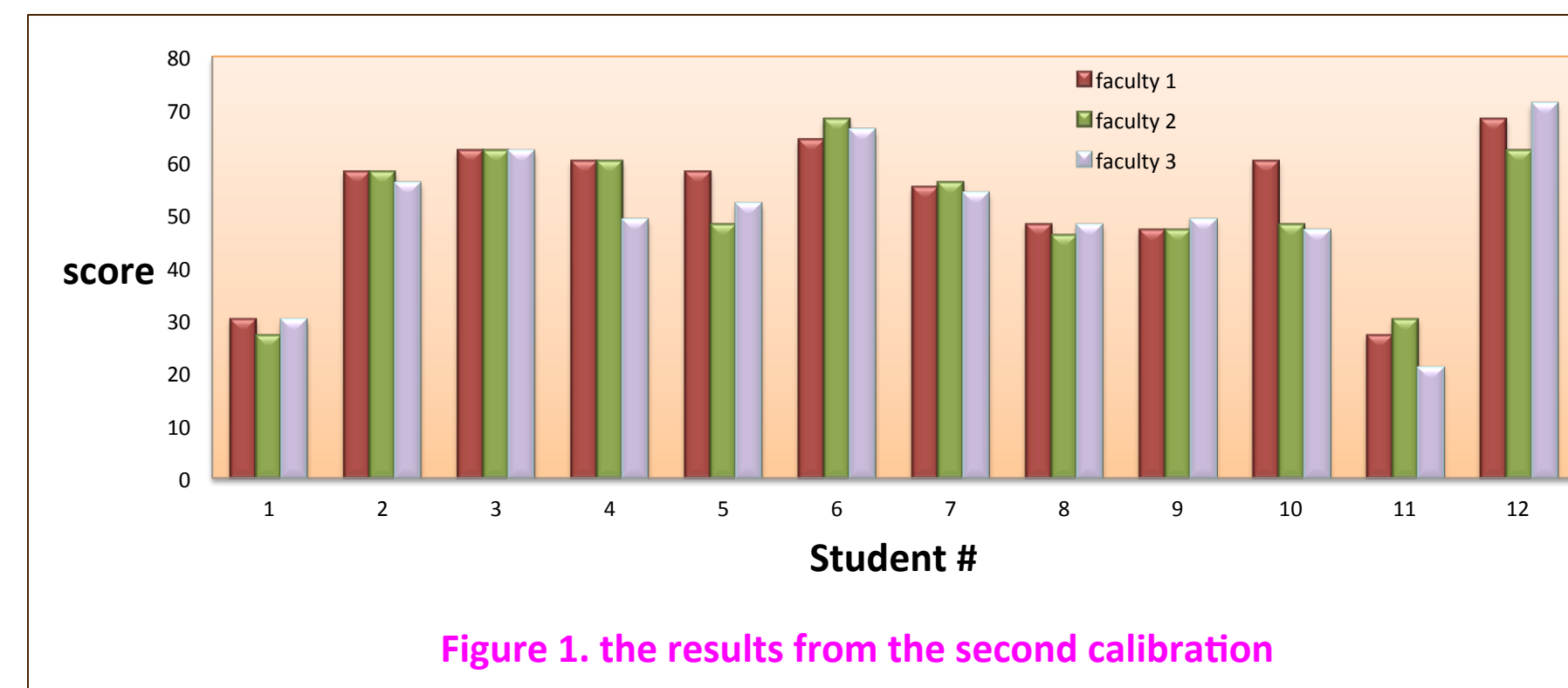


Figure 1. the results from the second calibration

Correlation between students' evaluation and faculty's evaluation

For the first calibration, two evaluators were pooled to compare the scores from the students since their correlation was shown to be strong ($r=0.8$). The mean of three faculty members' evaluations was used for the second calibration to compare the scores. The student-faculty agreement was $r=0.4$ (moderate) at the first calibration and $r=0.01$ (weak correlation) at the second calibration (Figure 2). The score from the students was significantly higher than that of the faculty at the second calibration (Table 1).

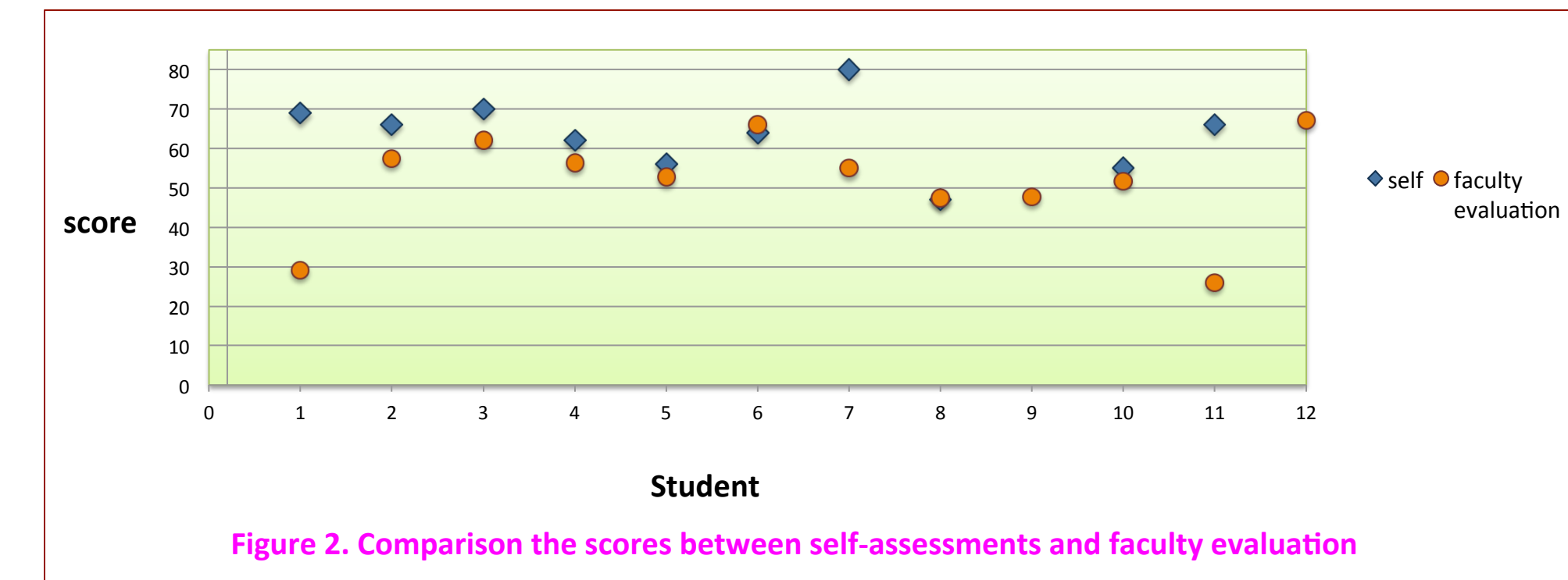


Figure 2. Comparison the scores between self-assessments and faculty evaluation

Table 1. Comparison of scores between students and faculty at the second calibration

n=10	Self-Evaluation	Faculty Evaluation	p value
Mean±SD	63.5±9.2	50.3±13.1	0.028*

DISCUSSION AND CONCLUSION

The students at the first session performed instrumentation three times separately to each faculty. The students' skill level may have increased from the first examiner to the last examiner. Moreover, there was a lack of agreement among faculty members regarding the critical failure. The problems from the first session were discussed. The students at the second session performed only once in front of three faculty members. Consequently, the reliability among faculty members improved. However, no student recognized a critical failure, which led a significant difference in scores between the students and the faculty.

This study demonstrated the reliability among the faculty members was strong. However, weak to moderate correlation was observed between the self-assessments and faculty evaluation. This reflects that the faculty comprehended the rubric clearly, while the students' understanding of the rubric was poor. Therefore, the faculty should help the students improve their understanding for the purpose of self-assessment and their ability to evaluate their work.