Research Article

JRAD Journal of Research and Advancement in Dentistry

J Res Adv Dent 2018;8:1:82-86.

Putting Theory Into Practice, Part II: Enhancement of Error Identification & Problem Solving by Way of an OSPE Approach

R. Prakash[1*] N. Praveen Kumar[2] K.V.S.P. Gupta[3] M.V. Mrudula[4]

[1]Professor and Head, Department of Prosthodontics, Anil Neerukonda Institute of Dental Sciences, Visakhapatnam, Andhra Pradesh, India.
[2]Reader, Department of Prosthodontics, Anil Neerukonda Institute of Dental Sciences, Visakhapatnam, Andhra Pradesh, India.
[3]Senior Lecturer, Department of Periodontics, Anil Neerukonda Institute of Dental Sciences, Visakhapatnam, Andhra Pradesh, India.
[4]Senior Lecturer, Department of Periodontics, Anil Neerukonda Institute of Dental Sciences, Visakhapatnam, Andhra Pradesh, India.

ABSTRACT

Aim: To evaluate the effect of self-evaluation enhancement by way of a modified OSPE in prevention of mistakes in teeth setting

Materials and Methods: 86 students were subjected to three OSPE examinations in increasing complexity requiring the identification of selected mistakes in teeth setting. They attended their final internal practical examination soon after and were asked to answer a Likert item questionnaire like they had after the second internal examination. The results were cross-compared and statistically evaluated.

Results: The results were subjected to Z-test statistical analysis. There was a statistical increase in the number of students who could identify errors (p values: 0.00012,00014) & a decrease in those who couldn't (p value: 0.00012).

Conclusion: Learning from others' mistakes is a valuable tool in self-assessment and improvement. Students were exposed to errors in an OSPE format and the result was found to be beneficial.

Keywords: Newer Perspectives, Preclinical Training, Dentistry.

INTRODUCTION

As humans one of our strongest mental defenses is that we are blind to our mistakes but can very readily and effortlessly be a critic.[1] This is especially true in a teaching scenario where students are expected to learn specific tasks like teeth setting. A desire to finish their tasks fast either due to an initial dislike or for the thrill of being noticed for fast completion or for a desire for work approval as an academic formality, often dilutes the quality of work being submitted. A stress must be made on the importance of self-evaluation.[2,3] When asked to check their work before submission, it was surprising to note that most mistakes escaped their notice not just because they were probably a bit over confident but most of the time because they had not learnt to patiently evaluate their own teeth setting as per the standardized evaluation criteria. It is important that students are made aware of the various methods of evaluation and how the evaluation criteria work so that they can attempt to apply the same criteria towards self-evaluation.[4] To make things worse was the fact that they were oblivious to some mistakes even when pointed out to them and this indirectly made them feel confident about their submitted work making them prone to repetition of the same mistakes. This could be compared to rote learning as they were performing blindly.[5] Another aspect of concern was the positive and negative implications of Pareto's principle on overall performance.[6,7] Would overall performance (80%) be good on account of the good

Received: Mar. 12, 2018: **Accepted**: May. 10, 2018
*Correspondence Dr. R. Prakash.
Department of Prosthodontics, Anil Neerukonda Institute of Dental Sciences, Visakhapatnam, Andhra Pradesh, India.
Email: dr_prakash@dr.com

pISSN 2278-0076
eISSN 2321-9270

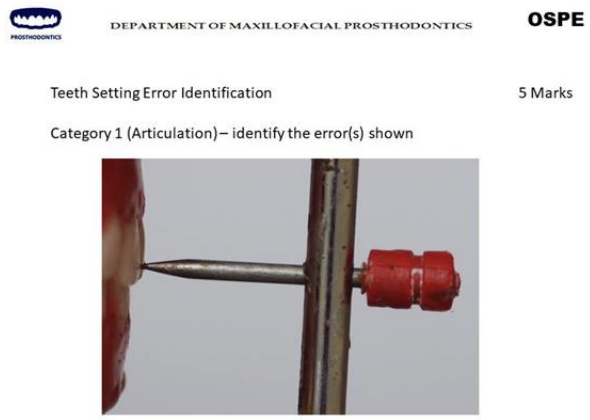

Fig 1: OSPE station example based on Articulation.

Fig 2: OSPE station example based on Anterior Setting.

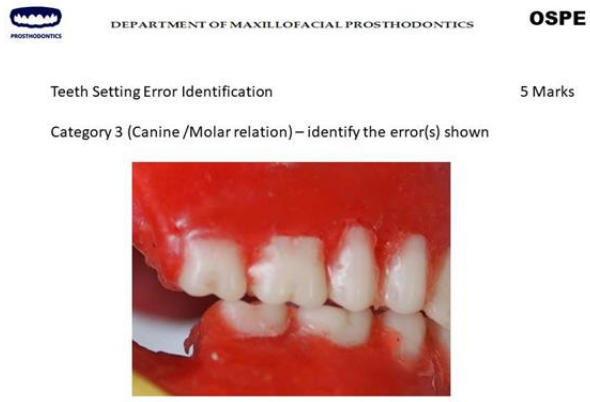

Fig 3: OSPE station example based on Canine/Molar relation.

students (20%) or would the performance always be held back by those not yet able to perform adequately enough (20%). An added emphasis would have to be on maintaining the good standards and increasing the standards of performance of those below the border line.

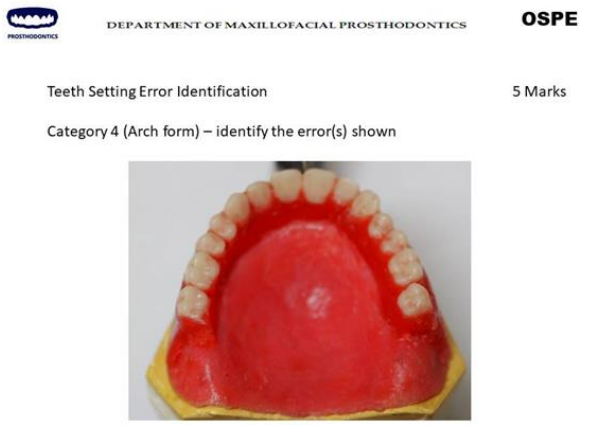

Fig 4: OSPE station example based on Arch Form.

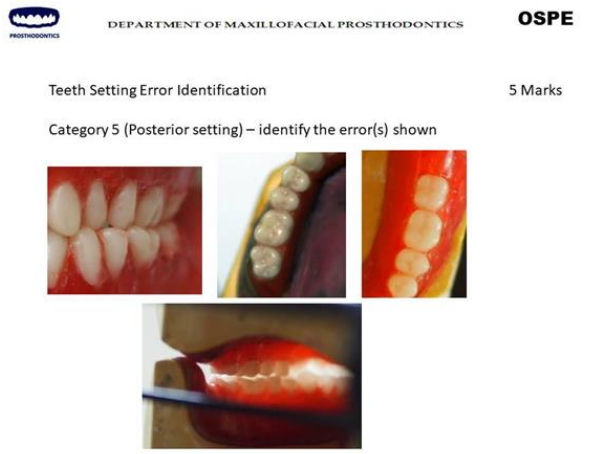

Fig 5: OSPE station example based on Posterior setting.

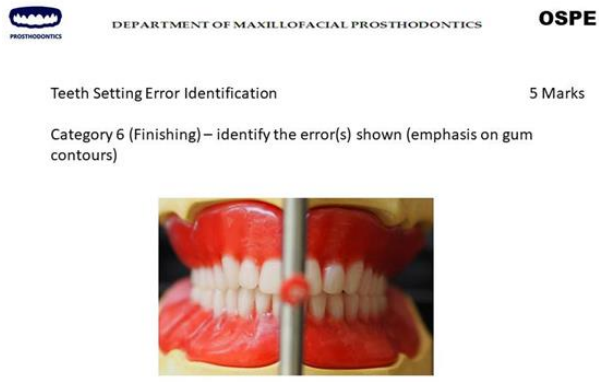

Fig 6: OSPE station example based on Finishing with an emphasis on gingival contours.

It was felt that this problem could only be rectified if the student could somehow take on the role of the teacher. Learning is much more effective when one

PROSTHODONTICS

DEPARTMENT OF MAXILLOFACIAL PROSTHODONTICS

Feedback Form : Kindly tick to indicate your choice

- Are you comfortable with the new Speed Setting technique

5 Strongly Agree	4 Agree	3 Neither Or N/A	2 Disagree	1 Strongly Disagree

- Would you prefer to revert to the older technique

5 Strongly Agree	4 Agree	3 Neither Or N/A	2 Disagree	1 Strongly Disagree

- Do you feel two hours are sufficient

5 Strongly Agree	4 Agree	3 Neither Or N/A	2 Disagree	1 Strongly Disagree

- Can you finish a setting in an hour in the final exam with Speed Setting

5 Strongly Agree	4 Agree	3 Neither Or N/A	2 Disagree	1 Strongly Disagree

- If given adequate time to perform the teeth setting and double check before submission can you avoid silly mistakes

5 Strongly Agree	4 Agree	3 Neither Or N/A	2 Disagree	1 Strongly Disagree

Fig 7: The Likert item Feedback Questionnaire used.

Q.No SPEED SETTING BEFORE OSPE EXAMS	5	4	3	2	1
1 comfort with technique	62/86	22/86	2/86	-----	-------
2 revert back to conventional	--------	---------	4/86	30/86	52/86
3 time management	39/86	40/86	4/86	3/86	-------
4 can less time be allocated	41/86	42/86	3/86	---------	---------
5 mistake identification & prevention	**18/86**	**9/86**	**2/86**	**49/86**	**8/86**

5 = strongly agree , 4 = agree, 3 = undecided/N.A. , 2= disagree , 1 = strongly disagree

Q.No SPEED SETTING AFTER 3 OSPE EXAMS	5	4	3	2	1
1 comfort with technique	71/86	15/86	---------	-----	-------
2 revert back to conventional	--------	---------	-------	14/86	72/86
3 time management	69/86	17/86	--------	--------	-------
4 can less time be allocated	53/86	28/86	5/86	---------	---------
5 mistake identification & prevention	**42/86**	**30/86**	**2/86**	**24/86**	**2/86**

5 = strongly agree , 4 = agree, 3 = undecided/N.A. , 2 = disagree , 1 = strongly disagree

Fig 8: The consolidated feedback data.

has to use the knowledge gained to teach someone else.[8] The desire to be appreciated as a teacher has an subconscious protective mechanism that makes the teacher double check information before addressing a group so that mistakes are avoided. Things magically become clearer when one is trying to gather information for someone else. A second

	Strongly agree	agree	disagree	Strongly disagree
Before OSPE	18/86	9/86	49/86	8/86
After OSPE	42/86	30/86	24/86	2/86
Z-score	-3.8396	-3.8241	3.8568	1.9551
p-value	0.00012	0.00014	0.00012	0.05
Result significance at p <0.05	YES	YES	YES	NO
Inference	There was an increase in the ability of students to analyse their settings and prevent mistakes after exposure to error identification OSPE			

Fig 9: Analysis of Mistake detection before and after OSPE.

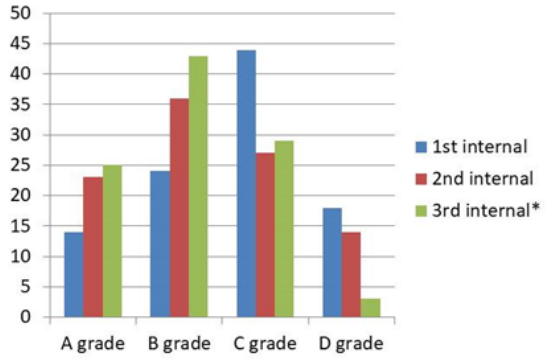

Fig 10: Graph showing student performance variation between internal examinations.

aspect was that a lot of time and effort could be saved if students could learn from others' mistakes in addition to learning from their own making the learning more meaningful.[9-11] This would enhance their goal attainment in a teological manner.[12] Using this approach it was decided to subject the students to photographs and later actual teeth settings in which certain mistakes were there. The students had to either identify the problem or problems present depending on the question posed in an OSPE (Objectively Structured Practical Examination) as being the most appropriate style of examination for the purpose.[13-15] Being able to identify mistakes would be the first step towards improving their own standards of work.

MATERIALS & METHODS

86 students were chosen for this two=part study of which this was the second part. Most were moderately confident about their teeth setting but were still making silly mistakes in spite of having sufficient time and being reminded to check their work before submission. They were subjected to 3

sequential OSPE exams divided into the 6 categories of standardized evaluation. (Fig.1-6) Each category had a mistake specific to that category. The first exam was structured with relatively easy to identify mistakes and the complexity was increased through the next two exams. The students were allowed to continue with their routine teeth setting exercises side by side and one on one evaluation using the standardized criteria was performed to continue giving students relevant performance-based feedback. The final internal examination was conducted after the 3 OSPE modules and the students were given the feedback questionnaire one last time. Their grades over the three internals and their feedback form responses were statistically evaluated

RESULTS

The results before and after OSPE modules (Fig.1) were statistically analysed by Z-testing .Students who strongly agreed showed a Z-score of -3.8396 (p value 0.00012), those who agreed a Z-score of -3.8241 (p value 0.00014),those who did not agree a Z-score of 3.8568 (p value 0.00012) & those who strongly disagreed a Z-score of 1.9551 (p value of 0.05). The first three were statistically significant while the result of those who strongly disagreed did not show significant variation before and after OSPE.(Fig The exam grades of the 1st internal examination(conventional setting), the 2nd internal examination (Speed Setting) & the 3rd internal examination (Speed Setting after OSPE) were plotted to form a bar chart that exhibited a slight increase in the A grade performance , with a decrease in C & D grades contributing to an increase in B grade performance.

DISCUSSION

In this two-part study the first difficult faced by students was getting accustomed to implementing their theoretical knowledge into the task of teeth arrangement in an ideal Class I situation. Repeated practice sessions were scheduled with the view that practice makes perfect. Quality control management methods like PDCA & 5s were implemented by modifying the setting technique. [16-18] The Speed Setting Technique proposed was implemented as a shortcut method, a method aimed at saving time whilst still following all relevant principles. Although the speed of their performance was enhanced both due to regular practice and the Speed Setting Technique, the quality of work continued to suffer. Mistakes continued to emerge and when the assessment log-books were examined during each subsequent evaluation there were even situations where the same mistake was being repeated in spite of it having been pointed out earlier.

A decision was made to force students to learn to identify mistakes better and to instruct them to do a final check with the evaluation criteria as their checklist before submission. The OSPE exposure allowed for a competitive enhancement of evaluation skills. The examination was conducted in three levels of increasing complexity to allow easy interpretation. The OSPE exam segments being grouped in the same order as the standardized teeth setting evaluation form allowed for a sequential focus. The enhancement of mistake identification coupled with the systematic arrangement of the OSPE allowed for a checklist pattern self-evaluation of their own work as evidenced by an improvement in the overall performance in the 3rd internal examination and the feedback pertaining to prevention of mistakes

CONCLUSION

In the first part of this study quality management protocol was implemented to streamline execution of the task in the easiest possible way within a reasonable time frame. In the second part of the study the focus was on quality control by way of enhancing self-assessment. This was effected by introducing error identification OSPE modules.

CONFLICT OF INTEREST

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

REFERENCES

1. Covey M. Cognitive Dissonance: Fifty Years of a Classic Theory. Journal Of Family Theory & Review 2009;1:111-113.

2. Hendricson WD, Andrieu SC, Chadwick G, et.al. Educational Strategies Associated With Development of Problem-Solving, Critical Thinking, and Self-Directed Learning. Journal of dental education 2006; 70: 925-36.

3. Schneider W. Training High-Performance Skills: Fallacies and Guidelines. Human Factors: The Journal Of The Human Factors And Ergonomics Society 1985;27:285-300.

4. Hodson D. Assessment of practical work. Science And Education 1992;1:115-144.

5. Mayer R. Rote Versus Meaningful Learning. Theory Into Practice 2002;41:226-232.

6. Backhaus J. The Pareto Principle. Analyse & Kritik 1980;2.

7. Bommier A, Zuber S. The Pareto principle of optimal inequality. International Economic Review 2012;53:593-608.

8. Stollhans S. Learning by teaching: developing transferable skills. Employability For Languages: A Handbook 2016:161-164.

9. Michota F. Learning From The Mistakes of Others. Hospitalist News 2012;5:2.

10. Wieman C. Minimize Your Mistakes by Learning from Those of Others. The Physics Teacher 2005;43:252-253.

11. Bhattacharya S. Wise to learn from others' mistakes. Indian Journal Of Plastic Surgery 2013;46:165.

12. Dickinson A. Actions and Habits: The Development of Behavioural Autonomy. Philosophical Transactions Of The Royal Society B: Biological Sciences 1985;308:67-78.

13. Brown G, Manogue M, Martin M. The validity and reliability of an OSCE in dentistry. European Journal Of Dental Education 1999;3:117-125.

14. Zafar M ,Yaqinuddin A ,Ikram F, & Ganguly P. Practical examinations - OSPE, OSCE AND SPOT. Education in Anatomical Sciences 2013 ;Nova Publishers, New York :223-237

15. Brown G, Manogue M, Martin M. The validity and reliability of an OSCE in dentistry. European Journal Of Dental Education 1999;3:117-125.

16. Kiran D. Quality Gurus. Total Quality Management 2017:21-37.

17. Adina-Petruţa P, Roxana S. Integrating Six Sigma with Quality Management Systems for the Development and Continuous Improvement of Higher Education Institutions. Procedia - Social And Behavioral Sciences 2014;143:643-648.

18. Sokovic M,Pavletic D, Pipan KK. Quality Improvement Methodologies – PDCA Cycle, RADAR Matrix, DMAIC and DFSS.Journal of achiements in materials and manufacturing engineering 2010;43:476-48.