



**COMPARISON OF TWO FORMATIVE ASSESSMENT METHODS IN DISSECTED  
SOFT PARTS IN ANATOMY**

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**ABSTRACT**

Dissection of a human cadaver and identification of dissected soft parts is a long-established and time-tested method for teaching anatomy and is a “must know” topic in the subject of Anatomy in the curriculum for the first-year MBBS course. This complete enumeration, cross-sectional comparative study was conducted on 59 first-year MBBS students (30 females; 50.84% and 29 males; 49.16%) at Rajiv Gandhi Medical College in Kalwa, Thane, Maharashtra state, India, to compare the scores obtained by students in traditional practical examination on dissected anatomical soft parts with that obtained in objective structured practical examination. The traditional practical examination was conducted as per the pattern recommended by the Maharashtra University of Health Sciences and were allotted marks out of 20. During the objective structured practical examination, the examiners were provided with a pre-validated checklist and marks (out of 20) were allotted by the examiners. The students obtained higher scores in traditional practical examination and differences between scores in two examination methods were highly significant, both for female ( $p < 0.0001$ ) and male ( $p < 0.0001$ ) students. The gender differences in scores in the traditional practical examination ( $p = 0.980$ ) and objective structured practical examination ( $p = 0.410$ ) were not significant.

**KEY WORDS:** Anatomy, Dissection, Objective structured practical examination, Soft parts.

**INTRODUCTION**

The traditional practical examination (TPE) is constrained by examiner subjectivity that influences students' scores,<sup>[1]</sup> variation in difficulty levels of questions, examiner bias, inter-examiner variation in allotting marks and adverse effects on scores due to anxiety among students.<sup>[2]</sup> The Objective Structured Practical Examination (OSPE) involves assessment of the student by direct observation of the student's performance in a flexible examination setting that consists of laboratory stations.<sup>[3,4]</sup> The OSPE was first described from the University of Dundee, Scotland in 1975<sup>[5]</sup> and improved in 1979.<sup>[3,4]</sup> A four-level framework has been proposed for assessing levels of clinical competence – “knows”, “knows how”, “shows how”, and “does”.<sup>[6]</sup> Student performance has to be

evaluated across an assortment of situations to establish a reliable skill-based evaluation.<sup>[3]</sup>

The initiation of a new idea (e.g.: OSPE) in a conservative framework, is met with disbelief.<sup>[7]</sup> Each method of student evaluation has its own importance, based on the situation, relevance and the available resources<sup>[8]</sup> and currently, there is no benchmark<sup>[9]</sup> or single pattern of examination that can evaluate students' knowledge, comprehension, psychomotor skills, communication skills and attitudes.<sup>[10]</sup> The pattern of assessment largely determines the learning methods of the students<sup>[11]</sup> and these learning behaviours and methods can be transformed by altering the student evaluation method.<sup>[12]</sup> The OSPE evaluates an assortment of competencies,<sup>[6,13]</sup> measures practical psychomotor

skills, facilitates uniformity in student assessment, diminishes stress levels among students,<sup>[14]</sup> eliminates subjectivity,<sup>[6]</sup> removes examiner bias,<sup>[15]</sup> reduces total time for practical examination, has a broader discrimination index with high reliability,<sup>[16]</sup> and helps students to appreciate multiple elements of competencies and also to take feedback.<sup>[10]</sup>

Though limitations of OSPE include its labour-intensive nature, difficulties in retaining identical difficulty levels, and observer fatigue, OSPE brings about an improvement in student assessment.<sup>[17]</sup> A Hyderabad-based study<sup>[18]</sup> has reported use of Computer-assisted OSPE (COSPE) in the subject of Anatomy, wherein, the OSPE questions were formulated using well-labelled specimens, animated and projected as a PowerPoint presentation on an LCD screen. This study<sup>[18]</sup> reported that the entire batch of students can take the COSPE at the same time and did not have to physically move between stations. Besides, COSPE saved staff time and effort in arranging the examination in small batches and identical difficulty levels was maintained for the entire batch of students. A modification of OSPE, termed "SOSPE" (Semi-Objective Structured Practical Examination) has also been described.<sup>[19]</sup>

OSPE was first introduced in India as a teaching and evaluation tool and later standardized to assess the practical skills of students in Physiology.<sup>[20,21]</sup> OSPE is currently conducted as a formative examination in select Indian medical colleges<sup>[17]</sup> and has been introduced as summative assessment in a small number of Indian universities.<sup>[14]</sup> OSPE is not yet mandated by the Maharashtra University of Health Sciences and thus it is not used as a routine evaluation tool during MBBS practical examinations in Maharashtra State.

Dissection of a human cadaver and identification of dissected soft parts is a long-established and time-tested method for teaching anatomy and is a "must know" topic in the subject of Anatomy in the curriculum for the first-

year MBBS course. The objective of the present study was to compare the scores obtained by students in Objective Structured Practical Examination (OSPE) with that obtained in Traditional Practical Examination (TPE).

## MATERIALS AND METHODS

This complete enumeration, cross-sectional comparative study was conducted at Rajiv Gandhi Medical College in Kalwa, Thane, Maharashtra state, India. After obtaining permissions from the Institutional Ethics Committee (IEC) and institutional authorities for conducting the study, the purpose of the study and the OSPE procedure (including check-list based marking system) was explained to first-year MBBS students and written informed consent was obtained from those willing to participate in the study.

The TPE was conducted as per the pattern recommended by the Maharashtra University of Health Sciences – students were expected to identify and describe dissected soft body parts, such as organs, viscera, brain – and were allotted marks out of 20. During the OSPE, the examiners were provided with a pre-validated checklist and marks (out of 20) were allotted by the examiners.

The data were entered in Microsoft Excel (Microsoft Corporation, Redmond, WA, USA) and statistically analyzed using EpiInfo Version 7.0 (public domain software package from the Centers for Disease Control and Prevention, Atlanta, GA, USA). Continuous data were presented as Mean and Standard Deviation (SD). 95% Confidence interval (CI) was stated as: [Mean - (1.96)\* Standard Error] - [Mean + (1.96)\* Standard Error]. The paired t-test value and the standard error of difference between two means (Z) were calculated. Statistical significance was determined at  $p < 0.05$ .

## RESULTS AND DISCUSSION

A total of 59 first-year MBBS students (30 females; 50.84% and 29 males; 49.16%) participated in the study.

**Table 1: Differences in scores: TPE versus OSPE (marks out of 20).**

Parameter	Females (n=30)		Males (n=29)	
	TPE	OSPE	TPE	OSPE
Mean	12.80	6.46	12.81	6.01
SD	1.37	2.30	1.68	1.89
95% CI	12.10 – 13.29	5.63 – 7.28	12.20 – 13.42	5.33 – 6.68
Paired t-value	12.971		14.481	
'p' value	<0.0001*		<0.0001*	

TPE=Traditional Practical Examination; OSPE=Objective Structured Practical Examination; CI = Confidence interval; \* Highly significant

### Scores in TPE and OSPE

The differences between scores in TPE and OSPE were highly significant both for female ( $p < 0.0001$ ) and male ( $p < 0.0001$ ) students (Table-1). In the present study, the students had higher scores in TPE, as compared to that in OSPE, which may be ascribed to inter-student variation in the questions and inter-examiner variation in allotting

marks. Contrasting results have been reported by other studies,<sup>[22,23]</sup> wherein students obtained significantly higher scores in OSPE as compared to that in TPE.

### Gender differences in scores

The gender differences in TPE ( $p = 0.980$ ) and OSPE ( $p = 0.410$ ) scores were not significant in the present study

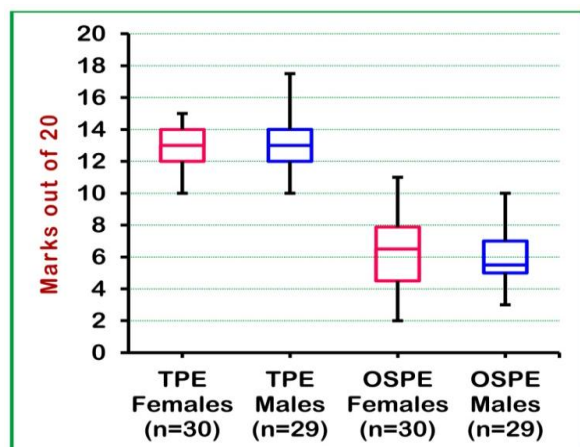
(Table-2). The third quartile, median, first quartile and minimum scores were identical for students of either gender in TPE and the male students had higher maximum score (17.5 out of 20). In OSPE, female students had higher maximum score (11 out of 20), and

higher third quartile and median score, as compared to their male counterparts (Fig.1). Other studies<sup>[24,25]</sup> have reported higher scores among female students, as compared to their male counterparts.

**Table 2: Gender differences in scores (marks out of 20).**

Parameter	TPE		OSPE	
	Females (n=30)	Males (n=29)	Females (n=30)	Males (n=29)
Mean	12.80	12.81	6.46	6.01
SD	1.37	1.68	2.30	1.89
95% CI	12.10 – 13.29	12.20 – 13.42	5.63 – 7.28	5.33 – 6.68
Z value	0.025		0.822	
'p' value	0.980		0.410	

TPE=Traditional Practical Examination; OSPE=Objective Structured Practical Examination; CI = Confidence interval; Z = Standard error of difference between two means



**Fig-1: Box plot of gender-wise scores.**

TPE=Traditional Practical Examination; OSPE=Objective Structured Practical Examination

## CONCLUSION

The difference in the overall mean TPE and OSPE scores was significant for both female and male students. The gender differences in mean TPE and OSPE scores were not significant. A larger study would be necessary in order to generalize the results since this study was limited to one batch of first-year MBBS students studying in a medical college.

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