

## Implementation Of OSPE As A Formative Assessment Tool In Anatomy For Phase1 MBBS Students

Dr.NamburuBhanuSudhaParimala, Dr.S. Priyadarshini,  
Dr.T.M.Sucharitha,Dr.GangavarapuSreedevi,  
(Dept OfAnatomy, NRI Medical College, NTR UHS, A.P)  
(Dept Of Anatomy, ASRAMS Medical College,NTR UHS, A.P)  
(Dept Of Anatomy, NRI Medical College, NTR UHS, A.P)  
(Dept Of Anatomy, NRI Medical College, NTR UHS, A.P)

---

### Abstract:

**Background:** Objective structured practical Examination (OSPE) is a variant of OSCE (Objective structured clinical Examination) that aims at testing of practical skills in an objective manner.

Despite of availability of newer assessment tools the TPE (Traditional Practical Examination) continues to be the common mode of assessment for Anatomy practical. There are limited studies on OSPE in Anatomy; particularly in Andhra Pradesh henceforth the study was undertaken.

**Materials and Methods:** OSPE was conducted for phase 1 MBBS students of N.R.I Medical College, Mangalagiri with IEC Approval. All 200 students were included in the study. Introduction of OSPE was done by an orientation session to both students and faculty. 10 OSPE stations were designed and pre validated with response, skill and resting as 3 major categories. Students proceeded through these stations with a single answer sheet. Each station carried 5 marks and completed in 3-5 min. Student feedback was taken by Google forms. Different subdivisions of Anatomy tested were - Gross Anatomy, Embryology, Histology, Radiology, and Osteology. Surface marking was included as Skill station.

**Results:** 76.5% students secured more than 50% (25/50marks) in OSPE. It was evident from the descriptive data that in 4 stations the average score was less than 3 out of 5 and thus the weak areas could be identified and remedial measures were planned accordingly. Interpretation from student feedback was in favour of OSPE and they felt it to be a clear, objective, unbiased examination that needs to be a part of curriculum.

**Conclusion:** OSPE can be implemented as a formative assessment tool in Anatomy as it is a form of Assessment for learning basic sciences with clinical correlation.

**Keywords:** Practical, station, check list

---

Date of Submission: 25-01-2025

Date of Acceptance: 05-02-2025

---

### I. Introduction

Objectives, Teaching learning methods and Assessment are the 3 major components of Learning cycle. Assessment is influenced by and in turn influences other 2 components and so it is absolutely vital to match assessment methods with them. Assessment checks appropriateness of TL methods and achievement of the intended objectives. A wide variety of assessment tools are available in the literature depending upon the competency and type of domain to be assessed.<sup>1</sup>

Assessment of clinical competence using a Objective structured clinical examination (OSCE) was introduced in 1975<sup>2</sup> with an idea to overcome major shortcomings associated with TPE. OSPE is a variant of OSCE used for phase 1 MBBS students in early clinical years to assess their practical skills (psychomotor), higher order cognitive skills - analysis (knowledge) and communication skills (attitude) in an objective manner. Structured assessment with objectivity fosters structured learning.

In Anatomy MCQ, SAQ and EQ are commonly used for assessment in theory. Assessment of practical skills continues to be in a traditional mode with practical and Viva –Voce as major components. In practicals students are assessed in spotters, discussion of histology slides and gross specimens (major and minor). Viva Voce is done by 4 examiners on 4 subdivisions but it is unstructured (Table. 1). Despite of availability of newer tools the TPE (Traditional Practical Examination) continues to be the common mode of assessment for Anatomy practicals. There are limited studies on OSPE in Anatomy; particularly in Andhra Pradesh henceforth the study was undertaken. In the present study OSPE is used as a formative assessment tool in Anatomy in our institute as students were not exposed before.

**Table: 1** Showing Scheme of examination with distribution of marks in Traditional Practical Examination (TPE) in Anatomy in Andhra Pradesh (A.P) state.

TPE in Anatomy in A.P -100 marks				
Histology (40 M)		Gross Anatomy (40 M)		Viva Voce (20M)
Spotters	10x1=10M	Spotters	5x2=10 M	Embryology -5M
Discussion slide (general histology)	1x10=10M	Major Dissection (any 1 viscera –from Abdomen, Thorax ,Neuro Anatomy and Head and Neck )	1x15=15 M	Osteology -5M
Discussion slide (systemic histology)	1x10=10M	Minor Dissection (any 1 region of dissected upper limb or lower limb specimens)	1x10=10 M	Radiology -5M
Genetics chart	1x10=10M	Surface Marking	1x5=5 M	Soft parts -5M

**Aim**

- Implementation of OSPE as formative assessment tool for Phase 1 MBBS students in Department of Anatomy

**Objectives**

- To conduct OSPE
- To obtain feedback from students

**II. Material And Methods**

This descriptive study was conducted for phase 1 MBBS students (2022 to 2023batch) for a period of 2 to 3 months. All 200 students who were present on the day of examination were included in the study. The study was conducted after obtaining approval of the Institutional Ethics Committee (IEC) in NRI Medical College, Mangalagiri.

**Methodology:**

Introduction of OSPE was done by an orientation session to both students and faculty using a power point presentation where blue print of stations and model questions were explained.OSPE/OSCE stations were designed and pre validated with response, skill and resting as 3 major categories. Cognitive skills were assessed by response stations (Interpretation and question stations) and psycho motor skills were observed and assessed with a check list. Students proceeded through these stations with a single answer sheet.

Each station carried 5 marks and completed in 3-5 min.Student and faculty feedback was taken by Google forms on the same day.

**Study setting and Logistics –:**

- OSPE was conducted in **2 sessions**.
- Time for each session: **2hours** (8.30 to 10.30 AM Roll no:1 to 100-A batch & 10.45AM to 12.45 PM –B batch )

**Arrangement of OSPE stations:** 3 locations - 2 in dissection hall and 1 in histology lab.



**(Fig 1:** Image showing OSPE conducted in Dissection Hall with 2 sets of stations- set 1 on left side and set 2 on right side, RS- Resting Station, O – Observer.)

- **No. of stations: 10**
- **Time for each station: 3-5 min (Average - 4 min )**
- **Time:** In Session1, 30 students took OSPE at a time in 3 pre allocatedlocations arranged (10 students in histology lab and 20 in dissection hall) and could complete the examination in 40 minutes. 90 students completed OSPE within 2hrs.
- Session 2 is a repetition of the first.

**Observers:** Total - 6 (first session 3 and second session 3 -1 observer per each location), Interaction among students was discouraged and strict vigilance was maintained by the observers throughout the examination. There was rotation of observer at skill station to avoid fatigue.

**Materials:** Different subdivisions of Anatomy tested in response stations were - Gross Anatomy, Embryology, Histology, Radiology, and Osteology. In a response station questions are of 2 types- initial ones were meant to test their basic anatomical knowledge (recall - level 1 of cognitive skill) followed by questions on relevant clinical aspect (application - higher level cognitive skill). Scanned Colour Images with arrows were used for Gross Anatomy, Embryology and Radiology stations and questions were framed accordingly.

1. Identify the given condition? 1m
2. Why does it occur? 2m
3. Write source of development for 2 parts of kidney? 2m



**Fig 2 –Model response station –Embryology- Poly cystic Kidney disease –laminated image with questions.**  
Model key with marks for evaluation:

1. Secretory part of Kidney develops from metanephric blastema and collecting part from Ureteric bud -2m
2. Polycystic kidney disease -1m
3. It is an autosomal dominant disease, occurs due to failure of fusion of secretory and collecting parts – 2m

1. Name the given clinical condition? 1m
2. Describe the location where accumulation of fluid occurs? 2m
3. What are the coverings of testis? 2m



**Fig3 -Model response station – Gross anatomy-Hydrocele – laminated image with questions**

Microscopes with slides focused in low power were used in histology stations. Bony pelvis of both male and female were used in osteology station. Surface marking was included as Skill station and performed by students on a mummified cadaver using chalk and measuring tape.



**Fig 4:skill station on surface marking-** showing examinee and examiner with check list.

Questions displayed in skill station:

1. Surface marking of ileocaecal orifice? 2 M
2. Surface marking of appendicular orifice? 1M
3. Draw the surface marking of Mac Burney’s point? 2M

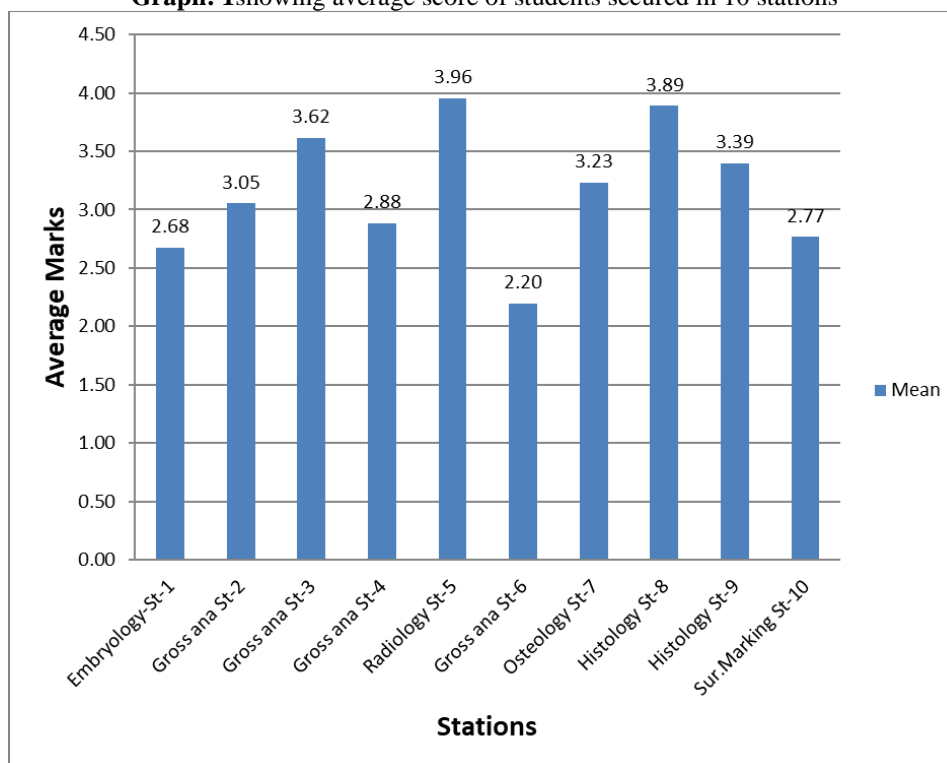
Check list for evaluation of student in skill station:

1. Student draws mid clavicular line trans tubercular plane and marks ileocaecal orifice at their junction -2m
2. Student marks appendicular orifice 2cm below the ileocaecal orifice – 2m
3. Student draws line connecting Anterior superior iliac spine and umbilicus and marks a point at junction of lateral 1/3<sup>rd</sup> and medial 2/3<sup>rd</sup> as Mac Burney’s point- 2m

**III. Results**

76.5% students secured more than 50% (25/50marks) in OSPE. Out of 10 stations, 4 stations assessed knowledge on Gross Anatomy, 2 stations Histology and 1 each from Osteology, Radiology, Embryology and Surface marking. Student performance in them was evaluated and analysed using descriptive statistics. It was evident from the graph that in 4 stations the average score was less than 3 and thus the weak areas could be identified and remedial measures were planned accordingly.

**Graph: 1** showing average score of students secured in 10 stations



Abbreviations: St-Station, Sur. Marking –Surface Marking

In 4 Gross Anatomy stations 4 different clinically important topics -Hydrocele, Anal Canal, Prostate and Diaphragm were tested. The questions asked in them were aimed at testing 2 major aspects i.e.; basic knowledge (2 or 3/5 marks) and clinical application (3 or 2/5 marks) with clear allocation of marks. During valuation of answer scripts the marks obtained in basic and clinical application were separately entered in excel sheet to identify the strength and weakness of students respectively. P value was calculated and the difference in basic and applied knowledge was found to be significant in 3 stations thus pointing the gap that has to be addressed.

**Table 2: showing Average of split score in Applied and Basic components of Gross Anatomy stations**

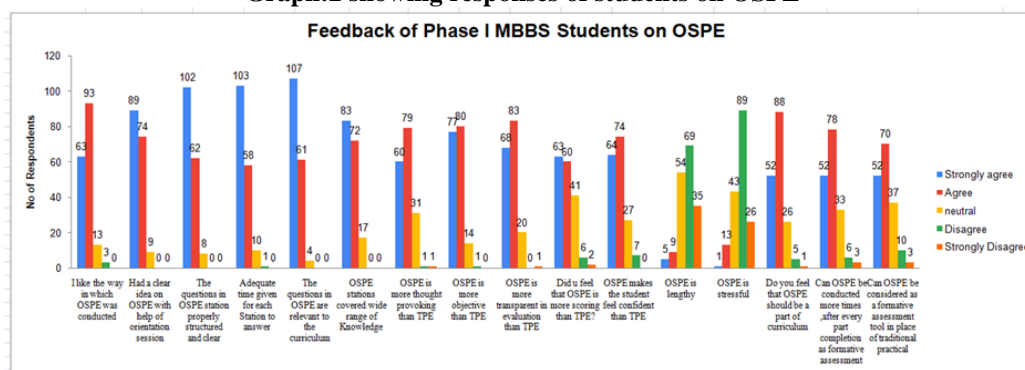
Stations	Applied		Basic		P-value
	Mean	SD	Mean	SD	
Station 2	1.53	1.19	1.56	0.71	0.77
Station 3	1.38	0.74	2.27	0.96	0.0001
Station 4	0.74	0.73	2.16	0.94	0.0001
Station 6	1.24	1.11	0.98	0.91	0.01

1<sup>st</sup> internal practical assessment was conducted at the end of Upper limb and Head and Neck regions as TPE. In this study students were exposed to OSPE as formative assessment in Abdomen region and feedback was taken from students with responses given in 5 point likert's scale.

**Questionnaire for Student feedback on OSPE:**

- I like the way in which OSPE was conducted
- Had a clear idea on OSPE with help of orientation session
- The questions in OSPE station properly structured and clear
- Adequate time given for each Station to answer
- The questions in OSPE are relevant to the curriculum
- OSPE stations covered wide range of Knowledge
- OSPE is more thought provoking than TPE
- OSPE is more objective than TPE
- OSPE is more transparent in evaluation than TPE
- Did u feel that OSPE is more scoring than TPE?
- OSPE makes the student feel confident than TPE
- OSPE is lengthy
- OSPE is stressful
- Do you feel that OSPE should be a part of curriculum
- Can OSPE be conducted more times ,after every part completion as formative assessment
- Can OSPE be considered as a formative assessment tool in place of traditional practical

**Graph:2 showing responses of students on OSPE**



**Interpretation of student feedback on 3 types of questions:**

Student opinion on the way OSPE was conducted: Majority (>90%) felt that exam was clearly oriented, properly structured and well conducted

- Student opinion on OSPE over TPE: Majority (>90%) agreed that OSPE was clear, objective, scoring, transparent, less stressful, less time consuming when compared to TPE
- Student opinion on future implementation of OSPE: >75% students opined that OSPE should be conducted regularly, should be a part of curriculum from the beginning and can be conducted in place of TPE.

**IV. Discussion**

OSPE (Objective Structured Practical Examination) is a structured examination with high validity and reliability, intended to test a wide range of skills in an objective manner.<sup>3</sup>

OSCE is mainly for assessment of clinical skills (psycho motor domain), with more observed stations and check lists using standardised patients and hence more time consuming than OSPE .OSPE aims at testing of application of factual knowledge for clinical aspects of disease –higher level cognitive domain along with practical skills and thus more response stations and limited observed stations are needed.<sup>4</sup>OSPE is a variant of OSCE conducted with pre planned questions that are intended to test higher order cognitive, psychomotor and communication skills with uniform time allotment for stations.The major drawback of conventional practical examination was considered as content (subject assessed differs from student to student) and examiner variability significantly affecting the score.<sup>5</sup>In the present study OSPE was conducted as formative assessment for 50marks with 10 stations of 5marks each. Answer scripts of students on response stations were evaluated with check list of answers and in observer station marks were awarded using a check list. Check list eliminates subjectivity and makes the student assessment more objective and transparent. In the present study OSPE was

conducted at end of a region –Abdomen, like a structured part completion practical .OSPE was conducted in major syllabus in Anatomy following TPE at the end of academic schedule in a study from Central India.<sup>6</sup> Results of present study are similar to this study as students scored better in OSPE and felt that it was an unbiased assessment. Absence of examiner reduces anxiety and improved the performance of students. In the other case student does not get any clue from examiner about the answer in an OSPE station if he is unable to recollect it due to apprehension or when doubtful about it and thus may lose marks .Some studies reported the higher score in TPE compared to OSPE.<sup>8</sup> Hence a blended approach of OSPE and TPE can be beneficial.

In TPE (Table1) Gross Anatomy spotters are arranged as 5 stations answered by all the students. In each spotter pins, probes, pointers or tags are used to point muscle, artery, nerve, organ or an area in wet or dry specimens .Each spotter has 2 questions of 1mark each -first question on identification and other related to it, like name of probed foramen and structures passing or name of pinned muscle and its nerve supply etc;

Spotters are common to all students but only recall level of knowledge is tested. OSPE tests ability to apply the basic knowledge for clinical correlation unlike spotters concerned only with identification of structures.<sup>4</sup>

TPE can be conducted ideally to 25 students per day and can be stretched up to maximum of 30 students. It takes 7 to 8 days to complete examination for 200 students.

COSPE a digital version of OSPE was conducted in Telangana using software technology. Students were provided with virtual stations using power point presentation that enabled large no of students to take examination simultaneously.<sup>9</sup>

In the present study OSPE was conducted to all 200 students in 5 hours with stations designed using printed charts with colour images on Embryology, Gross Anatomy and Radiology, bones, microscopes with slides focused for response stations and mummified cadavers for observed station to perform surface marking .Questions printed with clear allocation of marks was provided in each station. OSPE was conducted in the department simultaneously for 30 students at a time in a single allocated location and each student could complete OSPE in 35 to 40 minutes unlike TPE where student has to perform practical in three different places and time taken is variable from 5 to 6 hours.

Out of the three major variables of TPE the student, the patient and the examiner, the last 2 are more controlled with the structured examination when compared with traditional examination.<sup>2</sup>

The analysis of student performance in different stations of OSPE gives a non-verbal feedback that helps teaching fraternity to identify the gaps in student's knowledge related to different regions of Anatomy so that necessary remedial measures can be taken and also to plan future teaching learning methods.

The present CBME curriculum embarks on an integrated approach in both teaching and assessment. OSPE can be considered as a valid formative assessment tool well suitable to assess practical and clinical aspects of Anatomy. OSPE provides Assessment for learning to bridge the existing gap between clinical application and basic anatomical knowledge of phase 1 medical students.

## **V. Conclusion**

OSPE is an assessment tool that ensures uniformity in questioning, evaluation and time provided for students in an unbiased manner unlike the traditional practical and viva.

### **Advantages:**

- can be conducted for many students with proper planning ,less manual working hours when compared to TPE
- Higher level cognitive skills and practical skills can be assessed
- Scoring

### **Challenges:**

- Extensive planning, preparation and arrangement of stations
- motivation of faculty and students
- observer fatigue

### **Scope of the study:**

- OSPE can be conducted at end of every region in Anatomy as formative assessment tool and can be made part of curriculum.
- OSPE can be implemented as a part of TPE.

### **Take Home Message**

OSPE can be implemented as a formative assessment tool in Anatomy as it is a form of Assessment for learning.

### References

- [1] Singh T, Saiyad S, Virk A, Kalra J, Mahajan R. Assessment Toolbox For Indian Medical Graduate Competencies. J Postgrad Med [Serial Online] 2021 [Cited 2021 May 6];67:80-90. Available From: <https://www.jpgmonline.com/text.asp?2021/67/2/80/315367>
- [2] R. Mcg. HARDEN, MARY STEVENSON, W. WILSON DOWNIE, G. M. WILSON. Assessment Of Clinical Competence Using Objective Structured Examination. British Medical Journal, 1975, 1, 447-451.
- [3] Shilpabhimalli, Daksha Dixit, Mahanteshsiddhibhavi, Sheetalpattanshetti, An Objective Structured Practical Examination To Test Under Graduate Medical Students In Anatomy, Indian Journal Of Anatomy 2014, 3(1):6-9.
- [4] Yaqinuddin A, Zafar M, Ikram MF, Ganguly P; What is An Objective Structured Practical Examination In Anatomy ? . Anatomical Sciences Education, 2013;6(2):125-133
- [5] Hasan S, Malik S, Hamad A, Khan H, Bilal M; Conventional/Traditional Practical Examination (CPE/TDPE) Versus Objective Structured Practical Examination (OSPE)/Semi Objective Structured Practical Evaluation (SOSPE). Pak. J. Physiol, 2009; 5(1): 54-64.
- [6] Rajiv Ranjan, Amit Jain, Rashmibhujade. OSPE IN ANATOMY: NEW DIMENSIONS IN ASSESSMENT, Int J Anat Res 2016, 4(1):1789-94. ISSN 2321-4287.
- [7] Gaikwad AP, Patil AD; An Introduction Of OSPE For Embryology To First MBBS Students In Anatomy Department. Sch. J. App. Med. Sci., 2015;3 (6B):2306-2308
- [8] Malik SL, Manchanda SK, Deepak KK, Sunderam KR; The Attitude Of Medical Students To The Objective Structured Practical Examination. Med Educ, 1988; 22(1):40-6.
- [9] Saju Binucherian, COSPE In Anatomy: An Innovative Method Of Evaluation. Int. J. Adv. Res. 5(5), 325-327