



**Sri Aurobindo College of Dentistry, Indore**

**OSCE/OSPE**



## OBJECTIVE STRUCTURED CLINICAL EXAMINATION/ OBJECTIVE PRACTICAL CLINICAL EXAMINATION

Assessing teaching-learning outcomes in anatomical knowledge is a complex task that requires the evaluation of multiple domains: theoretical, practical, and clinical knowledge. In general, theoretical knowledge is tested by a written examination system constituted by multiple choice questions (MCQs) and/or short answer questions (SAQ). The assessment of practical knowledge (three-dimensional anatomical concepts) involves oral, spot, or objective structured practical examinations (OSPE). Finally, the application of anatomical knowledge to patients is tested mainly through objective structured clinical examinations (OSCE).

An OSCE/OSPE is an examining process made up of a series of stations of equal length set in a circuit. Clinical/practical examination is designed to test the clinical skill, performance and competence of the candidate in skills such as communication, clinical examination, medical/dental procedures or prescription, exercise prescription, latest techniques, evaluation and interpretation of results so as to undertake independent work as a specialist.

### OBJECTIVE PRACTICAL CLINICAL EXAMINATION (OSPE)

OSPE is a multi station, multi task process of assessment. It reflects the objectives - construct validity. It set at an appropriate level, Understand and apply theory - NOT A SERIES OF MCQs, but Test practical skills (similar to OSCE)

#### **OSPE IS IMPROTANT-**

- Better coverage than a practical examination „
- Do not need multiple sets of equipment
- Ideal for integrated curricula „
- More reliable and in terms of training doctors, more valid
- Usually cheaper than a practical exam „
- Shares the same psychometric pluses & minuses as OSCE

#### **PRACTICAL STATIONS CAN BE-**

- I. Use of a microscope
- II. Analysis
- III. Histopathology „
- IV. Applied anatomy – SPs, X-rays „
- V. Measurement – BMI function tests „
- VI. Side Room procedures, if still done
- VII. Read some recordings – X-RAY etc.,
- VIII. Elementary clinical skills – integration

### OBJECTIVE STRUCTURED CLINICAL EXAMINATION (OSCE)

The OSCE is considered to measure clinical competence and was first created by a group of senior examiners in Glasgow, UK, to replace the undergraduate finals' long case, which is inherently

unreliable. Since that time the OSCE has been used in postgraduate and national licensing examinations in the USA, UK, Canada and Australia among other countries.

### **SRI AUROBINDO College has chosen the OSCE to evaluate the undergraduate and postgraduate Examinations.**

The OSCE is very resource intensive and should not be undertaken by those without experience. OSCEs used to certify specialist competence meet the standards required for a valid, credible and defensible test.

#### **INTRODUCTION**

The OSCE also incorporated the use of standardized patients first described by Barrows and Abrahamson in 1964. The use of standardized patients allowed the nature of problems and the level of difficulty to be standardized for all students (van der Vleuten and Swanson). This combination of multiple observations and standardization of content and difficulty has made the OSCE a very popular evaluation tool.

Further, extensive research demonstrated that OSCEs could have excellent psychometric properties. As a result, the use of OSCEs is now extensively used in medical schools throughout the world, various competencies are tested using manned and unmanned stations.

Importantly, the measurement is structured, using specially prepared mark sheets with specific instructions and training provided for the examiners. A time allowance may be given for candidates to move between stations and often REST stations are interspersed in the circuit to allow candidates to prepare themselves for the coming stations and complete any incomplete questionnaire. The candidate's answers from unmanned stations may be carried in an OSCE book, while examiners record their marks on separate sheets which are not given to the candidate.

Best of all, of course, is to pre-test stations or know from previous editions of the examination how long chosen competencies take to test effectively. This can be determined using formative OSCEs with a limited number of stations.

The OSCE is very flexible and can test a wide range of tasks and skills. The choice should and will always be within the boundaries **set by stated outcomes and more specific learning objectives**. Consideration also needs to be given to whether or not the candidates are familiar with the format of certain "unusual" stations otherwise the danger of exam by ambush becomes a problem. To avoid this, again formative OSCEs even if not full length, are to be highly recommended.

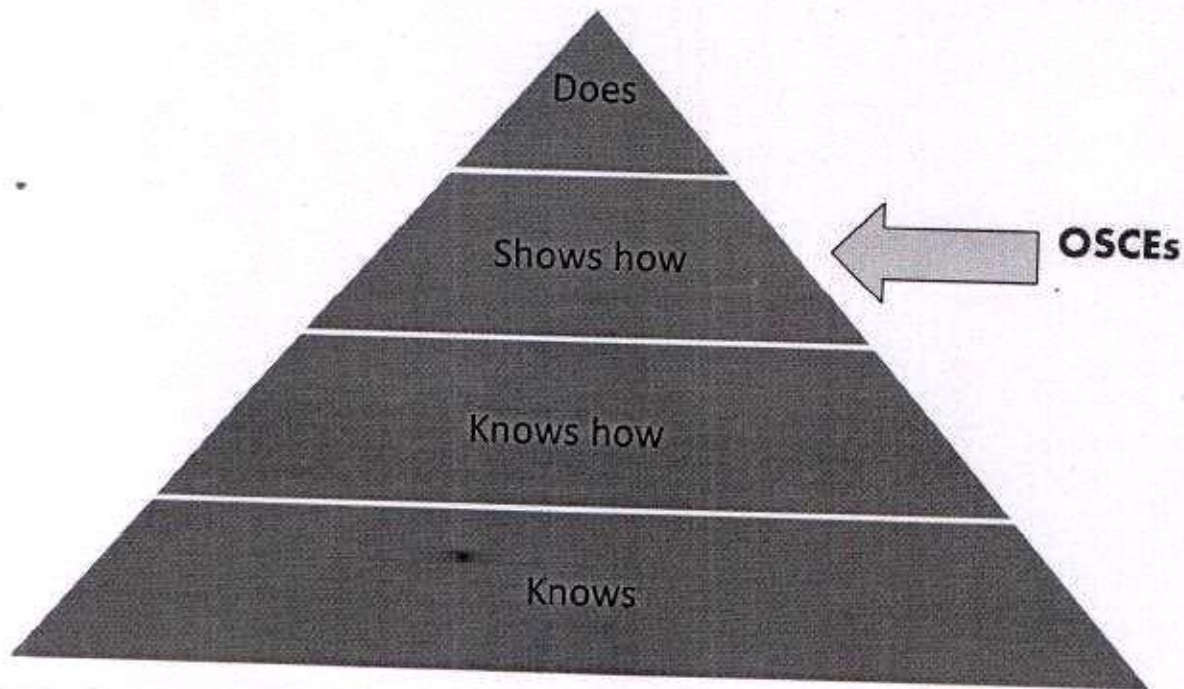
Another important issue to address is to satisfy the need for a wide variety of skills and competencies by using a test blueprint or matrix to design the OSCE itself. In this respect, the other exam components should not be forgotten, such as paper tests of knowledge, and other higher tests of cognition. If the whole examination presents an unbalanced and overlapping distribution of competencies tested the value of the OSCE is diminished.

The choice of tasks is part of the organizational procedure for setting up a successful OSCE and above all shall reflect the core competencies expected of the students. The organizing team needs also to consider

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whether an OSCE can reasonably give information about all attributes expected from the candidates at the level of the test or indeed be possible to test at all.

### Purpose of OSCE



### THE MILLER PYRAMID

#### STATIONS

A station list should be compiled. Staff Members can distribute the stations among themselves or ask other staff to participate in the preparation process.

All station designers need to prepare a number of documents related to their station.

#### Station's profile

This profile is usually used for the identification of the characteristics of the station in the item bank. An estimate of the time needed for the task, and the domain and competence tested (objective/construct of the station). The profile should also include a proposal of the suitable examiner (for example a surgeon).

The documentation should also specify the item which is most suitable for the demonstration of the skill, whether it is going to be a patient (non-standardised or standardised), a model /cast/phantom, a simulator (physical or digital) or an interactive animation and so on. If the item is not a patient, the

alternative item should also be clearly specified, for example a video of a patient. Station materials must be prepared in goodtime.

### **Opening statement of station (scenario, preamble)**

This is important as it is expected to prepare the mindset of the examinee and provide a semi-real-life situation. A scenario should, as much as possible, use the patient's language rather than technical medical terminology. It should provide enough information to guide the examinee to the required task, but not too little. A standardized format for the task is helpful - for example, providing the patient's name, age, presenting complaint, and the setting (such as clinic, emergency department) - and must be uniform for all stations. Bearing in mind the time constraint for any station, care must be taken not to overload the scenario with any unnecessary detail.

### **INSTRUCTIONS**

Clear instructions should be written for examiners, examinees and patients (non- standardised or simulated/standardized).

#### **Instructions for candidates**

Candidate instructions may state the specific task or skill to be demonstrated. They must be clear and precise, whereby any person reading the instructions will have a full understanding of the task.

At integrated stations, more than one competence can be tested, in which case, clear instructions for both tasks must be provided. Finally, it is always useful for the candidate to know the division of marks between tasks and questions that might be asked.

#### **Instructions for the examiners**

Explicit instructions should always be provided for the examiners of a station. As an introduction the station profile shall be presented, with a clear statement of the construct being measured.

#### **Instructions and training material for patients**

There shall be a short and informative description of what will happen at the station, some stations may require unusual responses. If a history is to be given the details shall be provided, and preferably surplus to requirements (a complete history) to avoid leading the candidates by the absence of important information that a patient would normally give.

### **SCORING AND MARKING FORM**

The station designer/constructor should follow the rules and standards agreed upon by the heads. The format of the form(s) to be used should be specified by the head of the departments as there are various formats. The most widely used are:

#### **i. The checklist**

This is a list of the expected items if the task is completely performed. The staff must decide the degree of detail with which items will be described. Some assessors believe that the statements should be general and flexibility left for the experienced examiner, others believe that statements should be so specific and objective that subjectivity is minimized.

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Statements regarding generic skills and behaviors which are expected to be in most or all stations should not be given a high mark as this will affect the overall mark of the exam. Scoring in a checklist is usually of the yes/no, done/not done type. This method of rating is particularly useful for inexperienced examiners and is not recommended for postgraduate examinations.

**ii. The rating scale**

Like the checklist, a rating scale has a list of statements detailing the task to be performed. The difference is in the scoring style as examiners are interested in differentiating performance based on quality and level of mastery. The candidate will be rated across a scale such as, satisfactory, borderline, weak, not done or problems. A mark is assigned for each level in the scale, like 2, 1.5, 1, 0.5 and 0 for the example given earlier.

**iii. Global rating**

This concept can be used for different purposes. Some examiners would like to assess the overall performance in the station to differentiate the competent from the insufficiently competent. In this case a mark should be allocated for this global rating. This is usually used with the checklist and is not necessary in the rating scale.

**STATIONS REFINEMENT, CALIBRATION AND TESTING – FORMATIVE OSCEs**

New stations should be scheduled for testing and calibration where examiners make sure that the task is objective and doable and that the time suggested is appropriate. If a clinical sign needs to be demonstrated by the candidates with a non-standardized patient, the examiners must make sure that the sign is clear and can be detected by the examinees before the OSCE starts, and this can only be done by the examiner examining the non-standardized patient himself, and not during the OSCE itself.

**Preparing the examinee's exam book**

An OSCE book is desirable, but might not be favored. Not everything goes into the OSCE book, for example the Observer Examiner station mark sheets are retained at the station. Exam books were found to be very useful for the candidates.

The book could include:

- a) The map of the examination area/ department.
- b) The instructions and regulations for the exam (for example, five minutes reading time are allowed at the beginning of the exam).
- c) The scenario and instructions for every station (active and static).
- d) Marks for each station.
- e) Answer sheets, in most cases with the questions, for example, X-ray and data interpretation.
- f) Available resources. It needs always to be stated what the candidate should expect in general at each station.

**Recommended standards and regulations**

1. Every station must correspond to a specific item (cell) in the test blueprint.
2. The construct must be clearly stated, including what level of mastery, and whether with a simulated patient or non-standardised patient, phantom or simulation equipment.
3. Before a procedural demonstration the candidate shall explain to the examiner, as though a patient, exactly what they are going to do.

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4. Every station must have an explicit marking schedule, and all stations must have one set of total marks, for example ten or twenty.
5. The following materials must be available for every station:
  - The station title is implied through its classification, and must have at least two parameters
  - Examiners' instructions must be available
  - Instructions, which may include a simplified marking schedule
  - An equipment list, including disposables and other materials must be provided for every station,
  - Computer based stations are legitimate provided they fit the test blueprint and are aligned with the curriculum.
  - Stations which can be delivered in another format should, however, be avoided
6. OSCE stations must focus on appropriate psychomotor skills at the 'shows how' level of the Miller's pyramid avoiding items that can be included in tests of knowledge like MCQs, Spotter exams, bearing in mind that multiple-choice question tests for postgraduate.
7. As much as possible, OSCE stations should be of the integrated types that assess soft skills such as communication, ethics, attitudes, and professionalism as well as the clinical task applicable to that station.
8. It is recommended that the number of OSCE stations should be between 5- 10 stations (rest stations not included). The exact number may vary.
9. Banking of OSCE stations is encouraged after applying all these guidelines with the feedback from candidates and examiners, so that the relevant station could be modified and re-tested.
10. All newly designed stations shall preferably be calibrated and tested in a formative test before banking.

### **The Test Blueprint**

Developing a test blueprint is the process by which test content is carefully planned and then aligned against curricular learning objectives. Test blueprints are important in any assessment to ensure content validity; the most important concept in any assessment system. A test blueprint ensures that the test measures the intended learning outcomes. It is recognised that no test can measure everything in a course/programme or whole curriculum.

A test blueprint or specification table could be prepared by plotting the program contents against the program objectives to produce a grid or table, then putting the components of the program and their weights in the rows and the tasks or competencies in the columns. The number of stations for each component is calculated and distributed across the competencies which are most appropriate for the component.

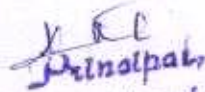
### **Preparing a Test Blueprint for an OSCE**

Blueprinting is a process by which educators ensure that all important components are proportionately assessed.

Validity is a requirement of every evaluation and implies that candidates achieving the acceptable performance level have acquired the level of competence set out in the learning objectives. Evaluation of content is considered to be valid when it is aligned with the objectives and learning experiences.

There should be distribution of cases whereby all competencies are mapped. The focus must be on competencies rather than selecting cases based on their availability in an OSCE assessment.

Example- TEST BLUEPRINT (BDS)

  
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No.	Course	No of stations	Domains of clinical competence								
			Communication		Examination		Procedures				
			HT	OC	PE	VSI	TP	DP	IATF		
			A	B	C	D	E	F	G		
1	Oral medicine and radiology	3	1		1				1		
2	Pediatric and preventive dentistry	5	1		1	1	1			1	
3	Periodontology	4	1	1	1		1				

- Communication:** HT=Focused History Taking, OC=other communication.
- Physical Examination:** PE = Physical examination, VSI=Virtual Sign Identification.
- Practical Procedures:** DP=Diagnostic Procedure, TP=Therapeutic Procedure, IATF=Identification of Abnormal Test Finding.

### Converting the blueprint into a test map

The next step in the preparation of an examination is the conversion of the blueprint into a test map. This can be achieved by the following steps:

- i. Draw a table as shown in Table 3.2 (components and tasks/skills).
- ii. Identify the conditions/problems which were agreed by the OSCE exam members for the different departments
- i. Agree on the weight given to each problem and possibly more competencies to be tested for any specific problem.
- ii. Transfer these problems/diseases in the appropriate rows according to their related system and competencies tested.
- iii. Be sure that all or a majority of cells are filled with the competencies to be tested

  
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Example- Table 3.2 - department of Pedodontics -

Blueprint Cell	Item (condition)	title	Competence tested	Proposed test item
A, G	2	Pulpities	HT/ IATF	Patient
C, E	1	Trauma of anterior tooth	PE /TP	Patient
E	3	Restoration of teeth	TP	Phantom teeth
G	2	Developing malocclusion	IATF	x-ray/ OPG
B	1	Special child	OC (counselling)	Patient

When an OSCE blueprint is ready, a station list can be prepared through the identification of the clinical conditions and tasks for each component of the educational unit. If a cell in the blueprint contains more than one station, the conditions are numbered 1, 2

**Types of stations (manned or unmanned, dynamic or otherwise, linking or duplex)**

The main purpose of a Postgraduate OSCE is to test clinical competencies at the 'show' level of the Miller pyramid. Therefore, when preparing the list of OSCE stations, after developing the test blueprint, only those stations should be included which really test the 'show' level of the candidates. The following are some of the station formats:

**i. Integrated stations.**

These are stations in which two or more competencies are tested for example history and examination, history and data interpretation, history and communication (counseling, getting informed consent, and so on).

**ii. Linking or duplex stations**

Usually, the time spent for an OSCE station is 5 - 15 minutes (undergraduate level, 5 - 7 minutes; and postgraduate level, 8 - 15 minutes). Duplex stations allow two related tasks to be tested example, history taken from a simulated patient, and at the following station lab or imaging results of the case are displayed for identification of abnormalities and interpretation of data, or a questionnaire is used related to the history just taken.

Alternatively, some skills may need more than the prescribed time and two parallel stations are placed in the OSCE circuit and candidates are fed first to one and then the other thereby allowing double the time at the station.

**Recommended regulations**

1. The OSCE prepared must fulfill the Criteria which include validity, reliability, educational impact, cost-effectiveness, and acceptability.
2. To ensure content validity, it is recommended that each board creates a master blueprint which specifies all the content and the learning domains/outcomes derived.

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3. An OSCE blueprint can then be developed from the master exam blueprint.
4. A test map of the venue to be used and a detailed station list should be developed from the blueprint together with an exam follow-up checklist for organizational purposes.

Since these OSCEs are for postgraduate candidates, it is recommended that rating scales be used as much as possible.

#### **Assigning roles and responsibilities (exam coordinator, examiners, support staff)**

The preparation of an OSCE is different from preparing knowledge based exams with multiple-choice or essay questions. The success of an OSCE largely depends upon thorough planning and efficient organization.

#### **Choosing and preparing the venue, the exam materials (signs, bell system, exam items) the use of video technology**

If a dedicated OSCE centre or custom built skills lab are not available to hold the OSCE in, a good alternative venue is a clinical environment.

When planning an OSCE, the testing area should be mapped, station placement and type (for example, unmanned, manned and with patients) noted and flow patterns shown. The layout should be such that the bell(s) used to indicate the time to change stations can be heard throughout the examination area. The best choices of bell are those frequently used for fire alarms.

Use of video technology in OSCEs is increasing. To save time and money, some of the stations involve videotaped material. Venues offer the facility of video recording to capture.

#### **Administering the OSCE**

On the day of exam, the OSCE coordinator and support staff should arrive early. Simulated patients should arrive next. Examiners should arrive at least 45 minutes before the start time to familiarise themselves with the details of the station and also with their patients. It is important that examiners are briefed some days before the OSCE itself so as to leave enough time to answer all their questions. Candidates should arrive at the venue at least 30 minutes prior to the start time. The candidates should be given a final briefing, including details of any arrangements, their starting positions and the movement flow in the OSCE circuit, and finally some words of encouragement.

#### **Marking**

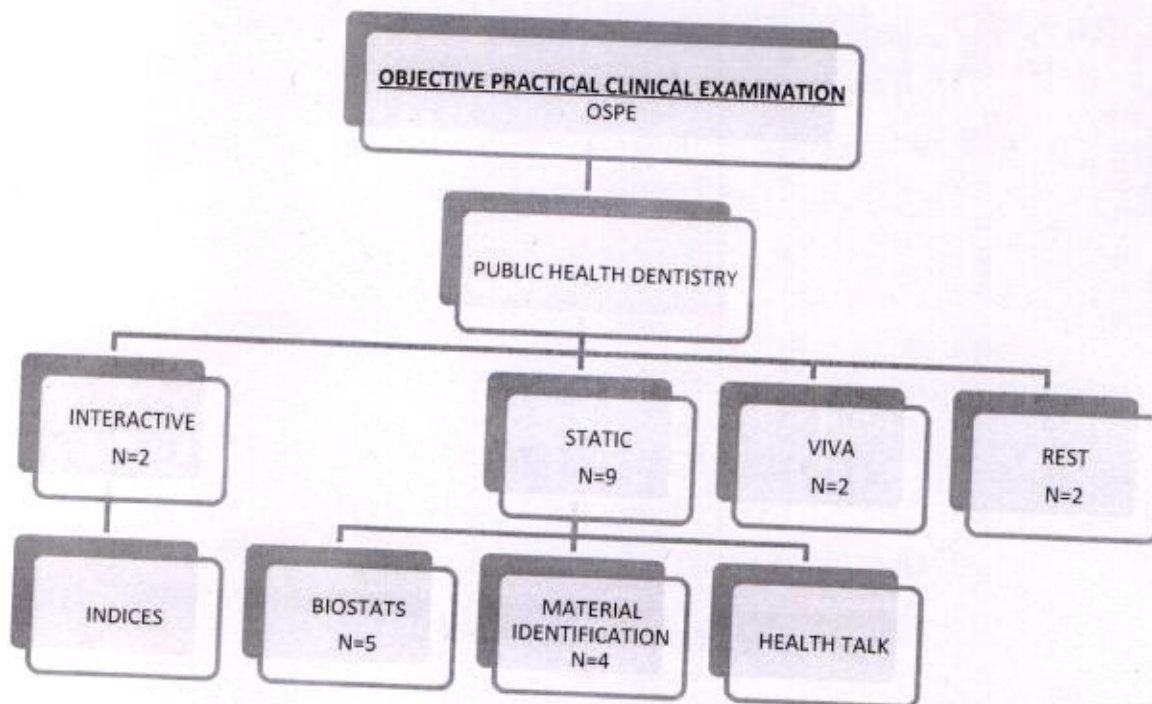
All mark sheets are collected from each station and checked for candidate identification, name and / or number. It is advisable to enter the marks into a data sheet (Microsoft Excel) as soon as possible after each session so the scores can be compiled shortly after the last OSCE session is completed. Adequate time should be allowed to process the marks and the data manager should be supported by sufficient staff to ensure no candidate score is omitted.

#### **Recommended standards and guidelines for the delivery of exams**

1. An OSCE committee should be appointed with an exam coordinator to supervise the delivery process helped by a support team.
2. A suitable exam venue should be chosen, prepared and tested well ahead of the exam day with sufficient space for patients, examiners at their stations and briefing and rooms for candidates.
3. The selection of examiners should be based on specific criteria, including training and contribution/participation in previous OSCEs.

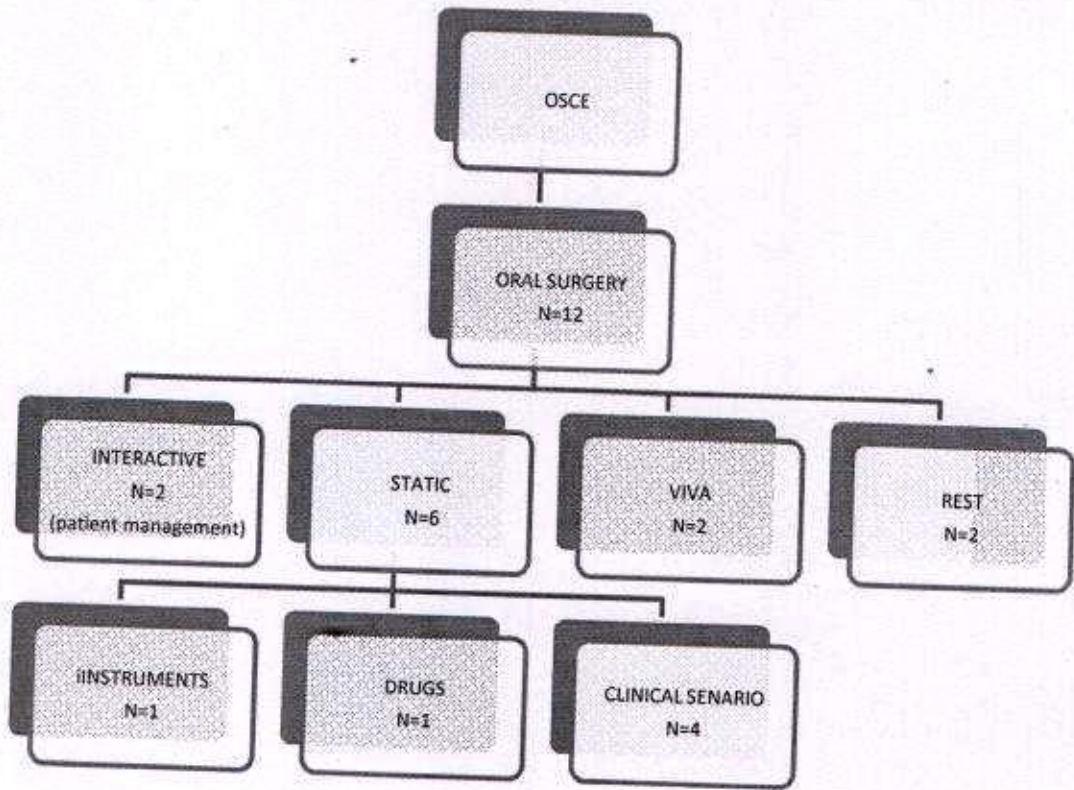
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4. To reduce variability and improve inter-rater reliability, workshops/training courses must be organized for the purpose of training and orientation of examiners and simulated patients.
5. The entry and collation of candidate marks should only be done by support team staff as soon as possible after each OSCE session.
6. The evaluation of students at each station could be done by examiners physically present at the station or through video system.
7. Instructions, answers and reflection could be done on papers posted and located at each station or preferably in an examinee's OSCE book distributed to candidates at the beginning of the exam.
8. Debriefing of examiners, patients, candidate representatives and support staff should be done as soon after the day of the OSCE as is convenient.
9. Some of the stations will need to be recorded for standardization purposes and to give further feedback to examiners.



**EXAMPLE – OSPE AND DISTRIBUTION OF STATIONS**

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**EXAMPLE - OSCE AND DISTRIBUTION OF STATIONS**

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