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## Mini-clinical examination (mini-CEX) as a tool for formative assessment for surgical interns

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### Abstract

**Background:** Medical education in India is undergoing paradigm shift from traditional teacher centered teaching to integrated, interactive, students centric teaching. Present day evaluation methods are lot to be desired. Assessment of students is very important in facilitating students to know how competent they are. Mini clinical assessment has been accepted as an efficient tool to measure the competencies.

**Aim:** To assess the effectivity of mini-clinical exam as an assessment tool for surgery interns

**Method:** Mini-CEX is introduced in our Institute recently from march 2018, to assess Interns posted in surgery department. 25 interns from the beginning of their posting in surgery department were introduced to this method. Clinical scenario and time decided by the interns and faculties, mutually convenient to them. The faculty serves as a mentor, and role model. Formative assessment and immediate feedback given to each intern

**Results:** Mini clinical exams found to be an effective tool for assessment of residents. Residents can be assessed in regular patient examination, without need for any special set up, by independent faculties there by eliminating any kind of bias. As an assessment tool, mini-clx increase not only knowledge, but also non technical skills like attitude and communication.

**Conclusion:** Mini clinical exam assessment is very effective as a milestone assessment tool for competency assessment in interns. It is affordable, genuine, and economical especially in a developing country like India. Mini CEX improves clinical skills and leads to reduced medical errors in diagnosis and better patient care.

**Keywords:** Interns, mini clinical exams, assessments, competency, economical

### 1. Introduction

Assessment for medical students was based on traditional clinical exams and year end theory exams till recently. Many innovative teaching learning methods and assessments have been introduced recently, though it may take time for successful implementation. Mini-Clinical Evaluation Exercise (CEX) is one new assessment tool found to be effective since it gives immediate feedback also <sup>[1]</sup>. Feedback is very essential in enhancing skill development. Feedback may be defined as observing the interns performing preplanned clinical setting, collecting data of their competencies and reflecting on it by qualified faculties <sup>[1]</sup>. The assessment and feedback should be formative, milestone stages to be effective, rather than at the end of program which is summative. While this kind of assessment has not being followed in India generally, many autonomous institutes started this kind of assessment. Assessment based feedback helps the interns' in improving not only technical skills but also non technical skills such as attitude, ethics and communication <sup>[2]</sup>. Hattie has recorded feedback has highest influence in concurrence with veloski in medical training <sup>[3]</sup>. At present interns are rarely assessed for their competencies and almost no observation done in clinical setting, when the interns examine the patient, and their attitude and communication goes unnoticed. Almost no observation done in clinical setting, presently when the interns examine the patient, and their attitude and communication goes unnoticed <sup>[4]</sup>. Mini clinical exams come as an effective way of assessing these skills with no need for any special set up. Instant feedback not only help the interns improvise their skills, in addition it makes them to be a competent clinician as well <sup>[5]</sup>. Though OSCE and OSPE are also being used, Mini clinical exams reported to be far more effective in achieving summit of Millers pyramids (does) level.

### 2. Methodology

This method of Mini-CEX is being introduced in our institute from March 2018, to assess the interns. The clinical examination with patients set up planned by interns and faculties time

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convenient mutually to both of them. Assessment schedule prepared at the beginning of posting for all interns with the faculties in charge against their names. Each intern will be given a time of 20 minutes to thoroughly examine a patient, though it is not mandatory to complete the task in given time. Attitude in receiving, elicitation of history, communication, physical examination, and attitude and a procedural skill all will be assessed. This session will be followed by individual feedback. Observing faculty will assess all aspects by giving score done on assessment sheet. A standard assessment form is used to score the interns based on the clinical case given using 9 point likert scale (1–3 (unsatisfactory), 4–6 (satisfactory), to 7–9 (superior) used for documentation and analysis. At the end of the session interns' feedback obtained using 5 point likert scale. We used SPSS-11.5 to analyze data. Descriptive (mean, S.D.) and analytic statistics including Pearson coefficient were applied. (<http://www.abim.org/pdf/paper-tools/minicex.pdf>.)

(Figure: 1) Standard assessment form has the advantage of ruling out any kind of bias, and remarks given by the faculties where ever there is scope for improvement. Constructive feedback at the end of session is the crucial part of this mini clinical examination. No effective scores, constructive feedback, and assessment is the goal of this study.

### 3. Results

100 encounters with 35 interns were recorded, and 66.674% of the interns completed the mini clx in the stipulated time. Encounters were equally divided between wards and OPD, with assessors being professors' 25% assistant or associate professors 75%. The focus areas and competencies assessed are shown in (Table 1) The complexity level of the cases varied with 10% of cases more complex, 60% of cases moderate and 30% cases straight forward simple cases. Time taken by interns to complete the examination varied between 20 to 40 minutes (range 20 to 40 minutes) feedback one to one took average of 15 minutes (range 5–25 minutes). We collected 100 assessments from 35 trainees who were in different semesters. Mean of trainees' score of mini- CEX method was  $18.8 \pm 1.7$  (of 25). Mean of satisfaction with was  $76.8 \pm 12.5$  (of 100). The most satisfactory domain of mini-CEX method was being elicitation history,  $82.5 \pm 18.9$ . In contrast, the least one in mini-CEX method was performing skills under trainer supervision"  $61.8 \pm 27.9$  (table 1). There was no significant correlation between trainees' score of rating scale and ( $P=0.973$ ,  $r=-0.06$ ).

Intern's feedback about this assessment documented, mean and standard deviation range documented. (Table 2) Feedback from every participating interns obtained based on 5 point likert chart, 90% of the interns who completed the task felt mini-cex helped them to be more confident, will help them in their postgraduate course. 60% felt that individual presentation was better without peer presence; all the interns felt that individual feedback was helpful in learning from mistakes, and same time confidence when the feedback was complementary. 10% interns commented presence of senior faculty made them nervous. Feedback from faculty increases strength of the assessment, as multiple faculties assess multiple encounters of different interns are assessed in a range of clinical situations than the traditional bed side examination in clinics., has better reproducibility, and offers residents greater opportunity for observation and feedback by more than one faculty member and with more than one patient. Trainees' satisfaction of mini-CEX was  $78.8 \pm 10.5$  (of 100). Feedback showed that they feel this method could improve their motivation, and competency. Results showed that Interns were satisfied with mini-CEX outcome.

### 4. Discussion

Senior faculty member, usually expert in the subject observes the performance of trainees and scores all aspects of examining a patient and gives feed back in mini clx to make it effective [6]. Mini clx will be more effective if different faculties score and give feedback of the interns throughout the course, which eliminates any kind of bias [7] (Formative assessment). Though traditional bed side teaching, FGD (focused small group discussions) hold good even now, there is no proper individualistic assessment of skills [8]. There is no feedback either from the students or from the faculties in present day teaching learning methods and only summative assessment at the end of the year. Mini-CEX is not only assess the technical and non technical competencies but also combines feedback and summative assessment [9]. Though this method of mini-clx exists in medical schools in western countries, this method is being introduced in many institutes in Van der Vleuten proposed a formula and tools for assessing different tasks. Studies by different authors and reviews also have used this framework to assess the effectiveness of these assessment tools, reliability, acceptability, impact, validity and affordability all form part of the assessment tool [10]. Hawkins *et al.* in their review analyzed the mini-CEX scoring, generalization, extrapolation, and interpretation/decision with instruments different from original and found effective [11]. One of the most frequently used assessment tools that measure the trainees' performance in workplace is the mini-Clinical Evaluation Exercise (mini-CEX) as studied by Sara mortaz in 2017 about the utility of mini clx. The mini-CEX assesses residents in a much broader range of clinical situations than the traditional CEX, has better reproducibility, and offers residents greater opportunity for observation and feedback by more than one faculty member and with more than one patient. Norcini *et al.* on the other hand, found that the mini-CEX may be more difficult to administer because multiple encounters must be scheduled for each resident [12]. Many studies have reported that the reliability of mini-CEX is higher than that of OSCE and OSPE [13]. This evaluation and assessment done as a pilot program in our institute, and the interns are very receptive, and feedback encouraging. Assessment of knowledge and skills can only be qualitatively assessed, by giving feedback and scope for improvement in different stages of learning. Formative assessment useful in checking different domains of learning like cognitive, psychomotor and non technical skills like attitude, communication legal and ethical issues in real patient encounters. Mini-CEX may be challenging as we have to schedule multiple encounters for all the interns and faculties for assessment. Bibi Leila *et al.* in their study on Practical study on Mini-CEX noted that they have some additional strengths like motivation, peer and teachers feedback. Most workplace-based assessment methods are though difficult to implement, Mini-CEX, found to be easy to incorporate into the day's work. Although it is relatively time-consuming according to some trainees, successive assessment of all competencies in mini-CEX method may establish this idea.

Weller *et al.* (2009) reported trainees' satisfaction with Mini-CEX, 7.3 (of 10) which is comparable with our study. About being interested in applying clinical evaluation method, 72.8% of the trainees were interested in applying mini-CEX. Although based on the change theory, people resist against acceptance of new things (10), it was surprising that trainees were eager to apply mini-CEX method. Since being interested in reusing a method, may be the indicator of trainee's satisfaction with it. Mini-CEX Is found suitable for both students and

faculties, as it does not require any special set up, and part of training interns. This new training introduced to our interns as a pilot project, findings can be as a guideline for faculties to plan more suitable, effective, and objective clinical evaluation methods to improve interns' clinical skills.

**5. Conclusion**

Present day medical curriculum stresses the importance of assessment for students. Many tools have been developed for measuring and assessing students' progress and achievement serving this purpose. Mini-CEX found to be more effective and authentic form of assessment for surgical interns in their daily routine clinical setting, than OSCE or OSPE. Assessment by faculties and feedback definitely help the interns in improving skills and confidence. This method is cost effective, interactive integrated with feedback makes it qualitative assessment and of course with dedicated faculties. Limitation of our study is, this

mini cex introduced only recently in our department and needs further qualitative analysis needed to assess the impact.

**Table 1:** Focused area and competencies assessed.

S. No.	Variables	N (%)
1.	Communication skills	52
2.	Attitude	82
3.	Physical examination	86
4.	counseling	82
5.	professionalism	65
6.	Organization	66
7.	Clinical competence	82

**Table 2:** Mean and range time for assessment and feed back

S. No.	Purpose	Mean Time	Range
1.	Assessment by faculty	15.25 min	10-22 min
2.	Feedback by faculty	11.20 min	7-15 min

### Mini-Clinical Evaluation Exercise (CEX)

**Evaluator:** \_\_\_\_\_ **Date:** \_\_\_\_\_  
**Resident:** \_\_\_\_\_  R-1  R-2  R-3  
**Patient Problem/Dx:** \_\_\_\_\_  
**Setting:**  Ambulatory  In-patient  ED  Other \_\_\_\_\_  
**Patient:** Age: \_\_\_\_\_ Sex: \_\_\_\_\_  New  Follow-up  
**Complexity:**  Low  Moderate  High  
**Focus:**  Data Gathering  Diagnosis  Therapy  Counseling

**1. Medical Interviewing Skills (○ Not observed)**  
 1 2 3 | 4 5 6 | 7 8 9  
 UNSATISFACTORY | SATISFACTORY | SUPERIOR

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**2. Physical Examination Skills (○ Not observed)**  
 1 2 3 | 4 5 6 | 7 8 9  
 UNSATISFACTORY | SATISFACTORY | SUPERIOR

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**3. Humanistic Qualities/Professionalism**  
 1 2 3 | 4 5 6 | 7 8 9  
 UNSATISFACTORY | SATISFACTORY | SUPERIOR

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**4. Clinical Judgment (○ Not observed)**  
 1 2 3 | 4 5 6 | 7 8 9  
 UNSATISFACTORY | SATISFACTORY | SUPERIOR

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**5. Counseling Skills (○ Not observed)**  
 1 2 3 | 4 5 6 | 7 8 9  
 UNSATISFACTORY | SATISFACTORY | SUPERIOR

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**6. Organization/Efficiency (○ Not observed)**  
 1 2 3 | 4 5 6 | 7 8 9  
 UNSATISFACTORY | SATISFACTORY | SUPERIOR

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**7. Overall Clinical Competence (○ Not observed)**  
 1 2 3 | 4 5 6 | 7 8 9  
 UNSATISFACTORY | SATISFACTORY | SUPERIOR

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**Mini-CEX Time:** Observing \_\_\_\_\_ Mins    Providing Feedback: \_\_\_\_\_ Mins

**Evaluator Satisfaction with Mini-CEX**  
 LOW 1 2 3 4 5 6 7 8 9 HIGH

**Resident Satisfaction with Mini-CEX**  
 LOW 1 2 3 4 5 6 7 8 9 HIGH

**Comments:** \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Resident Signature \_\_\_\_\_ Evaluator Signature \_\_\_\_\_

**Fig 1:** Standard assessment form for Mini-CEX showing Professional and non professional skills scoring with feedback from both resident and faculty

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