IOWA STATE UNIVERSITY
Veterinary Clinical Sciences

5th International Veterinary Simulation in Teaching (InVeST) Conference
Pretoria, South Africa
April 10-12, 2017

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Objective Structured Clinical Examination by means of an anesthesia simulation

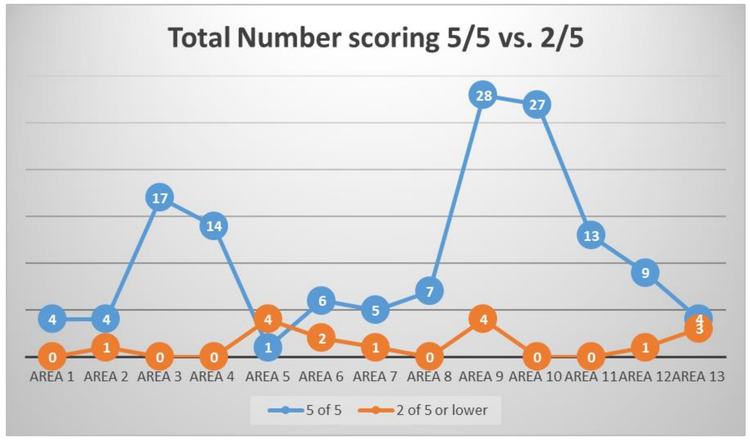
Creation of the OSCE

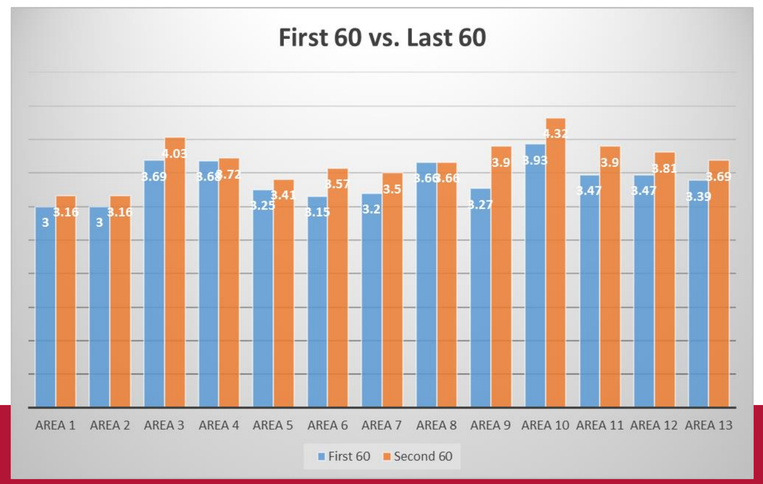
Introduction: At the Iowa State University College of Veterinary Medicine, second year veterinary students are taught anesthesia by means of lectures and anesthesia laboratories. One of these laboratories in particular teaches the assembly and operation of the anesthetic machine and anesthesia calculations for patients. The students assemble the machine, do all the operational checks and calculations. In order to improve the students' ability to identify components, assemble and operate the anesthesia machine, an Objective Structured Clinical Examination (OSCE) was developed, that focused on thirteen critical aspects of the process.

Goal: Create OSCE for students instructed using anesthesia simulation to significantly improve their ability to complete the associated calculations, identify the anesthesia components and assemble the commonly used breathing circuits.

Materials and Methods: The students had two separate anesthesia labs where they where introduced to the OSCE and it's scoring rubric. In these labs the students where able to perform all the tasks for the OSCE per any specifics noted in the scoring rubric. Then 2-6 weeks later the OSCE was carried out by appointment with use of a Dispomed® complete unused anesthetic machine and a RescueCritters® intubation simulator both where available for the initial labs. The thirteen areas assessed were:

1 identify anesthetic machine components
2 describe components functions
3 identify breathing systems
4 calculate reservoir bag size
5 assemble rebreathing and non-rebreathing systems
6 perform leak test, rebreathing and non-rebreathing system
7 demonstrate gas supply knowledge
8 calculate fresh gas flow rates
9 list breathing system differences
10 calculate breathing system time constants
11 describe proper intubation protocols
12 demonstrate proper tracheal intubation
13 demonstrate proper endotracheal tube cuff inflation





Delivery of the OSCE

All second-year students (n=120) were examined by means of the OSCE. Of the 120, 1 student entered a alternate year and three grade sheet were determined to be unusable. The number of grade sheet used in the data stands at (n=116) The students were graded in each of the 13 areas on a scale from 5 (superior) to 1 (deficient). Students that scored grades of 1 and 2 were considered unsatisfactory. Students that scored 3, 4 or 5 passed the examination. Ninety-two percent (107/116) of students passed the OSCE. In conclusion, the highest scoring focus areas involved mathematical calculations. The lowest scoring focus areas involved assembly and functional operation of the machine.

All 9 failures retook the OSCE and all 9 passed. OSCE was graded pass/fail with unlimited attempts for 20 points in the course grade book.

Key Findings and Implications for Education:

Mean scores for each area were determined. The means scores for 116 student demonstrated student scored higher and statistically significant in area 10 "Calculate, time constants" when compared to areas associated with rote memory i.e. 'Name components' and 'Name functions'. The three highest scoring areas were 'perform calculation' based areas. The two lowest means were rote memory areas 1'Name components' and 2 'Name functions'. Means score for the first time failures were determined. These mean scores had statistically significant difference in area 10 'Calculate, time constants' and in area 4 'Calculate reservoir bag size' when compared to areas associated with 'hands on skills' areas.

Discussion:

Considering the means of the first time attempts areas1'Name components' and 2 'Name functions' appear to be the lowest due to the pass/fail grading system. These two area had no failures. Calculation based areas also had no failures.

Considering the first time failures mean scores for calculations based areas these areas still remain the highest scoring areas. However in the failure group the lowest scored areas are the 'hand on skills' based areas, areas 5, 6, 12 and 13. Rote memory and calculations accounted for 65% (90/139) of the perfect scores whereas the 'hands on skills' accounted for the 77% (10/13) of the failing scores.

The findings may indicate that the students do not need additional instruction in calculation based skills and conversely they may need more practice and review for the cognitive and multisensory skills.