



Competency-Based Training on Eye Surgery Simulator



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Introduction:

HelpMeSee eye surgery Simulator is a virtual reality simulator that combines ultra realistic visual graphics with real-time haptic feedback. The training on the simulator is led by a qualified Instructor, delivering a structured course.

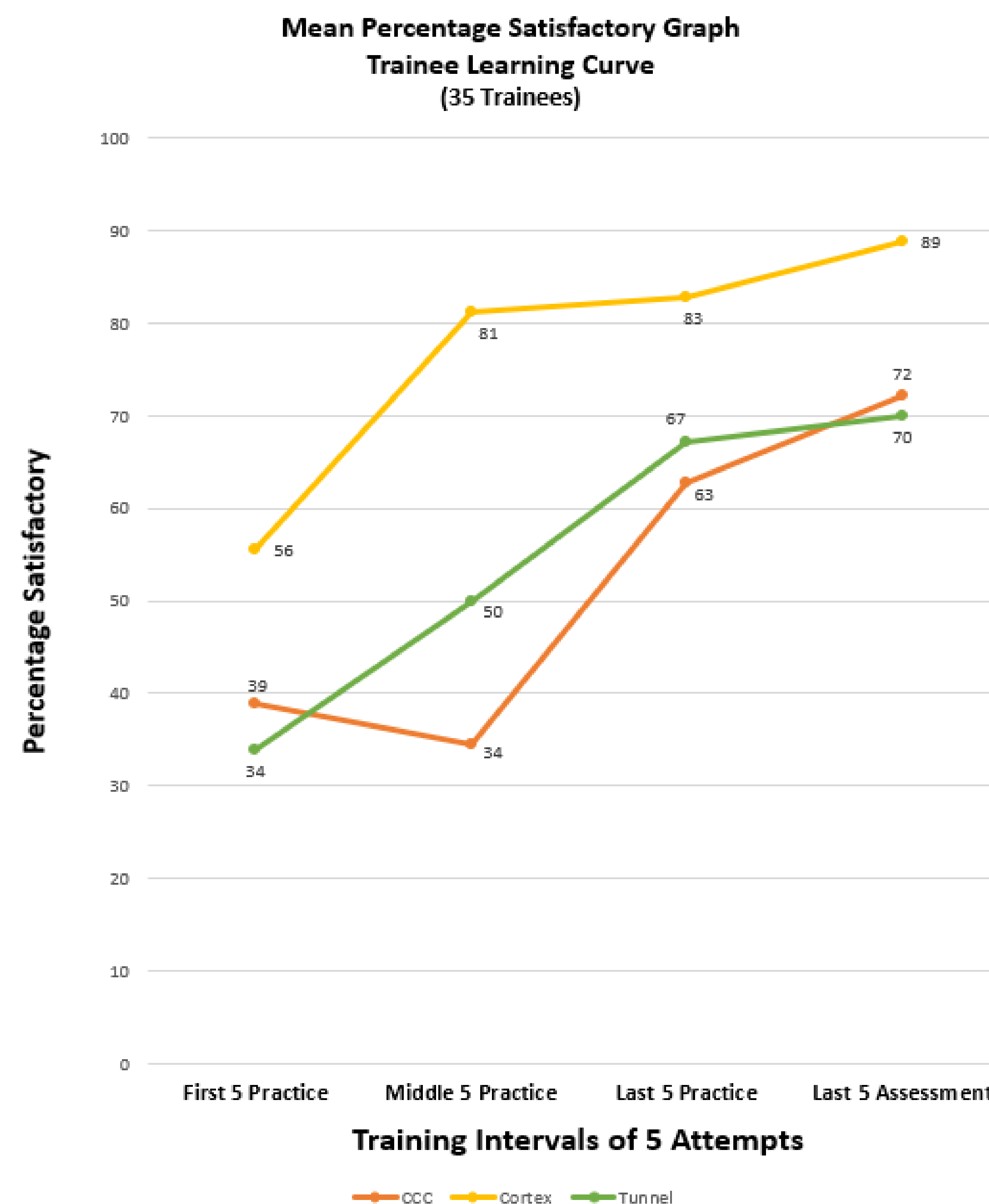
Additionally, the simulator is backed up by a unique simulation-based learning system, which assesses each trainee attempt on the simulator and using objective metrics, provides a performance score.

Thus, an objective scoring system is used to gauge the performance of a trainee on the simulator.

HelpMeSee eye surgery simulator has been previously investigated to assess the simulator metrics. The evaluation included 11 steps of the MSICS procedure and all simulator metrics for the steps were reviewed. Out of 55 initial metrics, 30 of them showed a highly positive discriminative ability suggesting that the simulator was able to discriminate between a novice and an expert in most of the objective assessment metrics. The authors were able to establish validity evidence on the HMS virtual reality simulators such that it can be used in proficiency-based training.

Based on this background information, in this study, we investigated the progress of 35 trainees to understand their learning curve based on the performance parameters and the reports generated by the simulator.

Methods: Training reports of 35 trainees were evaluated from the simulator for three key MSICS steps (Tunnel dissection, Capsulorrhesis, and Cortex removal). Each trainee attempt on the simulator is given a Satisfactory/Unsatisfactory grade based on the outcomes measured using the various performance parameters for each step. The percentage of satisfactory attempts for each trainee is tracked through the practice sessions and at the end of the course assessments to study the trends in the improvement of skills.



Discussion: Simulation-based training offers the advantage of objective assessment of skill acquisition. The summative scoring and grading of each trainee attempt into satisfactory or non-satisfactory based on major and minor errors while performing the task gives a good high-level assessment of the trainee's performance. This study demonstrates gradual improvement in the trainee's performance benefitting from practice and reaching a desired level of competency over the scheduled session and in the end of the course assessments.

There was a statistically significant difference between the trainee performances in the initial training sessions versus their performances in the end of the course assessments (Paired t-test value = 7.33695×10^{20})

Conclusions: Competency based training and objective assessment of surgical skill in Cataract surgery is desirable for qualification and certification purposes. HelpMeSee's performance evaluation matrix in the form of performance parameters and scores provides a framework necessary to deliver competency-based training on the simulator. HelpMeSee simulator with its meaningful performance parameters make competency-based training a real possibility.

References:

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