ABSTRACT

Objectives/Hypothesis: The purpose of our study was to explore factors that might influence the trajectories in residents’ learning curves of surgical performance in the mastoidectomy procedure.

Study Design: Retrospective-cohort study.

Methods: Mastoidectomy evaluations based on a previously validated task-based checklist were obtained for nine residents from post-graduate year (PGY) 2 and 3 over a period of 3 years. Average scores were measured over time and learning curves were generated using scatter plots and non-parametric smoothing techniques. A 5-item survey was conducted to explore various residents’ related characteristics such as interest.

Results: Residents with interest level of 4 in Otology demonstrated a better overall average scores and learning curves compared to those with an interest level of 2. After adjusting for time of assessment, otology level, interest in otology, and time spent in the temporal bone laboratory, on average, those residents who attended an extra session in the laboratory had a 0.04 higher average score (95% CI from 0.01 to 0.07, p-value=0.004).

Conclusions: Residents with higher level of interest in the Otology specialty demonstrated better average scores compared to other residents. Moreover, residents with more attendances at temporal bone course sessions had better average assessment scores.

INTRODUCTION

A learning curve is defined as an improvement in technical performance over time or with increased experience and training.1,2

The rate at which surgery residents achieve a predetermined competency level differs among trainees. Whether a trainee is inclined towards Otology from the very beginning of the training process possesses a better learning curve in Otology procedures has not been assessed.

In Otolaryngology, limited literature is available on factors that could affect a learning curve and surgical performance of a trainee.

Therefore, the purpose of this study was to study the potential factors that could affect surgical performance, and how these could shape a trainee’s learning curve.

METHODS AND MATERIALS

Participants
Four PGY-2 and five PGY-3 residents from the Johns Hopkins department of Otolaryngology-Head and Neck Surgery (OHNS) evaluated in the years 2008 and 2010 were included in this retrospective-cohort study.

Residents were categorized into Otology levels based on their clinical exposure to mastoidectomy procedures.

Assessment Tool and Settings
Evaluations were performed using a previously validated Task Based Checklist (TBC) for the assessment of mastoidectomy skills in the OR.3

The checklist consisted of five key tasks for mastoidectomy:
1) Initial bone cuts
2) Defining anatomic limits
3) Open antrum
4) Thin posterior EAC cortex
5) Open facial recess

Survey
Survey was conducted on nine participants inquiring about resident’s interest in Otology, mastoidectomy surgery, and extra time spent in the temporal bone laboratory using Survey Monkey.

Statistical methods
The Average checklist score was modeled as a function of time. The overall and individual trajectories of checklist score over time were explored using scatter plots and non-parametric smoothing techniques.4

RESULTS

The graphs indicate a non-linear change in the average score over time and heterogeneity in temporal trajectories among residents (Fig 1 – 4).

Higher interest in Otology was associated with higher average assessment score (p = 0.002) (Table 1).

After controlling for time, attendance, Otology levels, and time spent in the laboratory, the residents with an interest level of 4 have on average a 0.73 higher score when compared to an interest level of 2 (95%CI: 0.26 to 1.19, p =< 0.002).

Looking at the same time of assessment, same Otology level, interest in Otology, and time spent in the temporal bone laboratory, on average those residents who attended an extra session had a 0.04 higher average score (95% CI from 0.01 to 0.07, p-value=0.004).

DISCUSSION

Residency program directors (PD) have a responsibility to guide their residents in the selection of a fellowship program that best suits their skills.

Our study suggests that residents with a higher interest level for otology sub specially demonstrate better learning curves as compared to the other residents.5

Opportunities like temporal bone courses should be more frequently added to the Otolaryngology curriculum since we observed an increment in scores for residents with higher attendances at the temporal bone courses.

Moreover, acquisition of surgical skills in Otolaryngology by inculcating novel simulation methodologies like virtual reality simulation would also provide an excellent opportunity for learning and training.

Several confounders like aptitude, anxiety, stress, and fatigue were not addressed in our study. We were also limited in our ability to test the rate of learning by interest due to a small sample size.

CONCLUSIONS

Residents with higher level of interest in the Otology demonstrated better average scores compared to other residents.

Moreover, residents with more attendances at temporal bone course sessions had better average assessment scores.

Awareness of various traits and learning curves for each resident could lead to channeling the motivated minds in the right direction, thus optimizing acquisition of surgical skills in residency and fellowship training programs in order to ensure the development of competent physicians.

REFERENCES