

Formation and Assessment of a Novel Surgical Video Atlas in Otolaryngology Education

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Background & Objectives

Medical education aims to train competent, exceptional physicians in the practice of medicine. The Accreditation Council for Graduate Medical Education (ACGME) has outlined six core competencies: patient care, medical knowledge, professionalism, interpersonal communication, practice based learning and personal improvement, and systems based practice. However in a recent survey of residency program directors, 27% acknowledged that a poor fund of knowledge was a common problem among graduating medical students.¹

Though medical education has innovated in the specialties of internal medicine, pediatrics, and emergency medicine, there have been little efforts to improve medical students' experience on surgical clerkships. There is thus a significant need for educational resources that enhance surgical knowledge for medical students. Traditionally, surgical knowledge has relied on textbooks and anatomical atlases. However there is a significant chasm between cadaver dissections and drawings with what students actually encounter in the OR.^{2,3}

There is an increasing availability of web and mobile applications (apps) that provide resources for surgical anatomy, however these have just taken what was previously on paper and put it onto screens.^{4,5} In our study, we develop and assess the efficacy of a novel surgical video atlas in teaching surgically relevant head and neck anatomy in thyroidectomy to medical students.

Methods and Materials

A video atlas was created through intraoperative recording of a thyroidectomy with narration (via the LED DayLite NanoCam HD by Designs for Vision), and then reduced to 15 minutes of highlights. Medical students were recruited and randomly assigned to one of two interventions. One group was given the video atlas, while the other group was supplied with a traditional textbook atlas. Both groups underwent pre- and post- tests to evaluate anatomical knowledge. All students completed a satisfaction questionnaire at the end of the study.

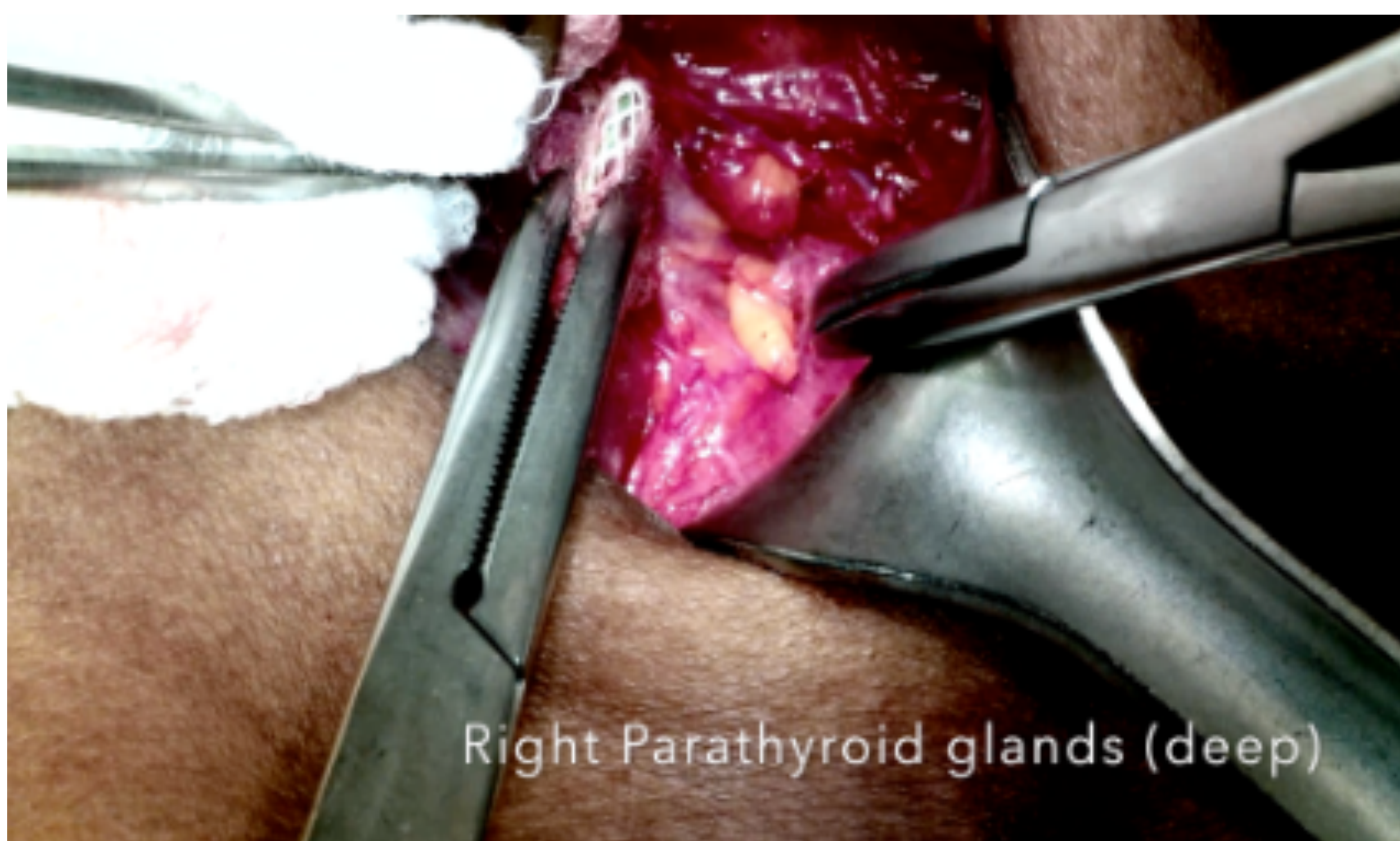
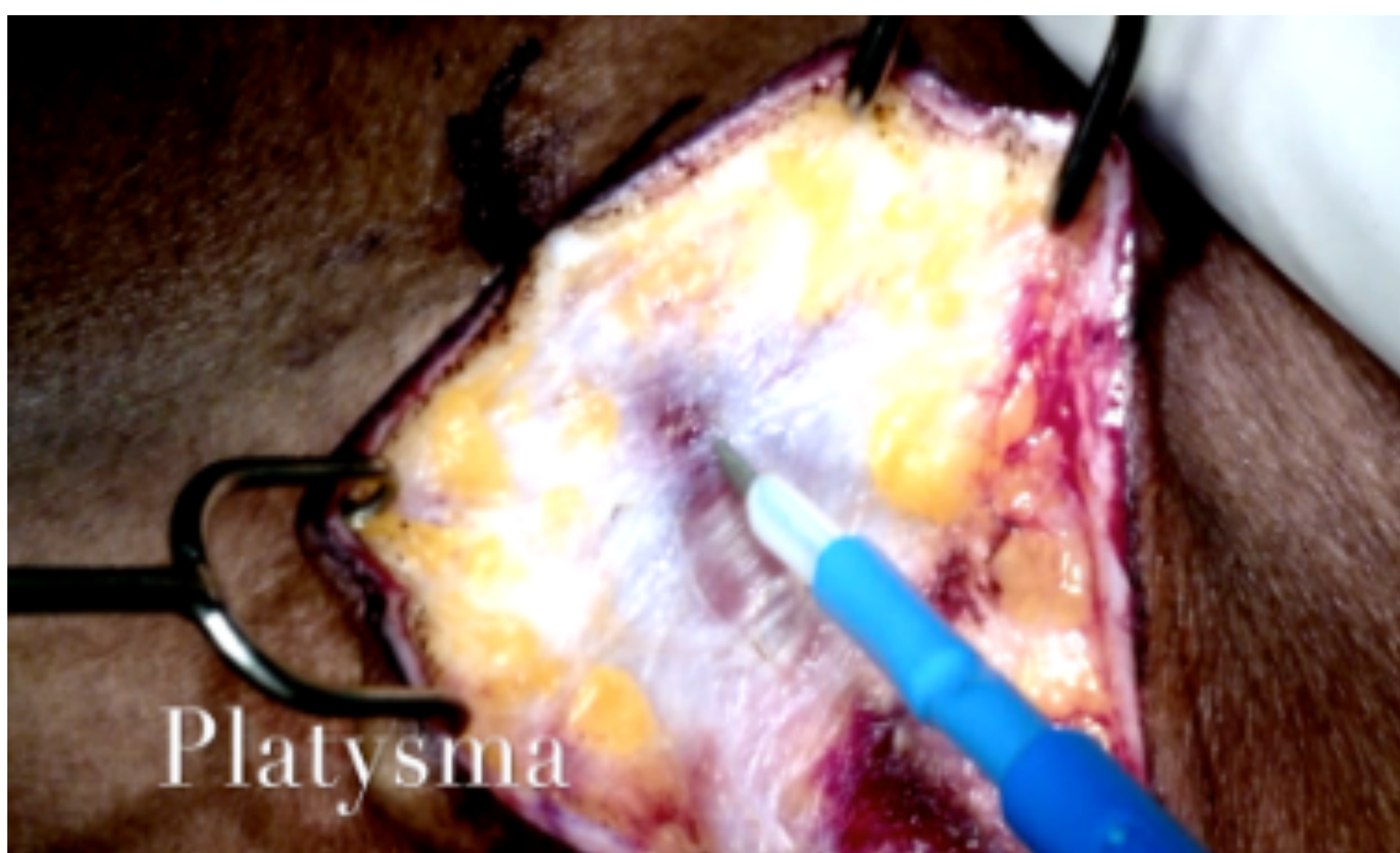


Figure 1. Screenshots from total thyroidectomy.

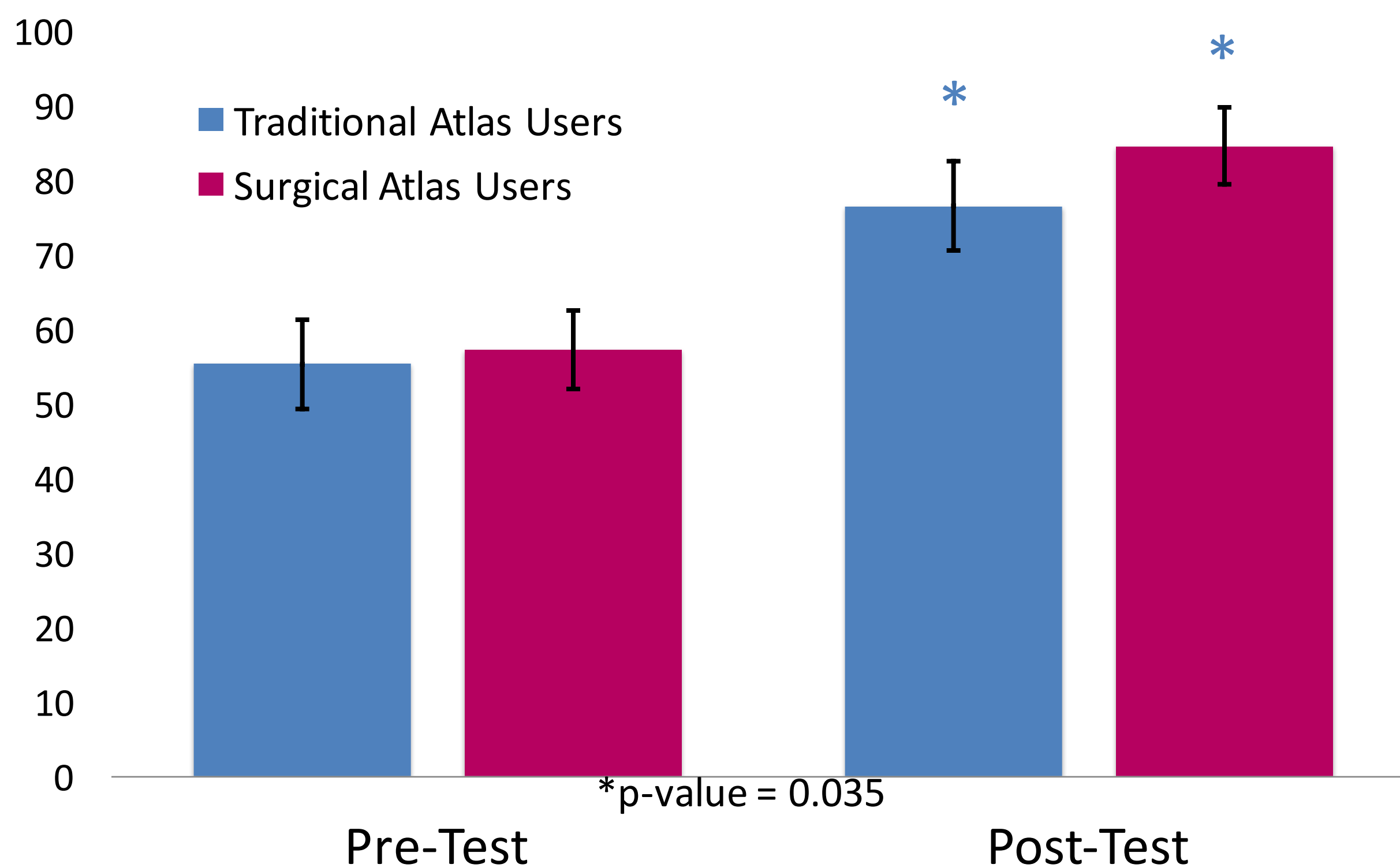
Results

- A total of 37 students completed the study with 19 students in the traditional atlas group and 18 students in the surgical atlas group.
- In the video atlas arm, mean pre- and post-test scores were 57.2% and 84.5% respectively.
- In the traditional textbook arm, the mean pre and post test scores were 55.3% and 76.51% respectively.
- Students with the video atlas had a mean post-test score 8.07% points higher than those without ($p=0.035$)
- Students felt significantly more satisfied with the surgical atlas in terms of "Ability to Teach Anatomy", "Likelihood of Use of Modality if Available", and "Image Realism" ($p<0.01$)

	Traditional Atlas	Video Atlas	P-value
Ability to teach anatomy	2.7	4.3	<0.01
Likelihood to use modality	2.3	4.1	<0.01
Ease of use	3.1	3.5	0.90
Ease of learning	3.2	4.2	0.41
Image realism	2.8	4.9	<0.01

Table 1. Post-test feedback Likert survey ranking on scale of 1 (Extremely Negative) 5 (Extremely Positive)

Mean pre- and post-test scores of pre-clerkship medical students



Discussion

This study demonstrates the effectiveness of a video atlas in teaching medical students surgically and clinically relevant anatomy. Our results suggest that a surgical video atlas can improve objective knowledge of head and neck anatomy and also subjective satisfaction of studying amongst medical students.

The concept of Computer-Assisted Learning (CAL) has been demonstrated to be effective in teaching pre-clerkship students.^{6,7,8} Our study lends further support to previous research showcasing that CAL resources are not only more effective than text anatomical resources, but also that students prefer them.

The routine viewing of live surgeries helps familiarize medical students with the operating field, allowing them to actually apply their medical knowledge. Furthermore, the teaching that occurs in the OR is usually under high stress scenarios that may actually detract from learning. Reduction of student stress in the OR is accomplished by maximum preparedness outside the OR, which can be effectively achieved through a surgical video atlas.

Conclusions

The implementation of a surgical video atlas was an effective and favorable form of education for medical students. New methods for improving the education of in-training physicians outside of clinical responsibilities is increasingly important as work-hour restrictions can possibly pose limitations on direct patient learning.

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