

INTRODUCTION

Anatomy education has always been regarded as an essential requirement in the curriculum of medical and other health related disciplines (Turney, 2007). Although there are multiple reports discussing the indispensable importance of anatomy education, there are still ample debates regarding the use of the most effective anatomy teaching method. In an attempt to explore innovative ways to enhance understanding and/or knowledge of the human body in terms of its structure and function, the present study investigates the use of the most advanced and recent sophisticated technological invention, Anatomage. Here, we determine whether the introduction of the virtual human cadaver in the teaching of human anatomy to nursing students and other health sciences students enhances their knowledge of the human body.

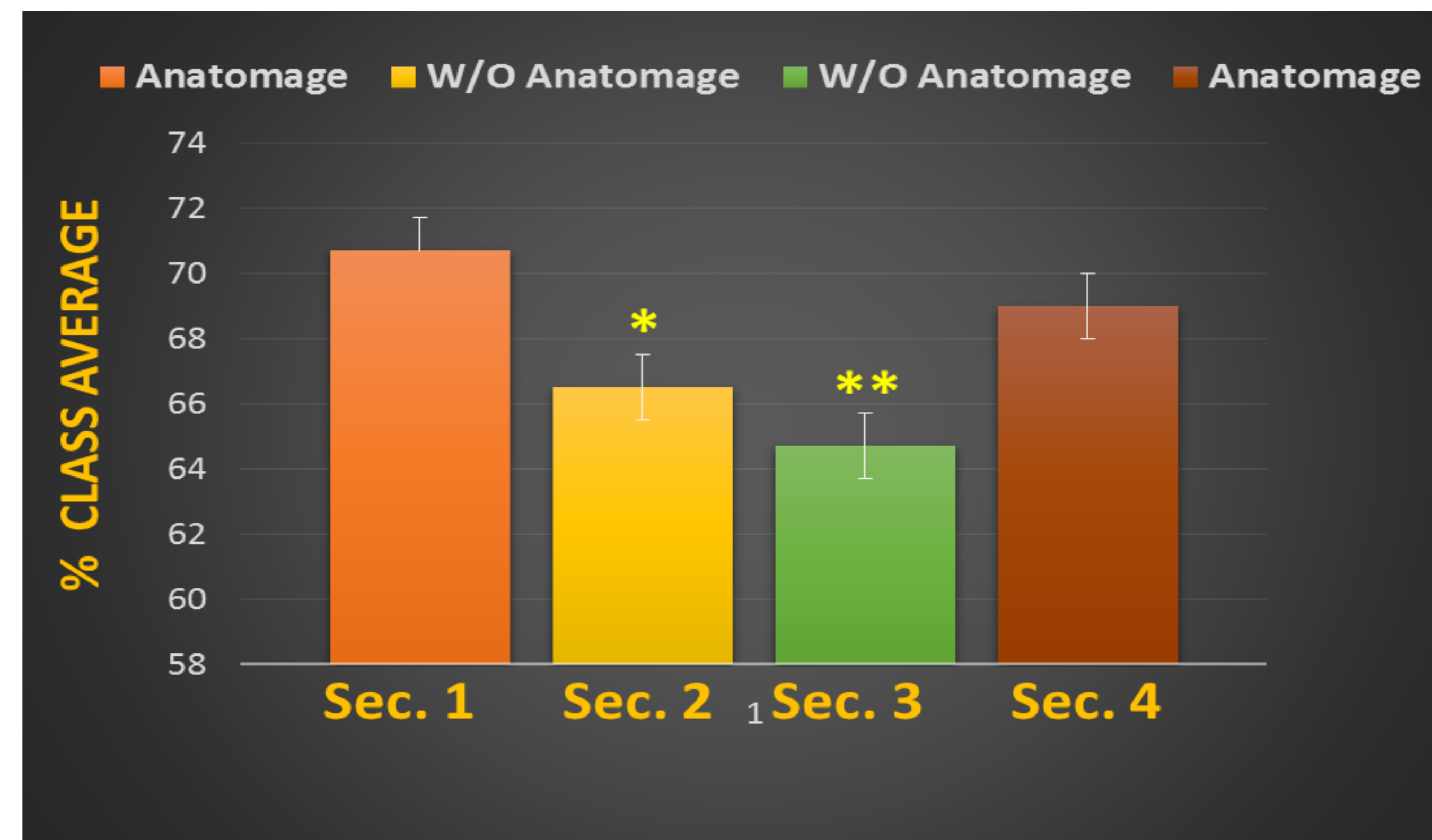
METHODS

This study was conducted in Fall 2015 and Winter 2016 semesters, comprising of 75-80 students group (Section). Course objectives, course contents, and course material, i.e. powerpoint presentation, and examination questions in all three mid-terms and the final for all groups were kept consistent. In Fall semester, one group of students (Section 1) were taught human anatomy with the use of Anatomage, while two other groups (Section 2 and 3) were taught without using Anatomage. Group 4 (Section 4) was taught in Winter 2016 with reintroduction of Anatomage in their teaching. Class average were pooled from three mid-terms and their final examination for each sections. Results are expressed as mean \pm S.E.M and converted into a percent class average. Significant differences ($P < 0.05$) were determined by using Student's 't' test for paired data followed by one-way ANOVA.

RESULTS

The data presented in each graph bar represents the mean score from three mid-terms and the final for each section (Figure 1). Statistical analyses indicated that teaching human anatomy with introduction of Anatomage resulted in significant increases in percent class averages compared to sections taught without Anatomage. Compared to students in section 1, the percent class average was significantly lower in section ($P < 0.01$) 2 and section 3 ($P < 0.005$) taught without Anatomage (Figure 1). However, the reintroduction of Anatomage in section 4 completely reversed the lower percent class average seen in sections (2 and 3). The percent class average was the same in section 1 taught with Anatomage and section 4 with reintroduction of it in their three mid-terms and the final examinations (Figure 1). Sections taught with anatomage also scored more letter grades A and B compared to section taught without it (unpublished data).

Figure 1



Teaching human anatomy with or without Anatomage. Pooled data from three quizzes and the final examination for each sections are expressed as mean \pm S.E.M and converted into a percent class average (n=78-80 students per section). Significant differences ($P < 0.05$) were determined using one-way ANOVA followed by Student's 't' test for paired data. * $P < 0.01$, ** $P < 0.005$ compared to section 1 and 4.

Figure 2

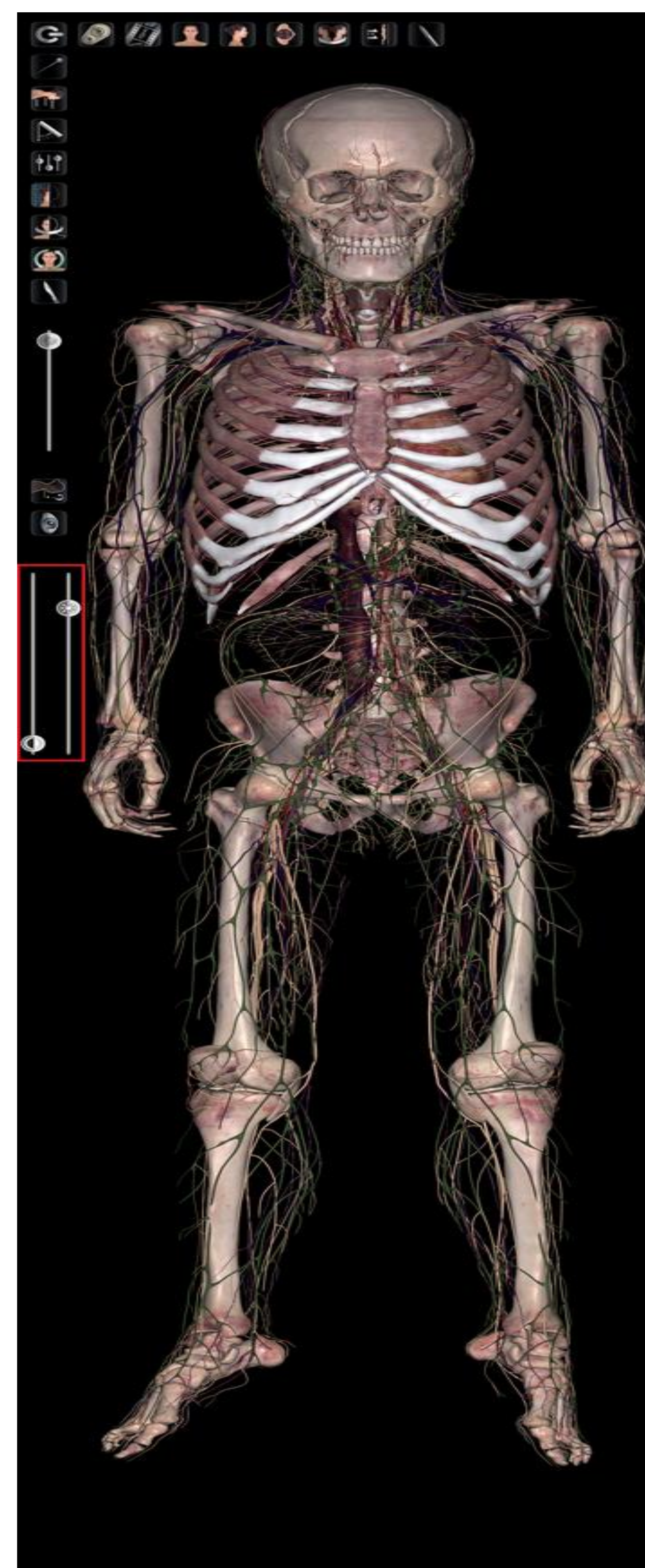


Figure 3

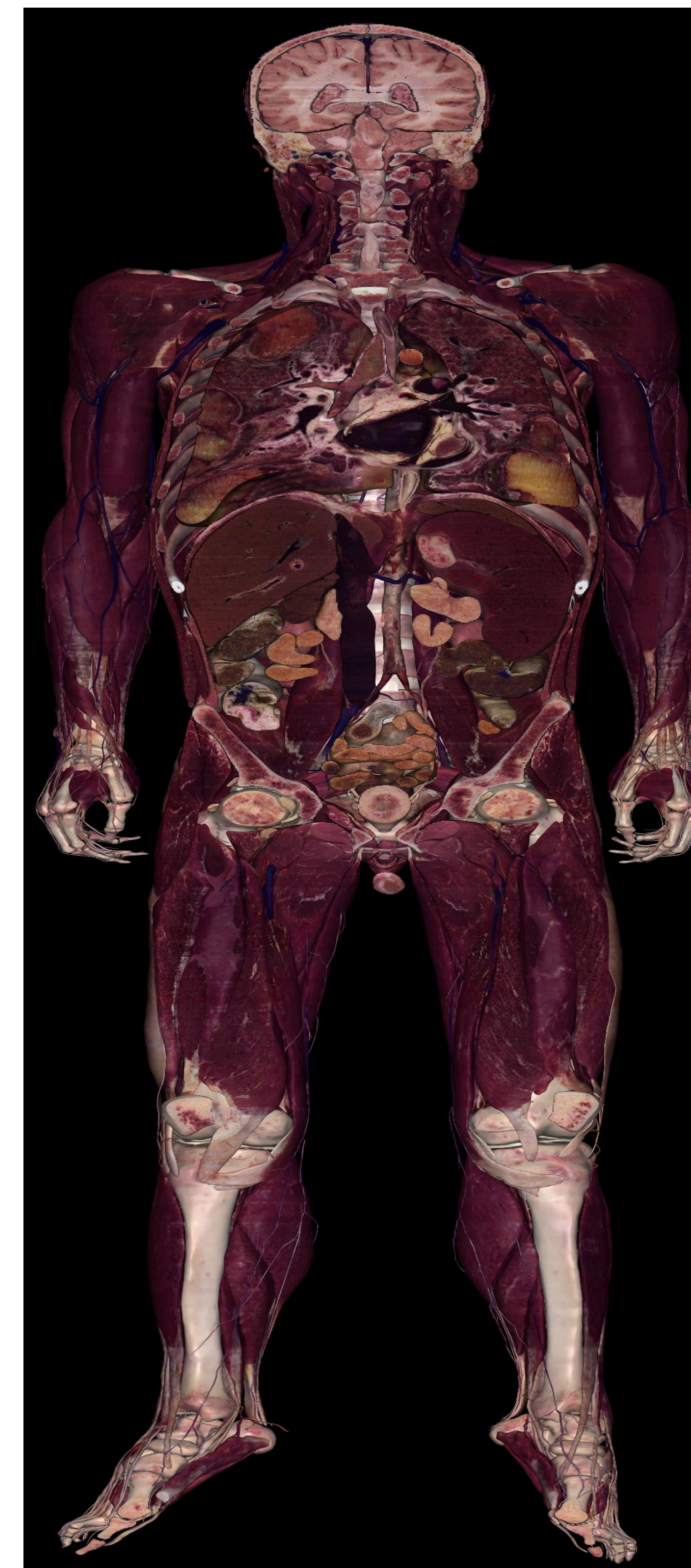


Figure 4



DISCUSSION AND CONCLUSION

Results in the present study clearly indicated that teaching human anatomy without Anatomage resulted in a significant decrease in percent class average, which was completely reversed by introducing Anatomage in their teaching (Section 4). Even though, the use of Anatomage in this study improved the knowledge of the human body, the benefits of teaching skills, positive interaction with students, and effective teaching methods and in-depth knowledge of teaching faculty cannot be completely ignored (Drake et al., 2009). As Anatomage provides a true perception of the human body (Figures 2-4), further study may show that this recent technological invention can be used to replace human cadavers in teaching, thus substantially minimizing the cost of human cadavers, technical support, laboratory space, and countless hours of cadaver dissections. Taken together, the present study reports for the first time that Anatomage can be used as an effective teaching tool to enhance the knowledge of the human body in terms of structure and function.

ACKNOWLEDGEMENTS

The authors wish to acknowledge Dr. Kathryn Burleson, Department of Biology at Hamline University, St. Paul, Minnesota, USA for her critical review and suggestions in this study.

REFERENCES

1. Drake, R.L., McBride, J.M., Lachman, N., Pawlina, W. (2009). Medical education in the anatomical sciences: The winds of change continue to blow. *Anat. Sci. Edu.* 2:253-259.
2. Turney, B.W. (2007). Anatomy in a modern medical curriculum. *Ann R. Coll. Surg.* 79: 114-117.