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Letter to the Editor

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Corresponding author: Dr D. Chytas, Basic Sciences Laboratory, Department of Physiotherapy, University of Peloponnese, 20, Plateon Str., 23100, Sparta, Greece.
Email: dimitrioschytas@gmail.com

Considerations for exploring the most appropriate method for residents' learning anatomy of CHD

Dimitrios Chytas[1,2], George Noussios[3], Georgios Paraskevas[4], Theano Demesticha[5], Vassilios Protogerou[5] and Marios Salmas[5]

[1]Department of Physiotherapy, Basic Sciences Laboratory, University of Peloponnese, 23100, Sparta, Greece; [2]European University Cyprus, 2404, Engomi, Nicosia, Cyprus; [3]Department of Physical Education and Sports Sciences of Serres, Aristotle University of Thessaloniki, 54124, Thessaloniki, Greece; [4]Department of Anatomy and Surgical Anatomy, School of Medicine, Faculty of Health Sciences, Aristotle University of Thessaloniki, 54124, Thessaloniki, Greece and [5]Department of Anatomy, School of Medicine, National and Kapodistrian University of Athens, 11527, Athens, Greece

It was our pleasure to read the study by Kukulski et al, [1] who explored the value of heart specimens in residents' anatomy learning of CHDs. It was shown that those specimens led to significant increase of knowledge, and it was proposed that three-dimensional visualisation, either in digital or physical form, should be encouraged in residents' learning anatomy of CHD. This statement implies that three-dimensional visualisation is more effective than conventional two-dimensional one, which is cheaper and more simply applicable. Although the study showed that heart specimens enhanced residents' knowledge, a comparison of their effectiveness with that of traditional two-dimensional visualisation did not take place, and it would be essential because the literature has suggested that three-dimensional physical visualisation is not more effective than conventional two-dimensional one for enhancing residents' learning anatomy of CHD. To the best of our knowledge, there is lack of evidence that three-dimensional physical models are superior to traditional two-dimensional images in terms of improving residents' knowledge about anatomy of CHD.

Loke et al[2] performed a randomised controlled study which included residents, divided into two groups. The first group was taught about tetralogy of Fallot via conventional two-dimensional images. The second group was taught via three-dimensional physical models. There was an insignificant difference between the two groups in terms of the post-intervention knowledge improvement.

The randomised controlled study by Jones and Seckeler[3] also comprised two groups of residents. The first received teaching about vascular rings and pulmonary artery slings via a lecture. The second group was taught with the addition of three-dimensional printed models of the defects. Again, insignificant difference was noted between two groups' post-intervention knowledge improvement.

Generally, it has been shown that when residents are taught anatomy via three-dimensional printed models, the knowledge acquisition is insignificantly different from teaching via traditional two-dimensional images.[4] An interesting conclusion was reached by White et al[5] who included, in their randomised controlled study, two groups of residents. The control group was taught about tetralogy of Fallot and ventricular septal defects via lectures with two-dimensional images. The intervention group was taught with the addition of three-dimensional printed models. The authors concluded that this addition was not beneficial for understanding ventricular septal defects, but it was for tetralogy of Fallot. This finding was probably attributed to the increased complexity of the latter defect, compared to the former. Smerling et al[6] also found that the value of three-dimensional printed cardiac models for teaching CHD increases in proportion to the anatomical complexity.

In conclusion, we believe that, although the findings of the study by Kukulski et al[1] are interesting and important, the literature has suggested that three-dimensional physical models generally do not seem to significantly enhance residents' understanding of anatomy of CHD, compared to the cheaper and more simply applied traditional two-dimensional images. Especially, it has been suggested that CHD with more complex anatomy may be more effectively taught via three-dimensional physical models, compared to CHD with simpler anatomy.[5,6] Future research may further clarify the role of complexity of CHD in the educational value of three-dimensional physical models.

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