Author's response to reviews

Title: Arthroscopy or ultrasound in undergraduate anatomy education: a randomised cross-over controlled trial.

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Dear Editors,

i’m pleased to submit my manuscript (new manuscript, research article) addressing the fundamental problems related to challenges in the undergraduate anatomical studies. The anatomical education of medical students is frequently problematic and there are different approaches at medical universities all over the world. The exponential growth of image-based diagnostic and minimally invasive interventions requires a detailed three-dimensional anatomical knowledge and increases the demand towards the undergraduate anatomical curriculum. Therefore, a profound and in-depth training in anatomy during undergraduate medical studies gets increasingly important. Results of previous studies indicated that students benefit from incorporating virtual multidimensionality in anatomy training. This randomised controlled trial investigates whether musculoskeletal ultrasound (MSUS) or arthroscopic methods can increase the anatomical knowledge uptake.

Our work represents the first study that details objective and subjective parameters for an estimation of teaching quality and outcome in students with regard to additional implementation of arthroscopy tutorials and musculoskeletal ultrasound sections to the dissection course during the undergraduate anatomy training.

In this open randomised cross-over clinical trial among 2nd year medical students, adding short educational units of arthroscopy to the macroscopic dissection course increased the anatomical knowledge gain compared to standard anatomy training. Adding equivalent education units of musculoskeletal ultrasound (MSUS) to the standard anatomy training using the peer-assisted learning (PAL) system did not improve the anatomy knowledge.

The benefit of the ASK module depended on certain joint regions and was limited to the shoulder area. The multidimensional augmentation of the classic anatomy through arthroscopy and ultrasound was considered reasonable by the students including a high learning effect regarding the anatomical knowledge of the musculoskeletal system. Comparing the two methods, students preferred the arthroscopy because of a better anatomical orientation and the achievable anatomical knowledge benefit as well as the spatial imagination.

Yours sincerely

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