BEME Spotlight 44

Effective methods of teaching and learning in anatomy as a basic science: a BEME systematic review

Losco C, Grant W, Armson A, Meyer A and Walker B

Review citation

Review website

https://bemecollaboration.org/Published+Reviews/BEME+Guide+No+44/

Keywords

Anatomy, teaching methods, student learning, knowledge acquisition, knowledge retention, systematic review

Headline conclusions

This review demonstrates a wide variety of teaching interventions used in anatomy and provides evidence in support of the use of alternatives to traditional teaching methods in anatomy, in particular the use of computer-assisted instruction (CAI) / computer-assisted learning (CAL) with a number of high quality, low risk of bias studies supporting this.

Background and context

Anatomy is a subject essential to medical practice (Smith & Mathias 2011), yet the time committed to anatomy teaching is on the decline, and the resources required to teach anatomy can be costly, particularly dissection (Bergman et al. 2014). Advances in technology are seen to be a potential solution to the problem (Papa & Vaccarezza 2013), while maintaining the quality of teaching and learning required in anatomy for eventual clinical application.

Review objectives

This review aimed to specifically identify methods used to teach anatomy, as well as those methods demonstrated to enhance knowledge acquisition (short-term) and retention (long-term).

Review methodology

Search Strategy: PubMed, CINAHL, ERIC, Academic OneFile, ProQuest, SAGE journals and Scopus were search from the earliest entry of each database to 31 August 2015. References of all included studies were additionally screened for any further relevant articles cited.

Inclusion and Exclusion Criteria: The review included comparative studies, randomized controlled trials (RCTs) and crossover design on a single group that a) utilized undergraduate medical or allied health students, b) had a teaching intervention on human gross anatomy and c) measured knowledge acquisition or retention using assessment scores, with or without additional subjective measures. Studies using speech pathology, psychology, dental and veterinary students or those teaching histology or embryology were excluded as the anatomy in these studies was either not comparable to most included studies or combined anatomy & physiology in the intervention and assessment. Assessment of study quality was determined by incorporating risk of bias and additionally critiquing the reported study design and methodology (internal validity). Low quality articles were excluded from the study.

Data Extraction: The lead investigator (CL) screened all titles, removing only obviously irrelevant titles. Two investigators (AA and CL) then assessed the full-text of articles remaining for eligibility in duplicate and independently summarized study characteristics, outcomes, quality and risk of bias for each article using the electronic data extraction (coding) sheet developed for this review. Disagreements at any stage were evaluated and resolved by a third reviewer (AM).

Data Synthesis: Data was synthesized by tabulating characteristics of included studies, presenting quantitative outcomes of all studies and qualitative outcomes where applicable. A narrative review of the data was additionally presented. The data in this review were not of sufficient homogeneity to combine (similar interventions, comparisons, outcomes and study designs), therefore standard methods for quantitative pooling through meta-analysis (Higgins 2011) could not be employed.

Implications for practice

Many of the teaching interventions deemed effective in this review are less expensive, require fewer resources to support them and can be delivered in ways that would be more time efficient. CAI/CAL provides the ability to replace didactic lectures with more efficient use of teaching time where necessary (tutorials, workshops), reduces the number of contact hours or offers online alternatives to students in a busy world where technology is easily accessible by most.

References

Bergman EM, Verheijen IWH, Scherpbier AJJA, Van der Vleuten CPM, Bruin ABH. 2014. Influences on anatomical knowledge: The complete arguments. Clin Anat 27: 296-303.

Higgins J. 2011. Green S. Cochrane handbook for systematic reviews of interventions version 5.1. 0. The Cochrane Collaboration 5.

Papa V, Vaccarezza M. 2013. Teaching anatomy in the XXI century: new aspects and pitfalls. TSWJ 2013: 310348.

Smith CF, Mathias HS. 2011. What impact does anatomy education have on clinical practice? Clin Anat 24: 113-119.

Copies of BEME Guides are available from
Association for Medical Education in Europe (AMEE),12 Airlie Place, Dundee DD1 4HJ, UK
email: beme@dundee.ac.uk, Internet: www.bemecollaboration.org, Scottish Charity No. SC 031618