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## Short Communication

# Evidence based anatomy- Past, present and future

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### ABSTRACT

**Introduction:** Evidence based anatomy is a branch of epidemiological anatomy. In this commentary, we propose the four pillars of Evidence based Anatomy. The foundation is formed by Sackett et al's article. The foundation is reinforced by Yaminne et al's article. The pillars being formed by evidence, knowledge, application of knowledge and training of researchers (E-KAT) was proposed in this study.

**Methods and Results:** We conducted a review adhering to PRISMA guidelines. We searched MEDLINE, EMBASE and Google Scholar. 2 review authors screened the retrieved citations, downloaded the citations in PDF format and it was cross-checked by another review author. CASP tool was used to assess the quality of the articles retrieved.

We included and retrieved 8 articles related to evidence based anatomy. The articles were reviewed and findings written.

**Conclusion:** The highest level of evidence is Meta-analysis. This article describes the past, present and future of evidence based anatomy. Evidence based Anatomy will bring out high quality research in anatomy.

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## 1. Introduction

Recently one of my dear friend met a radiology colleague to discuss about a study on the median arcuate ligament. She explained to the radiologist how much the study would be significant. The radiologist first thought it would be a part of another insignificant study which goes unnoticed. The following day she was about to report a CT for a patient. The patient had vague abdominal pain. Then she remembered the conversation with the anatomist and went ahead to check the thickness of the median arcuate ligament. It was more than the normal value and she reported it as Median Arcuate Ligament Syndrome and was very happy to inform my friend about the finding. This helped me think how much Evidence based Anatomy was important for anatomist and clinician as well. From Anatomist to molecular geneticist,

Evidence is the key. Evidence is the base a doctor can look upto at all times.

Anatomy being a descriptive science, still remains as the main cornerstone for clinical medicine. Modern medicine has entered into a crisis where there is uncertainty over evidence, deficit in care and patient safety and clinical governance. The era of technology we are in has made us think beyond the horizons of just reporting cases to being more evidence based. There has been a paradigm shift from most primitive ways to the most modern ways of education. With the changing times, there was an ardent need to integrate evidence based principles to Anatomical education. This was named as Evidence based Anatomy. Efforts to make epidemiological anatomy more meaningful was the fruit of this movement. The concept of evidence based is much talked of in the many fields of medicine. In Anatomy, Evidence base is a relatively new concept.

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Evidence based medicine (EBM) is the conscientious, explicit, judicious and reasonable use of modern, best evidence in making decisions about the care of individual patients. The concept of evidence based medicine was given by Sackett et al., who set the foundation for evidence based principle. The components being clinical expertise, best evidence and patient values.<sup>1</sup>

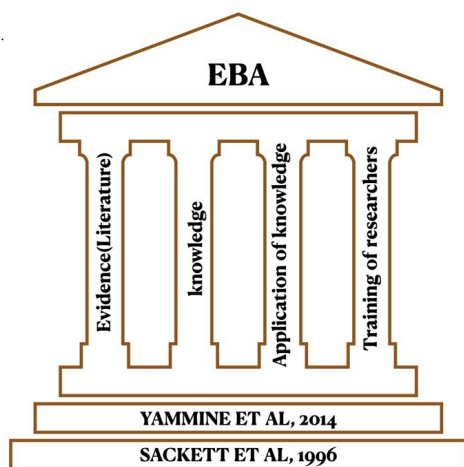
The highest level of hierarchy in evidence is Meta-analysis.

Evidence based anatomy is a branch of epidemiological anatomy research which involves principles of Evidence based Medicine. It is a powerful weapon for transferring knowledge to GenZ generation. Evidence based medicine is like an architect where the building is the client's health and evidence is the building blocks.

## 2. Methods and Results

We followed PRISMA guidelines for our study. The records were identified through surfing search engines like Google Scholar, MEDLINE, EMBASE using Boolean operators namely "Evidence based Anatomy". After removal of duplicates, the records were screened and full text articles were retracted. Case reports, conference abstracts and letters to editor were excluded from the study. 8 articles were included in the study and the findings were written.

Risk of bias was excluded by 2 authors individually reviewing the articles. CASP tool was used to check the quality of articles.



**Fig. 1:** Shows the pillars of Evidence based Anatomy. The foundation stones were laid by Sackett et al., and Yammine et al. The pillars are evidence, knowledge, applicability and training-E-KAT.

## 3. Discussion

Evidence based Anatomy is a promising concept which represents the next step in Clinical Anatomy and its

development will result in good clinical practice in Medicine and Surgery.

Here we propose the pillars of Evidence based Anatomy.

### 3.1. Pillars

We are glad to propose the pillars of Evidence based Anatomy-E-KAT (Figure 1). The first pillar is Evidence. The best available literature forms the basis of any research. The second pillar is perfect knowledge. The third pillar is the applicability of the knowledge. The fourth pillar is the training of researchers.

Evidence based anatomy promotes critical thinking and reasoning. It paves way for discovery of medical devices. It is essential for improved patient outcomes. To improve quality research in anatomy.

### 3.2. What we are so far

Yaminne K (2014), was a visionary who coined the term Evidence based Anatomy. He described a way of finding, appraising and synthesizing the results in a more organized way through high quality research articles like systematic reviews and meta-analysis. He classified anatomical variations into 3 types: morphological, consistency and spatial. All these variations are of relevance in the clinical field. While making a prosthetic, it can add value by being sex specific and ethnicity specific. While doing a surgery, these knowledge of these variations can prevent iatrogenic injury to the patients and reduce the surgeon's anxiety. It can sometimes prevent major complications. It is believed that results drawn from a large pooled sample are likely to be more accurate and to reflect true population statistics.<sup>2</sup>

Wilke et al.,2015 proposed the Quality Appraisal for Cadaveric studies (QUACS) which is a scale that the anatomist could use to assess the quality of observational study. It was a 13 item scale but the demerit of the scale was it did not include any bias.<sup>3</sup>

International evidence based anatomy working group is a core group working on evidence based anatomy. The members of this group are highly motivated to bring evidence based anatomy into practice. The aims of this group is make the transitioning of evidence based anatomy smoother. They have come up with guidelines for quality assessment of anatomical sciences.<sup>4</sup>

Tomaszweski et al., in their publication in 2016 mentioned that many anatomical studies were incomplete and unclear. Some of them were poorly designed which led to transfer for wrong information and misinterpretations leading on to "false or premature interventions. They emphasized the need for clear and transparent guidelines for describing the important information. This paved the way for AQUA tool which would raise the quality of anatomical research. The importance of comprehensiveness

was emphasized. Reproducibility is required and will be the criteria for high quality research in Anatomy.<sup>5</sup>

Winkelmann et al., suggested to add ethics component to the existing AQUA guidelines. The appraisal of the quality of anatomical study should dependent on the ethics domain.<sup>6</sup>

### 3.3. Steps involved in evidence based anatomy

The rise of evidence-based anatomy (EBA) has emphasized the need for original anatomical studies with high clarity, transparency, and comprehensiveness in reporting. Currently, inconsistencies in the quality and reporting of such studies have placed limits on accurate reliability and impact assessment.

So Anatomical Quality assurance checklist (AQUA) was put forth.

AQUA guidelines expected to improve the quality of reporting original studies in Anatomy. A steering committee formulated the concept proposal. The validity of checklist was assessed by Delphi procedure. The Delphi procedure included 2 rounds of Consensus of 12 experts in the field of Anatomy. By the end of the procedure, the AQUA guidelines took its shape. It consisted of 8 sections with 29 items. The sections included Title, abstract, background, methodology, discussion, results, conclusion and other information.

Guidelines and checklists for reporting scientific studies are not just tick box exercises; rather, they help to improve the transparency and presentation of studies and, therefore, have the potential to improve the impact and implementation of scientific research.

When the authors use AQUA guidelines and when a section is not applicable, the authors need to mention NA. Sample size and confounders are mostly NA in anatomical studies.

Title should mention the objective of the study. Methodology to include the setting, timeframe, inclusion and exclusion criteria. Results and conclusions should portray the highlights of the study precisely.<sup>5</sup>

### 3.4. Implications of evidence based anatomy

Evidence based principles have been used in developing multimedia content in Anatomy. Anatomy forms the base of knowledge of medicine. Surgeons and clinicians have a constant need to refresh their anatomical knowledge. Anatomists can adopt demand based approach for catering to postgraduates and consultants from other fields of medicine.

Implications of Evidence based Anatomy in research are EBA imparts the maximum value for surgeons to become more innovative with their surgical skills.

## 4. Limitations

The major limitations of the study was lack of proper quality assessment tool and poor reporting of anatomical studies as

reported by Yammine et al., and Henry BM et al.<sup>2,7</sup> Henry BM et al., have mentioned that there are in the process of creating tool for assessing the quality of the articles.<sup>7</sup>

## 5. The Future

AQUA is a promising tool and a boon for anatomists. It would help us anatomists to bring out the realities from bench to bedside in a more appealing way. We hope that Translational anatomy would be accomplished. Collaboration of anatomists with different specialist across medicine and technology would pave the way for new discoveries and patents.

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## 7. Conflict of Interest

The authors declare that there is no conflict of interest.


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