Perceptions Between Medicine Students on the Use of Anatomage and Other Practice Methods for Anatomy Teaching

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Abbreviations: A: Anatomage; AA: Anatomy Atlases; AM: Anatomical Models; BS: Bones and Skeleton PS: Prossections and Dissections.

ABSTRACT

Introduction: To know the usefulness, interests and preferences of a group of medical students, with some practical methods for teaching Anatomy, we designed a survey.

Material and Methods: This is a numerical scale containing 5 scores and 5 items or methods to assess the level of interest and usefulness experienced by students. The different methods included in the study and used to teach practical human anatomy range from the anatomy atlases, bones and skeleton, anatomical models, prossections and dissections and the newest and most sophisticated, the 3D virtual anatomical table: Anatomage.

Result: Prossections and dissections were the most valued of all practice methods with significant differences of p<0,000 with the Anatomage being the least valued. The students found the prossections very useful in percentage of 46.9 and only 6.2% of them found the Anatomage very useful. Intermediate scores were observed among the other practice methods.

Discussion: These techniques have advantages and weaknesses. Anatomical models give students a good three-dimensional perspective and relationships between internal organs and structures. The Anatomage allows teaching and learning anatomy interactively with students who can explore the inner parts of the human body and rebuild it again.

Short Communication

One of the most important subjects in medical education is the human anatomy. A good background in anatomy prepares the students for future in clinical disciplines and human body dissection has been used as the mean teaching tool. Also a good knowledge in anatomy can guarantee a safe and efficient clinical practice [1]. The cultural, scientific advances and new trends in medical education have altered the role of dissection in the teaching of anatomy in medical schools today [2,3]. It is true that in the past, lectures and cadaver dissection by students was considered as essential to anatomy learning. And anatomists and clinicians worry about the adverse effect on students' knowledge when decreasing the time-related to the cadaver dissection from anatomy education [4]. Using three-dimensional models is useful to understand the volumes of the body regions. They are also valuable for better interpretation of X-ray, ultrasound and sectional images [5]. The performance of medical students improved in human anatomy significantly with the use of computer tomography and life-size tablets for virtual dissection. What it is important, that medical images and virtual dissection should be included as part of the basic anatomy curriculum [6]. The Anatomage Table is becoming an additional component of anatomical courses for medical studies. It offers a unique digital teaching platform and digital Anatomy

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offers various benefits. This system will not only assist students to learn anatomical details, but also provide the appreciation of 3D structures. It can help young students to learn the complex anatomy structure and their special relationship better and faster than only using traditional methods [7].

Material and Methods

Classically and nowdays we are using different methods to teach practical human anatomy. We included in this survey five techniques: Anatomage (A) - Anatomy Atlases (AA) - Anatomical Models (AM) - Bones and Skeleton (BS) - Prossections and Dissections (PS). The survey was an item scale with five numeric values which extents from: 1. No useful, 2. Less useful, 3. Indiferent, 4. Useful, 5. Very useful. We use a Google Forms model. The survey was sent to a group of second-year students who were preparing as military doctors at the University Defense Center located in Madrid. At the end, we got a total of 32 good and complete surveys. Our goal was to evaluate the level of interest and usefulness experienced by students using these techniques. Statgraphics Centurion XV was used for statistical analysis. For each of the methods of practice evaluated and described above, an analysis of variance (ANOVA)

was performed to determine whether there are significant differences between the corresponding means to the value of interest and usefulness students experience when studying these five different anatomical methods. To calculate which means are significantly different from others with a 95.0% confidence level, Fisher's least significant difference (LSD) method was used.

Result

In the ANOVAS analyzed, significant differences have been found with a level of $P < 0.000$ between the Anatomage and all the other methods studied. Prossections and dissections were the most valued of all the practice methods with significant differences of $p<0,000$ with the Anatomage that was the less valued. No differences were found among prossections and dissections and the other practice methods studied as the anatomy atlases, anatomical models and the bones and skeleton.46,9% of the students found very useful the prossections and dissections and only 6,2% of them found very useful the Anatomage. The anatomy atlases and the anatomical models were valued by 34,4% of the students as very useful and only 15,6% gave the same score to the bones and skeleton (Figure 1).
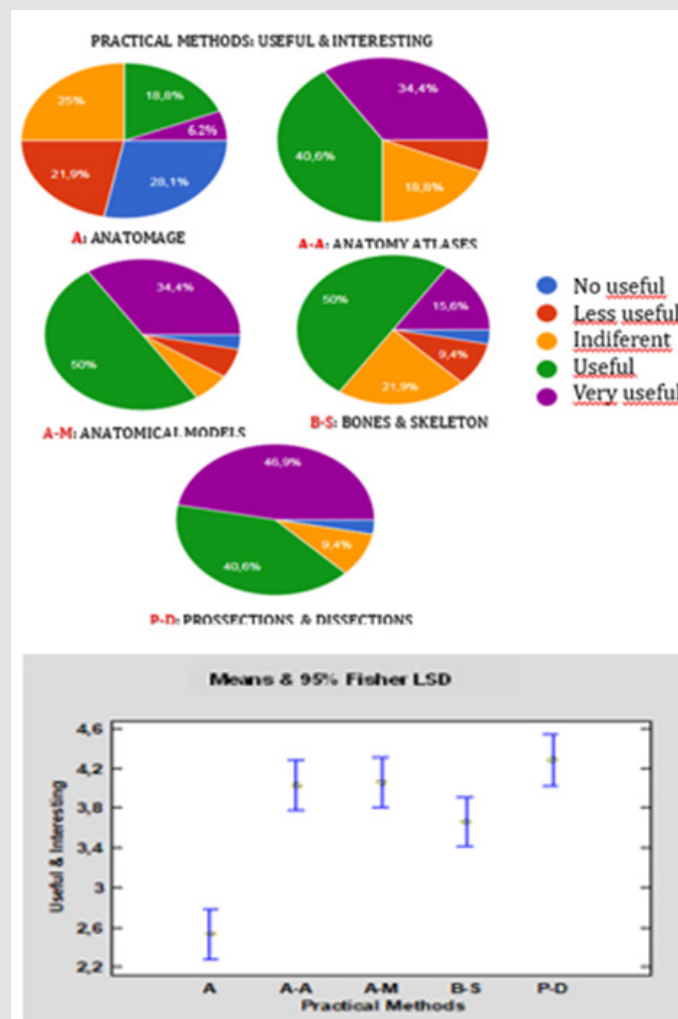

Figure 1: Practice Methods: Useful & Interesting; ANOVA for the 5 different Practice Methods.

Discussion

Patel. & Moxham (2006) state that recent developments in the medical curriculum have led to marked changes in the teaching of macroscopic anatomy. This change has implied a decrease in the curricular contact time of the students with the human body and the use of new methods for anatomical teaching. Some "modern" anatomists have welcomed the arrival of these novel methods, while other more "traditional" anatomists have struggled to maintain the use of cadaveric dissection. After studying these changes with a questionnaire, the authors observed that 98% of anatomists think that gross anatomy plays an important role in clinical medicine. And 69% of them support the use of dissection [8]. Moxham & Plaisant (2007) investigated the perception of medical students towards the importance of macroscopic anatomy to clinical medicine. Students at all stages of their medical course share with professional anatomists the view that anatomy is a very important subject for their clinical studies [9]. Patel & Moxham [10]) on 2008 observedthat a majority of anatomistsare in favour to the use of dissection, specially to gain skills by the students.

Cadaver dissection is an irreplaceable part of anatomy education to enrich the student experience and knowledge. The prossection and dissection are necessary to appreciate the complexity and multidimensionality of the human body, and to learn the basic language of medicine [11]. Pabst [12]on 2009 considered about the anatomy curriculum, that dissection is very important, but the main matter in the medical curriculum is to prepare a well-trained doctor. Anatomage-based training has proven to be effective. It has been observed that more publications appear with greater student acceptance, achieving better test scores, with more effective practice sessions in the classroom and laboratory. The precise details and rich content attract the interest and attention of students, leading to more effective learning outcomes as Professor Duparc points out [13]. The use of cadaver CT scans and full-size virtual dissection tables significantly improved the performance of medical students in gross anatomy. Therefore, medical imaging and virtual dissection should be considered part of the standard curriculum of macroscopic anatomy [6,13].

Custer and Michael [14] concluded that students appreciate learning with this technology and think it is a beneficial and effective tool to prepare them to enter a healthcare profession. In addition, the table allows exploration and learning of human anatomy and experience simulation of easy surgical procedures. It is possible to cut from the surface of the body to the inner body with a scalpel, as well as to view images of three-dimensional sections in all three spatial planes [15,16]. The controversy arises when the Anatomage is compared with other traditional methods of teaching anatomy such as dissection. A year ago we published an article based solely on an observational and subjective analysis from impressions about the advantages of using Anatomage for easier learning of anatomy practice by students. We observe very interested and highly motivated students to study the different practices taught. The students could see the internal relationships between organs and structures, could rotate views and perform different cutting levels, so it was easy to understand how these structures related. Another advantage is the possibility of storing Anatomical information and images and comparing them on a computer with information from textbooks, atlases or web pages and videos [17].

In this article, based on objective data taken from the survey, we have to draw different conclusions about the low interest and usefulness of the Anatomage for students. They have experienced prossections and dissections as the most valuable, useful and interesting method of practical anatomy, surely because they can live anatomy and contact with the corpse as a real affair and a way of getting started in the practice of medicine. Looking for the causes of the low utility found by students in the Anatomage, we have observed that only 32 students complete the survey (half of all of them) so this is not a significant number of surveys. Perhaps some students may be disappointed by the practice of anatomy and were more interested in completing the survey, according to Pabst (2009), who affirms these same options [12]. Also during the last year the ratio of professors per number of students decreased and we have to share practice groups and we cannot schedule different practical activities with the Anatomage [18].

Anand, K.M and Singel, T. C. in 2017 [19] compared learning with "Anatomage" with dissection in neuroanatomy. No statistically significant differences in knowledge gain were observed between both methods. That is why "Anatomage" as a teaching-learning method is as good as traditional dissection. Learning with "Anatomage" facilitates 3D visualization of structures and their relationships. Recently on 2018, Memon, [20] after making a review of 200 full texts about the topics related to cadaver dissection in the past three decades wrote that cadaver dissection is obsolete in medical training. But at the end, he reached the conclusion that cadaver dissection is still a part of medical training in modified ways. Following Krishnaveni, S. et al. [21] small group teaching in the form of cadaveric dissection or demonstration is the method which the students feel is best to understand Anatomy. The modern methods of teaching anatomy with power point presentations or virtual anatomy are only a supportive methods to understand anatomy. Anatomage will offer in a short future the augmented reality eyepieces that can be used to overlay imaging of the patient over his or her actual body and anatomical structures will then be automatically recognised on the patient's body [22].

Conclusion

Proven opinions on the interest and usefulness of the different teaching methods of practical virtual anatomy will continue, with a difficult agreement, including dissections and anatomy. Without a doubt, a useful way to reconcile different opinions may be to take into account the opinion of the students. But, above all, by conducting objective studies (surveys, questionnaires, observational analyzes)

administered at the beginning and end of the degree and at the graduate level. As explained in the studies carried out in different publications, about the results of the learning achieved with the different teaching methods of anatomy practices. And we must also have the opinion of the professionals of the Anatomy and other subjects that are part of the Medicine curriculum.

Acknowledgement

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