



# Venezuelan surgeons view concerning teaching human anatomical dissection

Rafael Romero-Reverón<sup>1,2</sup>

<sup>1</sup>Department of Human Anatomy, José María Vargas Medical School, Faculty of Medicine, Universidad Central de Venezuela, Caracas, <sup>2</sup>Orthopedic Trauma Surgery Service at Centro Médico Docente La Trinidad, Caracas, Venezuela

**Abstract:** Currently, the importance of human anatomical dissection have come under debate in many countries but there are not references in Venezuela on this concern. This survey's aim is to assess the insights of Venezuelan surgeons and their outlines of usage of human anatomical dissection in teaching and learning human anatomy. Sixty-five Venezuelan surgeons at the Centro Médico Docente La Trinidad completed an anonymous survey on current and future teaching practices in human anatomy. Eighty-nine point two three percent of surveyed (n=58) conferred importance to human anatomical dissection despite the arrival of new innovations in learning human anatomy. The group surveyed view human anatomical dissection-based teaching as the most beneficial method of teaching human anatomy and it should be bolstered in human anatomical education with matching use of three-dimensional computerized tomography imaging as a complementary form for teaching and learning.

**Key words:** Human anatomical dissection, Human anatomy education, Perception of surgeons, Imagenology-based teaching

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## Introduction

The teaching and learning of human anatomy through human anatomical dissection has historically been a cornerstone of medical education and essential as a research tool: in fact, it was the study of the human body, its organs and their spatial relationships rather than of other animals that laid the basis for much of our current understanding of human structure [1-3]. Human anatomical dissection is also important in the medical syllabus because it is here that students learn the essential language of medicine and how to develop understanding through experimentation and acquire expertise in solv-

ing problems in a three-dimensional space [4-9]. Moreover, human anatomical dissection, incorporating the teaching of surface anatomy, represents a critical initial learning experience about the patient-physician relationship [10-13]. Human anatomy itself is very important to all health-care specialties and not only to surgical specialties [14-16]. It is essential to teach the fundamental principles of human anatomy from the beginning of medical school thus to facilitate subsequent expansion on them over time. The weight of opinion is that those principles are best taught during human anatomical dissection and further reinforced with supplementary visual aids. It must also be noted, with modern technical developments, human anatomy education has moved beyond being a "motionless science" and has benefitted greatly from continuous evolution [17, 18]. Human-anatomy learning methods have evolved from traditional teaching methods of human anatomical dissection, lectures, anatomical models, prosection, and tutorials: they are now supplemented by the recently emerging e-learning grounded in web-based technology [5]. Human anatomical dissection in many countries is en-

### Corresponding author:

Rafael Romero-Reverón  
Department of Human Anatomy, José María Vargas Medical School,  
Faculty of Medicine, Universidad Central de Venezuela, Orthopedic  
Trauma Surgery Service at Centro Médico Docente La Trinidad,  
Caracas 1080, Venezuela  
Tel: +58-4166389552, Fax: +58-2129459068, E-mail: rafa1636@yahoo.es

trenched as the best way to picture topographical landmarks and anatomical variation allowing medical students to appreciate relationships between different organs and structures and the three-dimensionality of the structures of the human body. Nevertheless, in recent years, the relevance and value of human anatomical dissection have come under discussion at different universities owing to high costs and time pressures in some medical curricula. Indeed, during the last two decades, multiple universities in many countries have abandoned cadaver-based dissection in favor of anatomy courses without cadavers at all. This development has given rise to a basic discussion on the role of human anatomical dissection in the medical curriculum and the ultimate question of whether the teaching of anatomy by human anatomical dissection should be continued. It is also worth mentioning that the use of online social networks as accessory tools in medical education could change and improve human anatomy teaching and learning [19, 20]. These aspects have not been an issue of research in Venezuela. Indeed, there are not references in Venezuela on this concern. This was the purpose of this research project handing out to evaluate the perceptions of Venezuelan surgeons and their patterns of usage of human anatomical dissection in teaching and learning human anatomy.

## Materials and Methods

The Centro Médico Docente La Trinidad is a private hospital in Caracas, Venezuela, founded in 1966. Since 2008, this hospital has 200 hospitalization's beds counting emergency room's beds and it has most of the health-care specialties. It is equipped with modern medical facilities with latest technology equipment. Eighty Venezuelan surgeons with different fields of specialties at Centro Médico Docente La Trinidad were invited to complete an anonymous survey, 65 of which were returned for a 75% response rate. All surgeons were informed of the purpose of this survey and the written informed consent of all the participants was obtained prior to their participation. They were asked about if they are or were any medical specialty teachers.

This group of Venezuelan surgeons was inquired about their surgery specialties at Centro Médico Docente La Trinidad. Respondents were requested to select the current method they viewed as the best current method of teaching human anatomy among: lecture, videos, computer aided learning, learning on models, human anatomical dissection, small

groups learning, or prosections. These Venezuelan surgeons were requested to choose the best method to be enhanced to learning of human anatomy among the options previously identified.

Finally, respondents were inquired to select what form of imaging between X-ray, magnetic resonance imaging, computed tomographic, angiography, three-dimensional computed tomography, and ultrasound should be further explored as a complementary tool in anatomical education.

## Results

An anonymous survey was performed to 65 Venezuelan surgeons at Centro Médico Docente La Trinidad, among them 15 are female surgeons (23.07%) and 50 are male surgeons (76.3%). There were not data about surgeons' age in this survey.

In this group of Venezuelan surgeons, 13 are medical specialty teachers (20%) and seven are retired medical specialty teachers (10.76%).

The respondents more inquired by surgery specialties in this survey were 16 orthopedic surgeons (26.1%), 13 general surgeons (20.0%), nine gynecologist-obstetricians (13.8%), six urologists (9.2%), and six ophthalmologists (9.2%) (Fig. 1).

The best method for teaching anatomy selected by 89.23% of surgeons (n=58) was human anatomical dissection ( $P<0.001$ ) (Fig. 2), while 61.23% of respondents (n=58), thought human anatomical dissection should be enhanced in anatomy education ( $P<0.001$ ). Finally, surgeons were asked

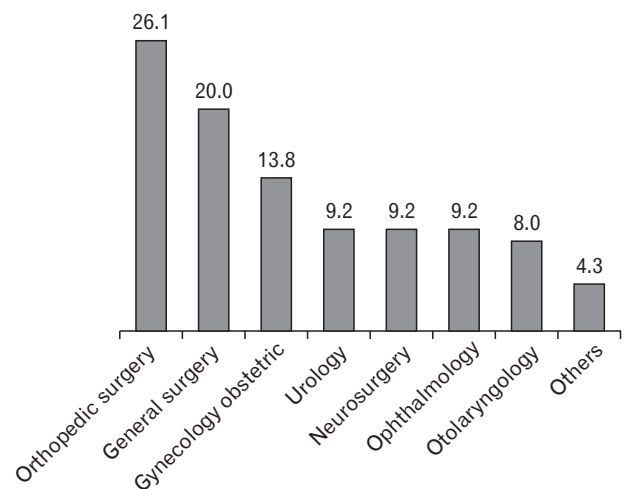


Fig. 1. The respondents more inquired by surgery specialties in this survey.

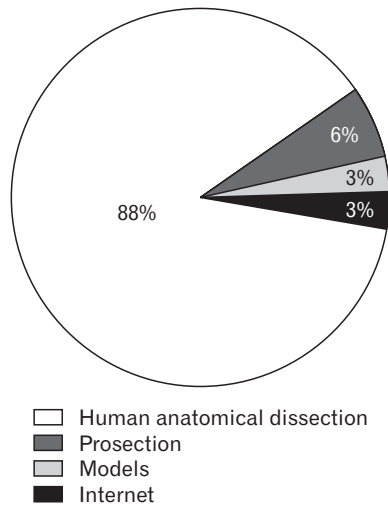


Fig. 2. The best method for teaching anatomy selected by Venezuelan surgeons.

to select what form of imaging as a complementary tool in anatomical education should be further explored in anatomical education, 41 of respondents' (63.07%) selected three-dimensional computerized tomography imaging compared to other imaging modalities ( $P < 0.001$ ) (Fig. 3).

### Discussion

The dissection of human cadavers is still entrenched as the fundamental method for teaching and learning human anatomy in many countries [21-26] but today's medical students have little chance to develop the manual skills that are essential to almost every medical specialty but specially in all surgery specialties [6, 27].

Some studies confirm the importance of anatomical dissection sessions despite the emerging innovations in teaching anatomy such as the use of the computer-assisted construction and virtual reality [14, 28-30]. Human anatomical dissection is employed as a major tool in the teaching and learning of human anatomy, owing to its perceived usefulness for understanding classifications and inter-relationships of different parts of human body, integration of theory and practice of human anatomy, touch-mediated perception, improvement of physicians' manual dexterity and practical skills, humanistic care, three-dimensional perspectives of structures, and the explanation of problems encountered in surgery and also for improving physicians' expertise in physical examinations, which cannot be carried out correctly without a deep-seated knowledge of gross and topographical human anatomy [16,

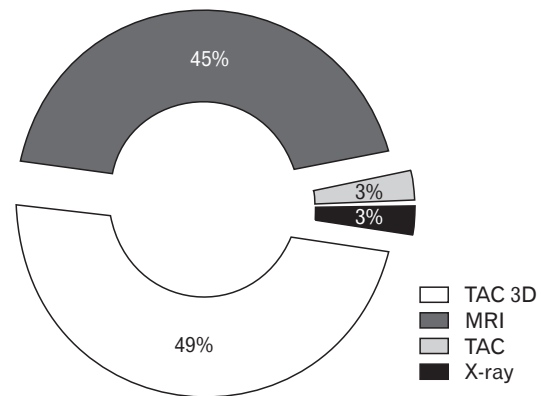


Fig. 3. Further form of imaging as complementary tool in anatomical education. TAC 3D, tomography computered axial 3D; MRI, magnetic resonance imaging; TAC, tomography computered axial.

31, 32]. Tools for improving the learning of human anatomy that are based on evolving technologies are being actively sought and evaluated [33-35]. Nevertheless, in today's world, there is no consensus on the best methods for teaching of human anatomy [36-40]. Due consideration should also be given to the known difficulties in procuring enough cadavers for pedagogical needs in medical schools leading to complaints of there simply being too many students per cadaver. Cadaver shortage is the problem facing medical schools all over the world [32, 41, 42]. Reduced hours of study and access to cadaver dissection-based teaching in medical education has led to many medical doctors especially surgeons reporting insufficient human anatomical knowledge of junior medical doctors [43], a fact that is causing a growing concern in this regard [23, 27, 44]. This tendency poses a significant risk overall but perhaps most of all in surgery [15]. In this research, the opinions of Venezuelan surgeons regarding current and future teaching practices in human anatomy were surveyed and it could be concluded that the usefulness of cadaver dissection for learning anatomy should not be underestimated. The new generations of medical students and junior medical doctors have an in-depth appreciation of the value of digital resources, having had wide exposure to web-based technology but, even so, in this survey of Venezuelan surgeons, 89.23% of respondents ( $n=58$ ) gave unchanged prominence to the importance of human anatomical dissection in spite of the advent of the new innovations in learning human anatomy. This research is not without its limitations primarily it having been carried out in a single hospital and so may not represent the opinion of the majority of surgeons in Venezuela. In this survey, the perspectives of junior medical doctors about the use of hu-

man anatomical dissection for learning human anatomy were not evaluated. It is important that future research should focus on what and how medical students learn from human anatomical dissection and other teaching and learning methods in order to give faculties and medical students information on which they can base their choices. The objective should be to incorporate more effective teaching and learning tools while maintaining the beneficial values of human anatomical dissection. Faculties of human anatomy could adjust their teaching style in order to mesh more readily with how medical students in this new digital era actually learn, all in line with students' aptitudes, attitudes, and expectations. Medical students have diverse approaches in dealing with human anatomical dissection and so they experience different learning experiences resulting in differences in form and the amount of their grasp of human anatomy. As this probably applies to all learning processes, it should be no surprise that a combination of methods for learning human anatomy gives the best results [39-45]. This survey shows that this group of Venezuelan surgeons consider human anatomical dissection-based teaching to be the most beneficial method of teaching anatomy and their perceptions are that it should be given corresponding prominence in medical education. Furthermore, 41 of the Venezuelan surgeons surveyed (63.07%) suggested that three-dimensional computerized tomography should be integrated further into anatomical education. These findings support the continued use of human anatomical dissection-based teaching and the integration of imaging in the design and implementation of human anatomy teaching in medical education [46]. Advantages of integrating imaging and human anatomical dissection include improved clinical application of human anatomy and an increase in medical student's interest in human anatomy [16, 47, 48]. The surgeons' ongoing concern about diminishing learning and knowledge of human anatomy among junior medical doctors and results of this survey and other studies [14, 15, 25, 28-30, 39, 40, 49] could constitute an important boost to the case for giving emphasis to keeping human anatomical dissection in the medical syllabus.

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