

EDITORIAL

The Importance of Teaching Anatomical Variations to Today's Medical Students

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Editorial

Human anatomical variations are structures that deviate from the typical range of framework and morphology within the human body [1-2]. They are prevalent and can be accompanied by other additional variations within the same person [3,4]. Anatomical variations can be identified through dissection of human donors in anatomy laboratories as well as through findings obtained in radiological investigations and during surgical operations [3]. Thus, teaching anatomical variations during medical students' pre-clerkship anatomy courses is essential. Not only does such knowledge enable students to succeed as practicing physicians, but it also helps to ensure the safety of their patients during treatment. Lack of knowledge of anatomical variations is at the center of innumerable medical and surgical errors [1]. In addition to causing errors, such anatomical variations can also mimic pathologic conditions, resulting in misdiagnosis, when evaluating imaging or performing physical exams. Knowledge of such variations can prevent unnecessary interventions. Equally, it is important to know

which anatomical variations may represent functional challenges or impairments in normal bodily functions versus those that do not, if medical intervention is necessary. The majority of anatomical variations do not affect bodily function, so knowing the distinction between those that do and do not is crucial [1-7].

Anatomical deviation from what is presented in anatomical textbooks is quite common in human anatomy [4]. Anatomical variation is frequent, so most textbooks do not mention even common variations that students will encounter during their pre-clerkship anatomy dissection courses, let alone when evaluating living patients during their rotations and medical careers. Iatrogenic injury during surgery is a well-known fact in the profession. Thus, being aware of normal variants is crucial for surgeons to be able to identify and adapt their surgical preoperative planning or if a variation is discovered in real-time during the procedure [2-4,7].

Accurate interpretations of radiological imaging findings and physical examination evaluations are key to successful patient care. Knowing the location of anatomical variations during a

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physical examination can influence clinical findings, eliminating unwarranted distress for the patient as they await imaging results that rule out any palpable derivations from normal anatomy as only ‘different anatomy’.

Exposure to anatomical variations early in one’s medical school curriculum allows students the ability to harness critical thinking skills when evaluating a donor or patient, rather than just memorizing “normal anatomy” [7]. Being able not only to identify an anatomical variation but also to understand if it would or would not impede normal function for the individual greatly enhances that student’s diagnostic capabilities for the future.

Understanding each patient’s individual anatomy can assist in accurate, patient-centered medical care and reinforce the value of personalized care. Such awareness of how anatomy can present itself in various ways is a definitive sign of an experienced and competent physician.

Besides the suggestion for more anatomical textbooks to include anatomical variation information, I also suggest the development of a 3D anatomical software that includes many of the anatomical variations that one could encounter when exposing various regions of the human body. This would be instrumental

in not only pre-clerkship education, but also for research in anatomical variations and as a guide to refer to for practicing physicians, radiologists, and surgeons. This type of software could be accessed remotely and in real-time during patient or imaging evaluations to increase the diagnostic accuracy of physicians and radiologists and to prevent iatrogenic injury by surgeons.

Human anatomical variations are prevalent. Knowledge of such variations early in a future physician’s career enables them to understand the anatomical uniqueness of each of their patients. Having this mindset when practicing medicine will ensure not only patient-centered medical care but will reduce the number of iatrogenic injuries in the surgical theatre, reduce the amount of unnecessary procedures, and enhance critical thinking when evaluating imaging and developing preoperative plans. Knowledge of anatomical variations is key to the success of all physicians in their medical careers and must be introduced into the medical school curriculum in their first year as they are introduced to their first patient in the anatomical laboratory. The earlier the exposure to normal anatomical deviations, the more receptive those aspiring physicians will be to adjusting their patient treatment plans should variations be discovered, optimizing the health and viability of their patient.

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