

Integral Role of Surface and Living Anatomy in Medical Education

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For centuries, anatomy has been considered a fundamental component of medical education, enduring the challenges of evolving pedagogy (1). With curricular reforms in recent decades and average reduction in teaching hours of anatomy in medical schools worldwide, there was a paradigm shift from traditional discipline-based teaching to integrated approaches in teaching and learning anatomy in the 21st century (2). Surface and living anatomy, acting as a conduit between theoretical knowledge and clinical practice, augments the integration with clinical application.

Surface and living anatomy are described as learning of anatomy by palpation and observation (surface and imaging) of living human body (3). Research has shown that inadequate surface and living anatomy education

results in inaccurate clinical examinations (4), unsafe clinical practices (5), and an increase in medico-legal claims (6). Regardless of these, there is insufficient time and depth allocated in current medical curricular for surface and living anatomy, globally (7). This editorial delves into the pivotal role of surface and living anatomy in present medical education and its implications for training future healthcare professionals.

Surface and living anatomy provide an intricate understanding of the static anatomy observed in cadavers, allowing visualization of body structures in living individuals. Knowledge on surface and living anatomy serves as the foundation to conduct thorough physical examinations (8), to interpret clinical findings and diagnosing images and perform

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interventional procedures (9): the essential components of effective clinical practice. More often, surface and living anatomy forms the basis for generating differential diagnoses (10). Hence, it is crucial to establish a solid foundation of surface and living anatomy within medical curricular allocating learning resources and sufficient time to this domain.

The surface and living anatomy sessions can be delivered through body painting, surface marking, peer/life model examination, ultrasound imaging and X-Ray/CT imaging, supplemented with self-directed learning. Through these techniques, a deeper understanding of anatomical structures, their relationships and surface landmarks correspond to structures hidden from view, can be achieved. The interactive nature of these sessions enhances students' comprehension of anatomical spatial orientation, variations between individuals, and key clinical features present on the body surfaces (11). This hands-on approach enables students to develop vital skills in physical examination and diagnosis, essential for their future roles as clinicians.

There are additional advantages in featuring surface and living anatomy learning in the medical curricular. Firstly, incorporating living models into the classroom creates dynamic learning environments that simulate real-life clinical scenarios. Live demonstrations on living models, enhances engagement and retention, fostering a deeper appreciation for the complexities of the human body (12). While these demonstrations bring numerous benefits, it also raises ethical considerations regarding consent and privacy.

Academics must uphold strict ethical standards and always ensure confidentiality of the session (13). Secondly, advancements in technology have revolutionized the teaching of surface and living anatomy, providing innovative tools and resources such as virtual reality (VR) simulations, augmented reality (AR) applications, and online platforms, to enhance learning experiences (14). These digital resources complement traditional teaching methods, catering to diverse learning styles and promoting active engagement among students. Thirdly, teaching and learning of surface and living anatomy transcends disciplinary boundaries, allowing collaboration between anatomists, clinicians, and allied healthcare professionals. The interdisciplinary learning opportunities together with experts from various fields, enriches the educational experience, teamwork, communication skills and mutual respect among students (15).

Nonetheless, several published literature reports inconsistencies in surface anatomy knowledge and the need for evidence-based research in this field (16). It is also noteworthy that current changes in the research have sparsely translated into textbooks commonly used in teaching anatomy in medical schools (17). Hence, quality research needs to be conducted to explore the inconsistencies in surface and living anatomy in the context of variables such as age, sex, ethnicity, geography, BMI and such research findings need to be reflected in medical textbooks.

In conclusion, it is imperative for medical schools to implement effective strategies to deliver evidence-based knowledge of surface

and living anatomy, especially considering institutional constraints such as limited access to state-of-the-art technology, a substantial student population, and constraints on human resources, particularly in resource-poor settings. By embracing applicable strategies and integrating clinical relevance into anatomical education, students will be more effectively equipped with knowledge, skills, and attitudes required to excel in their roles.

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