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Letter to the Editor

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Cadaver: A Valuable Resource for Early Clinical Exposure

Prasanna K. Santhekadur[1], M.V. Ravishankar[2*], Purna Bansal[3]

[1]Department of Biochemistry, JSS Medical College, JSSAHER, Mysuru, India
[2]Department of Anatomy, JSS Medical College, JSSAHER, Mysuru, India
[3]3rd year MBBS student, JSS Medical College, JSSAHER, Mysuru, India

***Correspondence to:** M.V. Ravishankar, Email: ravishmvrs40@gmail.com

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To Editor,

The use of cadavers as educational tools in medical science and technology is unparalleled. Cadavers serve as an essential foundation for learning and practicing the fundamentals of medicine, offering a student-centered, problem-oriented approach to education. Beyond imparting knowledge and skills, cadavers play a crucial role in fostering emotional connections to humanity, nurturing gratitude and responsibility, and a respectful attitude of service.

A cadaver is a vast repository of diverse tissues, organs, and systems that offer a myriad of gross anatomical variations. It serves as the cornerstone for comprehending the embryological origins of congenital defects, microanatomical variations, unusual histopathological findings, and subtle yet significant structural differences. Cadavers donated by individuals with various diseases provide invaluable insights for preclinical students, enabling them to grasp the fundamentals and their applications in clinical, diagnostic, or therapeutic challenges within medicine and surgery.[1]

In the domain of preclinical medical studies, cadavers prove invaluable for hands-on basic surgical training procedures, serving as a peerless model. They act as an invaluable simulation resource for advanced practice and postgraduate learning, and help students imbibe competencies and fortify their theoretical knowledge by providing opportunities for virtual practice. Cadavers serve as the basis for various surgical training skills, reinforcing the importance of human anatomy in careful diagnostic or therapeutic approaches. This includes procedures such as the use of intramuscular or intravenous injectables, venesection, skin suturing, collection of specimens through biopsies, endotracheal intubation, catheterization, and more.[2] Patient safety is of paramount concern in any diagnostic or therapeutic procedure. Artificial simulators may fall short in replicating the real challenges involved in skill accomplishments, unlike cadavers. Clinical cadavers, however, are physically appropriate materials for fruitful learning and serve as a basis for valid and constructive approaches under competency-based medical education programming. Soft embalming, a vital procedure in cadaver preservation, facilitates the learning of various invasive techniques such as arthroscopy, nerve blocking, dye infusion, and more.[3]

In the landscape of medical education, there has been a paradigm shift towards early clinical exposure (ECE) as a means of integrating basic medical science knowledge with clinical contexts. Reformed curricula emphasize the importance of ECE, empowering preclinical medical students to understand diseases, anomalies, and variations within a clinical framework. ECE, drawing from textbooks, case records, community settings, and more, aim to motivate students, and enhance their clinical skills, communication abilities, and decision-making confidence. Cadavers, with their rich array of unusual gross and microanatomical variations in various systems, complement ECE via offering a strong foundation for understanding clinical scenarios.[4]

ECE resources, including cadaver-based findings, facilitate advanced learning through vertical integration, thereby aligning basic medical science knowledge with its clinical application. Unusual cadaveric variations can be compared with normal cadavers within a cohort, and serve as controls to elucidate structural variations and their potential consequences. From a developmental biology and embryology perspective, cadaver-based congenital defects provide valuable insights into biochemical reactions and genetic mutations that may result in birth anomalies.[5] Year after year, medical educators encounter a wide spectrum of anatomical variations in dissected cadavers, particularly in the vascular system, peripheral nervous system, and skeletal muscles. These variations often form the basis for major findings reported in anatomical and basic medical science journals worldwide. Aberrant nerve branching and unusual nerve-muscle innervations, for example, have significant implications for general surgery and its various specialties. Other consistent variations, such as aberrant arterial or venous channels and muscle anomalies, present opportunities for in-depth learning.[6]

Among the many vascular variations observed, superficial venous channels, often accompanied by varicosities in the lower limbs, are noteworthy. Cadavers may exhibit gross pathological changes in the lungs, such as pleural adhesions, pleural effusions, or lung lesions, offering a foundation for constructing realistic case scenarios that enhance applied and clinical anatomy learning. This diversity of observations nurtures psychomotor planning skills and enables a stepwise integration of preclinical and paraclinical knowledge into an advanced clinical case understanding.[7] Cadaver-based findings have been successfully integrated into clinical concepts encompassing gross anatomy, embryology, physiology, biochemistry, genetics, histology, and more. They offer an excellent opportunity to expand preclinical knowledge and transform it into rational clinical case scenarios.

While ECE plays a crucial role in applied learning, cadaver-based unusual presentations are instrumental in steering medical students towards virtual applications in medicine. Dissection-based discoveries form a strong foundation for honing analytical skills that mimic real hospital experiences. It is worth noting that the human body may harbor structural variations that remain subclinical in individuals, and these findings often surface during cadaver dissections. Detailed documentation of illness history and causes of death in donated cadavers can help match rare anatomical findings, ensuring they are not overlooked. In this regard, the "Human Cadaver" serves as a cornerstone in fostering rational clinical case understanding in preclinical teaching and learning.

Authors' Contribution

Conceptualization: M.V. Ravishankar, Prasanna K. Santhekadur.
Data curation: M.V. Ravishankar, Prasanna K. Santhekadur.
Formal Analysis: M.V. Ravishankar, Prasanna K. Santhekadur.
Investigation: M.V. Ravishankar, Prasanna K. Santhekadur.
Writing–original draft: M.V. Ravishankar, Prasanna K. Santhekadur.
Writing–review & editing: Purna Bansal.

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None.

Ethical Approval

Not applicable.

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References

1. Changmai MC, Gohain K, Zulkarnaie AA. Cadaver dissection: attitude and perception of its importance among medical and health science students in learning anatomy. Malays J Med Health Sci. 2020;16(Suppl 7):52-56.
2. Gant T, Chiang H, Harman BD, et al. simulating early clinical experiences with surgical procedures in the anatomy laboratory. Cureus. 2021;13(3):e13966. doi:10.7759/cureus.13966
3. Kovacs G, Levitan R, Sandeski R. Clinical cadavers as a simulation resource for procedural learning. AEM Educ Train. 2018;2(3):239-247. doi:10.1002/aet2.10103
4. Ewnte B, Yigzaw T. Early clinical exposure in medical education: the experience from Debre Tabor University. BMC Med Educ. 2023;23(1):252. doi:10.1186/s12909-023-04221-4
5. Tayade MC, Latti RG. Effectiveness of early clinical exposure in medical education: settings and scientific theories - review. J Educ Health Promot. 2021;10:117. doi:10.4103/jehp.jehp_988_20
6. Ravishankar MV, Jevoor PS, Shaha L. Bilateral absence of musculocutaneous nerve. J Sci Soc. 2012;39(1):34-36. doi:10.4103/0974-5009.96472
7. Eckel CM, Clayton F, Szakacs JG, Ash JF, Albertine KH. Cadaver-based case studies increase the value and utility of cadaver dissection in medical education. FASEB J. 2006;20(4):A436-A436. doi:10.1096/fasebj.20.4.A436