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Utilizing Sculpture and Anatomy in Medical Education

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ABSTRACT

The integration of sculpture into anatomy education offers a unique multidisciplinary approach to medical training. Traditional methods of anatomy instruction such as dissection and static images can benefit from the tactile and spatial insights gained through sculptural techniques. This paper examines the historical intersection of art and medicine, emphasizing how sculptural practices can enhance spatial visualization, foster a deeper understanding of anatomical structures, and improve knowledge retention among medical students. Case studies illustrate successful programs combining sculpture and anatomy education, highlighting their impact on student engagement, learning outcomes, and emotional well-being. Best practices are proposed for curriculum integration, emphasizing the complementarity of artistic and scientific methodologies. By fostering an environment of collaborative learning, this approach can enhance students' anatomical knowledge, critical thinking, and sensitivity toward the human body, potentially transforming the educational landscape of medicine.

Keywords: Medical education, anatomy, sculpture, spatial visualization, multidisciplinary learning, tactile learning**.**

INTRODUCTION

The primary objective of medical education is the mastery of the structures of the human body. Once acquired, such knowledge of human anatomy represents the initial rung on the ladder of fundamental knowledge that unites all healthcare professionals. To understand the workings of the body, medical practitioners—from surgeons to psychiatrists to specialist physicians—must first establish an understanding of normal anatomical structures. This necessary foundation would be greatly enriched by integrating both traditional techniques of medical education, such as dissection, with the age-old art of sculpture—fusing science and art for the benefit of both medical professionals and the general public [1, 2]. The vast preponderance of teaching resources available at the undergraduate and postgraduate levels are static images or landmark references derived from early studies of anatomy conducted in cemeteries and morgues. Spatial visualization—the three-dimensional mental rotation or manipulation of objects—has emerged as a quantitative predictor for academic success in many scientific fields, including medical education. It then follows that learning at least some aspects of human anatomy via a sculpture perspective would likely improve knowledge retention. Could sculptural and kinesthetic understanding of the traits of the human body even enable healthcare professionals to better predict physical or mental conditions in their patients before they become apparent? A great deal of research supports the notion that the more senses are involved in the learning process, the more successfully the teaching modality will engage and retain students. The mode of tactile sculpture ought to be more engaging than mere passive looking. Art students have the opportunity to learn through tactile, representational clay and plaster figure sculpture every single day as well as from live model sculpture. Anatomical sculpting academia should be no different [3, 4].

Historical Perspective

For centuries, art and medicine have worked together to further medical knowledge. During the ancient periods, Greek and Roman cultures used sculpture to show detailed human anatomy, recognizing its value

through art. In the Renaissance, Italian artists created sculptures with detailed human musculature and skeletons, and those with great artistic skills also possessed knowledge of human anatomy. They also gave complex muscle-flowing trajectories and body positioning in their paintings and sculptures. The Italian Renaissance artists ultimately broke with traditional religious dogma and emphasized rationalism, presenting a humanistic convention even in the portrayal of the human body. The work of these artists and artisans directly influenced surgeons and anatomists during the Age of Enlightenment, who set up anatomy schools with acid injections and wax models based on earlier designs—influences that continue to be present in teaching curricula today [5, 6]. Centuries later, in the medieval period, the founding of early hospitals was initially religion-based, and care was given by monks. Education in medicine and surgery was undertaken by apprenticeship, where bank-side surgeons and barber surgeons took on employees for a fee. Even then, training was more about observing and following than knowledge-based teaching. Indeed, skills were taught, but the main features were treating a mixture of civilian and military casualties using a fascinating opposition of natural and pre-scientific herbs and deciding whether the treatment was successful. Teachers emphasized what could be described as visual learning, believing that feeling and visualizing 'real' can become 'worms' in one's brain and hence learning through experimentation. There are conflicting accounts about the later incorporation of anatomy into medical courses, although dissection never held an audience and was stigmatized due to its association with the execution of criminals [7, 8].

Benefits of Incorporating Sculpture in Medical Education

Art education in medical school, or rather medicine in art school, has benefits beyond just enhancing observational and technical skills. One area where we believe an art education can significantly assist is that of anatomy. The mechanical portions of anatomy can easily be learned from books, virtual models, and plastinated specimens. What remains difficult for many medical students is to comprehend the spatial relationships and the relative proportions of bony and soft-tissue anatomy. This manuscript aims to describe an experience where the creation of art—sculpture—has been utilized to directly supplement an anatomy curriculum for first-year medical students [9, 10]. Many medical students have had minimal exposure to the arts, and the intense, 'hard science' focus of their pre-medical school training may not have allowed for any post-secondary classes in the arts. For some medical students, an entirely new perspective on the human form can be witnessed through a sculpture course. First, it helps draw attention to the immense complexity of the human form; an intricacy in design that an individual, from which life originates, takes for granted. Additionally, the tactile nature of molding clay in three dimensions may open the door to a more investigative approach for a medical student to pursue visual medical research requiring the interpretation of two-dimensional images. It is also our hope that with time, cost, and artistic categorization pressures, medical education can provide an otherwise joyous and rewarding, albeit therapeutic, visual outlet to students facing increasing burnout and the mental health hazards of medical training [11, 12].

Benefits of Incorporating Anatomy in Medical Education

Anatomy forms the cornerstone of medical science education. In the clinical years of medicine, understanding the structure of the body is just as important, if not more so, than a solid grasp of pathophysiology or pharmacology. Medical practitioners must possess a good understanding of normal anatomy to genuinely comprehend and predict the disturbed interplay of organ systems in diverse diseases. Surgeons, in particular, are required to be proficient in three-dimensional spatial representation, image processing, and interpretation in their disengagements with exciting geometry. It is well documented that students struggle with basic doctor-patient interactions. Anatomy can help. Through a common language—that of the wonderful and beautiful inner workings of the human body—anatomical knowledge can make life easier and more rewarding for doctors and patients. So, why do we need to study anatomy as medical students, and what should we demand of such education? [13, 14]. Despite a shift toward customizable curricula and student-centered learning, the fundamental importance of anatomy remains immovable. It is considered an essential subject by both practicing healthcare professionals and their patients. While patient care has unsurprisingly shifted from anatomical to more holistic approaches in recent years, a solid anatomical background contributes to better clinical outcomes. Therefore, anatomy should be a core subject from a systems-based medicine standpoint, building this as part of a molecular, cellular, tissue, organ, and whole-patient approach. Medical students report that the strength of the anatomical education offered by a school is a factor in choosing which school to attend. There is ample research on the value of anatomical knowledge in diagnostic reasoning. For example, both

anatomical and internal medicine doctors netted extra marks by utilizing their unique skills, peer-rating the visual recognition of retinoblastoma.

Case Studies and Examples

Each of the following case studies describes where sculpture and anatomy have been combined successfully with similar techniques for educational improvement. As evident in the slight differences between these examples, each form of sculpture-based programming has an approach best suited to its own communities and guidelines. The descriptions include adaptations to courses, curricular schedules, and process details, as well as statements about how students and faculty have been affected by the course changes according to the goals of the related program [15, 16]. Case Studies Given here are some cases of sculpture programs that have been offered as a part of medical education. Unlike the general rules, where sculpture is offered as an elective, below it is described how teaching is allocated not to sculptors, but to future visual experts, usually students from medical universities. They just tried their hands at sculpture under the watchful gaze of a professional sculptor. Moreover, such a combination of anatomy and sculpture sometimes allows students to consider a cadaver not just as a dissected body but as an artistic creation. The assimilation of these principles and practices can make future doctors especially sensitive to future cadaver dissections. Program information and process details are provided in this section. The results of the survey suggest that they have reached one of the goals of the study, positively influencing attitudes towards anatomy. By participating in creating something with their hands, students expressed a more complex view of their cadaver 'partner' by choosing creative expressions compared to those who did not have a professional molding experience. In conclusion, this study may consequently propose medical schools enrich their anatomical and visual skills program with basic artistic training, promoting an organismic perspective thanks to sculpture, painting, or drawing. The program is time-consuming but effective. It might work more efficiently a few days before the first dissection takes place [17, 18].

Best Practices for Integrating Sculpture and Anatomy into Medical Curriculum

Successful integration of sculpture study into medical curricula and utilization of art and anatomy in medical courses is contingent upon close collaboration between art instructors and medical faculty. We strongly recommend a truly multidisciplinary course in which artists are students from the outset, being trained in anatomy, and medical students learn to handle art materials and to use art as a way of thinking about, remembering, and respecting the human form. It is important to start with simple tasks rather than complicated ones, to address anatomical learning from perspectives extraneous to those required of a classical lecture course, and to be prepared to reassess learning from art workshops and modify the course content, teaching, and learning from feedback from course participants. We suggest three interlocked principles for successfully integrating sculpture and anatomy in a medical course. First, the course structure only provides a few optional art-anatomical workshops for student volunteers, so no one has their main access to anatomy course content through this medium; students who choose not to attend the art-anatomy workshops proceed instead with the regular radiological and protected part of the course, accompanied by medical modeling and computer-aided learning as the main forms of learning about anatomy. Second, in this way, only volunteer students who are already interested in the relationship between art and anatomy are involved in the study; all these students also learn in the class dedicated to medical modeling that this particular artistic approach cannot be carried out unless students are well informed about the location, relationships, and variability of all the underlying anatomical structures. If students want to carry out good medical modeling, they need to study. Third, the timing of the optional workshops is such that staff can give feedback. It is important to erect a beautiful fortress, robust enough to resist any negative criticism and to use continuous positive reinforcement techniques. These principles are recommended because of the difficulty of teaching drawing skills and artistic anatomical knowledge to groups of some 200 students in one day of the obligatory teaching element of this program, and the increased danger of exclusion, stress, and humiliation that students might experience using sculpture. It is important that sculpting activity complements but does not contradict or restrict the teaching of anatomy as a scientific basis of medicine. New technologies like 3D modeling would also complement art in practice, albeit exceedingly difficult in current photographic practical classes, which in any case are taught from observations of surface forms; they miss important elements involved in the internal aspects of sculpture. The most important principle is that participants act as a learning group and give constant support and constructive criticism to one another with reinforcement from the teachers, noting their performance over time with continuous feedback. Early professors are also careful not to overemphasize

skills and academic performance and include sensitivity, humor, and humility in their feedback. If participants start to become less confident, they should take part in the exercise themselves and express their commitment to participant welfare [19, 20].

CONCLUSION

Integrating sculpture into medical anatomy education offers profound benefits, bridging the gap between art and science. Sculpture promotes tactile and spatial learning, enhancing students' understanding of complex anatomical relationships and improving retention through multisensory engagement. Historical precedents and contemporary case studies demonstrate the potential of this interdisciplinary approach to enrich medical education. By incorporating art-based practices into anatomy curricula, educators can foster a deeper appreciation of the human body, improve diagnostic reasoning, and cultivate a more empathetic and holistic medical professional. Future implementations should prioritize collaboration between art and medical faculties, volunteer-driven workshops, and innovative use of technology, ensuring that artistic methods complement traditional scientific training. This integration not only nurtures technical proficiency but also addresses emotional well-being and creativity in a demanding academic and professional environment.

REFERENCES

1. Maksymchuk B, Matviichuk T, Solovyov V, Davydenko H, Soichuk R, Khurtenko O, Groshovenko O, Stepanchenko N, Andriychuk Y, Grygorenko T, Tetiana DU. Developing healthcare competency in future teachers. Revista Romaneasca Pentru Educatie Multidimensionala. 2020 Oct 5;12(3):24-43. lumenpublishing.com
2. Ross CF, Pescitelli MJ, Smith HF, Williams JM. Teaching anatomy with dissection in the time of COVID-19 is essential and possible. Clinical Anatomy (New York, Ny). 2020 Jul 12;34(8):1135. nih.gov
3. Tzenios N. Clustering students for personalized health education based on learning styles. Sage Science Review of Educational Technology. 2020 Nov 28;3(1):22-36. sagescience.org
4. Pedler ML, Willis R, Nieuwoudt JE. A sense of belonging at university: Student retention, motivation and enjoyment. Journal of Further and Higher Education. 2022 Mar 16;46(3):397-408. [HTML]
5. Brenna CT. Bygone theatres of events: A history of human anatomy and dissection. The Anatomical Record. 2022 Apr;305(4):788-802.
6. Tuck SL. Terrae Motu Conlapsum: A Post-Earthquake Rebuilding Inscription at Pompeii in Imperial and Local Contexts. Classical Journal. 2021;117(1):67-90.
7. Tuck SL. Terrae Motu Conlapsum: A Post-Earthquake Rebuilding Inscription at Pompeii in Imperial and Local Contexts. Classical Journal. 2021;117(1):67-90.
8. Drakatos N, Tsompou E, Karabatzaki Z, Driga AM. Virtual reality environments as a tool for teaching Engineering. Educational and Psychological issues. TechHub Journal. 2023 Mar 30;4:59-76. techhubresearch.com
9. Conte DB, Zancanaro M, Guollo A, Schneider LR, Lund RG, Rodrigues-Junior SA. Educational interventions to improve dental anatomy carving ability of dental students: A systematic review. Anatomical Sciences Education. 2021 Jan;14(1):99-109. researchgate.net
10. de Carvalho Filho MA, Hafferty FW, Pawlina W. Anatomy 3.0: Rediscovering theatrum anatomicum in the wake of Covid-19. Anatomical sciences education. 2021 Sep;14(5):528-35. wiley.com
11. Stubbe JH, Tiemens A, Keizer-Hulsebosch SC, Steemers S, van Winden D, Buiten M, Richardson A, van Rijn RM. Prevalence of mental health complaints among performing arts students is associated with COVID-19 preventive measures. Frontiers in Psychology. 2021 Jun 15;12:676587. frontiersin.org
12. Saddik B, Hussein A, Sharif-Askari FS, Kheder W, Temsah MH, Koutaich RA, Haddad ES, Al-Roub NM, Marhoon FA, Hamid Q, Halwani R. Increased levels of anxiety among medical and non-medical university students during the COVID-19 pandemic in the United Arab Emirates. Risk management and healthcare policy. 2020 Nov 3:2395-406. tandfonline.com
13. Kim IB, Joo KM, Song CH. A brief review of anatomy education in Korea, encompassing its past, present, and future direction. Journal of Korean Medical Science. 2024 May 5;39(20).
14. Balta JY, Supple B, O'Keeffe GW. The universal design for learning framework in anatomical sciences education. Anatomical sciences education. 2021 Jan;14(1):71-8. ucc.ie

15. Bölek KA, De Jong G, Henssen D. The effectiveness of the use of augmented reality in anatomy education: a systematic review and meta-analysis. Scientific reports. 2021 Jul 27;11(1):15292.
16. Shapiro L, Bell K, Dhas K, Branson T, Louw G, Keenan ID. Focused multisensory anatomy observation and drawing for enhancing social learning and three-dimensional spatial understanding. Anatomical sciences education. 2020 Jul;13(4):488-503. figshare.com
17. Ferrara V, De Santis S, Manicone F, Martinino A, Consorti F. The visual art as a learning tool in medical education. Senses and Sciences. 2020 Nov 18;7(2). sensesandsciences.com
18. Radzi S, Chandrasekaran R, Peh ZK, Rajalingam P, Yeong WY, Mogali SR. Students learning experiences of three-dimensional printed models and plastinated specimens: a qualitative analysis. BMC Medical Education. 2022 Sep 28;22(1):695. springer.com
19. van Woezik TE, Stap TB, van der Wilt GJ, Reuzel RP, Koksma JJ. Seeing the other: how residents expand their perspective by learning with the arts. Journal of Graduate Medical Education. 2023 Feb 1;15(1):50-8. nih.gov
20. Chen P, Alexander SM, Baute Penry V. Nutrition Module: Addressing the Nutrition Education Gap in Undergraduate Medical Curricula via a Novel Approach. Medical Science Educator. 2024 Jul 15:1-7.

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