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Research Article

Assessment of Anatomy Education Teaching Modalities before and during COVID-19 in US Medical Schools

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Medical schools in the United States, as well as across the world, have undergone curriculum reform in the delivery of anatomy courses, which recently required social distancing during the COVID-19 pandemic. The aim of this study was to compare total teaching time across three major types of anatomy curricular formats in preclerkship and clerkship phases of US medical education, and quantitatively describe which tools/teaching modalities are used within different curricula structures across preclinical and clinical anatomy courses as well as evaluate the relative percent of the curricular time their use comprised prior to and during the pandemic. An optional survey instrument (with skip patterns), developed using Qualtrics Software and approved by the author's home Institutional Review Board, was sent to anatomy course directors at 152 allopathic medical schools, from all four geographic and size categories delineated by the Association of American Medical Colleges. Data were analyzed using Qualtrics XM Stats iQ software. Thirty allopathic US medical institutions were represented in this survey, among which there existed an even distribution across the three integration formats with the majority of instruction occurring in the first-year curriculum. Total anatomy teaching time varied widely, but cadaveric dissection and lectures were the predominant teaching modalities, even during the pandemic. Traditional dissection comprised the majority of contact time compared to alternative modalities, but less than half of respondents currently incorporate new modalities. Approximately half of the schools changed to an all-virtual format for 2020–2021. Among those that were fully virtual, time using 3D anatomy significantly increased. Our results demonstrate that traditional anatomic educational practices remain the mainstay of medical education. Surprisingly, total contact hours in anatomic education varied widely, but there were striking similarities in the use of traditional tools.

1. Introduction

The study of anatomy remains foundational within medical education. Over the past decade, many medical schools across the United States and other countries have undergone dramatic curriculum reform, including the integration of gross anatomy within systems-based curricula [1, 2], a decrease in total lab contact hours through the adoption of interactive learning tools, and a "flipped classroom" approach to teaching [2–5].

Even more recently, in light of the COVID-19 pandemic, medical schools had to acutely modify curriculum delivery, particularly for the delivery of anatomy courses. There has been a shift in the last half decade toward incorporating anatomy into an integrated curriculum [3]. Shin et al. [2] recently described major medical curricular changes of the last 5 years, including the first scholastic year of the pandemic; they reported that, on a national scale, there exists an even split among how anatomy is currently incorporated into US medical curricula, with approximately half of the schools integrating anatomy into an organ-based curriculum. However, these reports have not delineated exactly what level of integration has been achieved. For example, does a level of integration that is not "full" mean there is a foundational block in addition to partial incorporation of gross anatomy in systems curricula, or are schools still teaching anatomy as an isolated block alone? Additionally, a comprehensive analysis of which specific tools and modalities being used within anatomy courses among schools that remained in-person versus those that switched to an all virtual format has not been reported. The relative hours of educational time utilizing new tools available for visualizing and teaching anatomy would provide insight into the current state of nationwide anatomy curricular change.

The aim of this study was to provide additional detail about which specific tools and teaching modalities have been implemented at allopathic medical schools across the United States. This includes an analysis of whether and to what extent changes were made to the delivery of anatomy educational tools used in the preclinical curriculum in Fall 2020 as a result of the COVID-19 pandemic. In addition, we aimed to compare the total teaching time across the three major types of anatomy curricular formats: isolated anatomy block, foundational block with additional integration into systems-based curriculum and fully integrated anatomy in systems curriculum. In doing so, we hope to contribute to the growing understanding of anatomy curricular practices in both the preclinical years as well as assess what opportunities exist to return to anatomy during the clinical years of medical education.

2. Methods

2.1. Design. This study (HP-00093310) was fully approved by the Institutional Review Board of the University of Maryland Baltimore. A 31-question survey instrument (with skip patterns) was developed using Qualtrics Software Version (10/2020–11/2020) of Qualtrics. Copyright © (2020) Qualtrics (Qualtrics, Provo, UT, USA). Question categorical items assessed included (1) which educational tools (lecture, lab, case-based learning, peer-to-peer instruction, etc.) had been implemented in preclinical anatomy curricula and the relative percent use of each tool before the COVID-19 pandemic; (2) which teaching modalities (embalmed cadaveric dissection, medical imaging, computer anatomy, etc.) had been implemented in preclinical anatomy curricula and the relative percent use of each modality before the COVID-19 pandemic; (3) what methods were used to assess anatomical knowledge in the preclinical anatomy curricula prior to the COVID-19 pandemic; (4) how did the relative percent use of each tool and teaching modality change in preclinical anatomy curricula during Fall 2020; and (5) what opportunities existed to return to anatomy content in the clerkship phase of the curriculum.

Question item response options included multiple choice, free text response, and sliding scale bars to estimate the time students spend engaging with different learning activities, teaching modalities, and educational tools. Certain survey items were only visible to participants who indicated "yes" to specific questions in a dynamic branch structure. As an example, if a participant indicated that their respective school does not offer opportunities to return to the anatomy lab in the clinical curriculum, then subsequent questions regarding clinical anatomy curricula detail were not visible to that participant.

2.2. Participants. Participant schools were recruited through an email detailing the aims and basic knowledge requirements for participation in the survey sent to faculty deans in the Office of Medical Education and/or Anatomy Course Directors at 152 allopathic medical schools across the United States. Emails were obtained through an internet search and review of each respective school's website. Recipients were asked to forward the survey instrument to anatomy course directors or someone with extensive knowledge of the anatomy course curriculum sufficient to answer the survey details. Completion of the survey was optional, and participants were consented prior to accessing survey questions. Participants were informed in the initial recruitment email that they could elect to be entered into a raffle for an iPad compensation upon completing the survey. At the end of data collection, one individual was randomly chosen and sent the compensation.

2.3. Data Analysis. Data were analyzed using Qualtrics XM Stats iQ software, Version (9/2021–11/2021) of Qualtrics. Copyright © (2022) Qualtrics (Qualtrics, Provo, UT, USA). The associations between normally distributed variables were analyzed using a paired t-test and effect sizes were calculated using Cohen's d. The reported values for school's self-report of estimated percent of time engaged in different modalities were all normalized to 100 and respondents putting a "null" value in a modality were assumed to have a 0% time within that modality. In analyzing associations between estimated percent of time engaged in different modalities during lab contact hours prior to and during the pandemic, the total number of respondents (n) was not equal. Therefore, they were treated as independent samples, and associations were analyzed using an unpaired t-test. Variance of the samples was calculated, and Welch's test was used for associations among variables with unequal variance, defined as a ratio greater than 4. One-way analysis of variance (ANOVA, Kruskal–Wallis post hoc) was used when there were more than two groups to analyze. The level of significance was set at $\alpha = 0.05$.

3. Results

3.1. Survey Responses. Thirty allopathic US medical institutions (20% of those surveyed) were represented in this survey. Overall, 86.7% ($n = 26$) of respondents identified as the anatomy course/section head at each respective institution, with the remaining identified as having a significant instructional role in the school's anatomy curriculum. Respondent school class size ranged between 50–100 ($n = 5$, 16.7%), 100–150 ($n = 12$, 40.0%), 150–200 ($n = 10$, 33.3%), and >200 ($n = 3$, 10.0%). All four geographic regions, based on the Association of American Medical Colleges Office of Student representatives map responded covering central ($n = 5$, 16.7%), northeast ($n = 11$, 36.7%), southern ($n = 10$, 33.3%), and western ($n = 4$, 13.3%) regions. The primary endpoints of this study were to assess the duration and

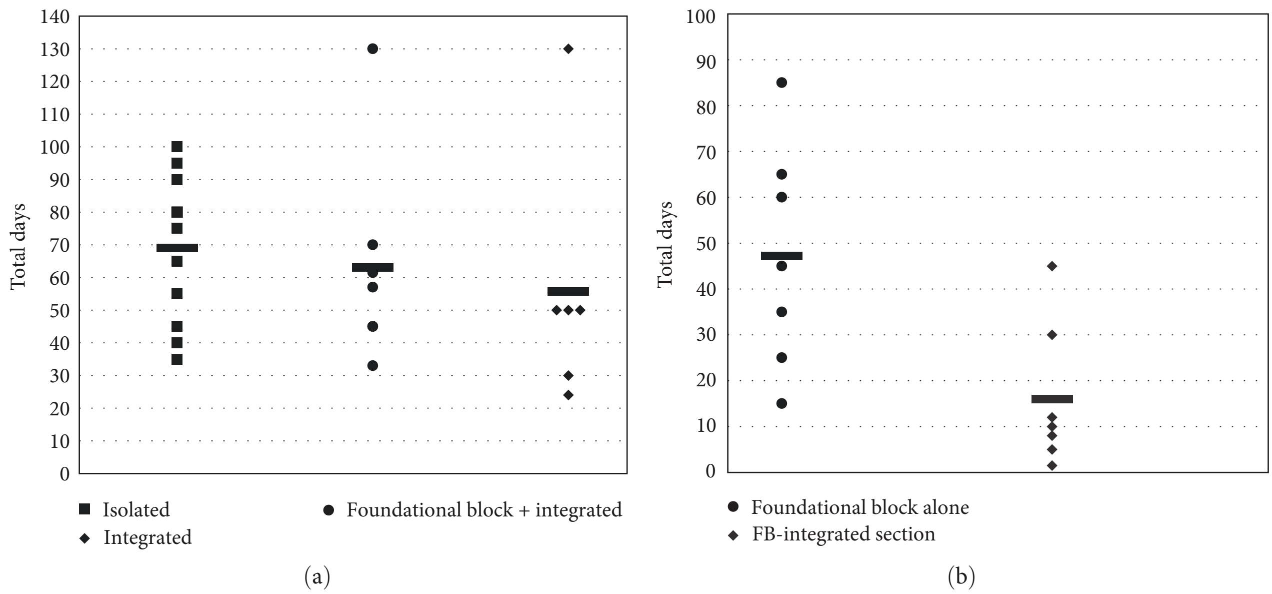

FIGURE 1: (a) Estimated total number of days of anatomy by curriculum type. Bar indicates the mean; (b) Estimated total number of days of anatomy in the foundational block and integrated sections of the foundational block plus integrated format, respectively.

structure of anatomy curricula along with the relative proportions of different educational tools used across US medical schools. Additionally, we assessed how these proportions and tools were affected by the COVID-19 pandemic.

3.2. Preclinical Anatomy Curriculum (Prior to Fall 2020). Two-thirds of respondents reported that anatomy was a part of the first-year curriculum only and the remaining third reported that anatomy was included within both the first and second years. No respondents reported that anatomy is being taught in the second year only. The majority of respondents indicated anatomy was integrated into the preclinical curriculum as either an isolated block ($n = 12$, 40.0%) or as a foundation block plus integration (FBI) within systems-based curricula ($n = 8$, 26.7%). The remaining 33.3% of schools ($n = 10$) reported that anatomy was fully integrated into a systems-based curriculum.

Respondents were asked to represent the estimated study days spent by students on anatomy, as well as the exact number of contact hours with each type of instructional contact time (see below). Total number of educational days were not significantly different among the three different types of curricular formats ($p = 0.1$; Figure 1(a)). The average length of the anatomy block at schools where anatomy is taught as a stand-alone course was 69 days (SD = 28.2). For schools with a foundational block, the average length of the foundation block was 47.14 days (SD = 24.47) with 15.9 additional days (SD = 15.7) of anatomy integrated into the systems-based curricula phase, yielding a combined total of 63 days (SD = 31) of anatomy in the FBI curriculum (Figure 1(b)). Schools with fully integrated anatomy curricula reported an average of 55.7 days (SD = 34.8) of anatomy.

Assessing the relative adoption of anatomic educational modalities shows that the majority of student contact time during the anatomy curriculum was spent in the anatomy lab or in lectures. Other formats, such as small group instruction, case-based learning, team-based learning, and peer-to-peer teaching, collectively comprising less than one-fourth of overall contact teaching time (Figure 2). We assessed hours of education using embalmed cadavers, nonembalmed cadavers, histology, prosection, plastinated specimens, demonstrations, physical models, virtual models, virtual dissection tables, virtual reality, medical imaging (MRI/CT/X-ray), medical imaging (ultrasound), simulation, video, and body painting (Table 1). The majority of lab contact hours were spent engaged in embalmed cadaveric dissection (60.3%) or interaction with preprepared materials consisting of prosections, plastinated, demonstration, 3D/virtual, or videos (0.05%–8%).

Within the dissection laboratory, a wide diversity of primary professions were represented among anatomy lab preceptors. PhDs comprised the largest professional field providing 33% of instructors, whereas MDs represented 27% of preceptors. The remaining teaching assistants were represented by undergraduate and graduate students, second to fourth-year medical students, DPTs, physician assistants, and DOs, respectively.

The average number of examinations used to test purely anatomical knowledge in the preclinical curriculum differed by curricular format. Respondents reported using 4.6 exams (SD = 2.4) for an isolated block curriculum, 3.0 exams (SD = 2.2) for a foundational block plus integrated curriculum, and 5.1 exams (SD = 3.2) for fully systems integrated. These differences were not statistically significant ($p = 0.3$). The percent of questions which test anatomical knowledge on exams containing a mix of disciplines was highest among schools where anatomy is fully integrated into systems-based curricula (14%), compared to 9.6% in those with a foundational block plus integration and 5% for those with an isolated block. Most respondents reported using multiple choice ($n = 21$, 70%) and a free association wet practical with tagged

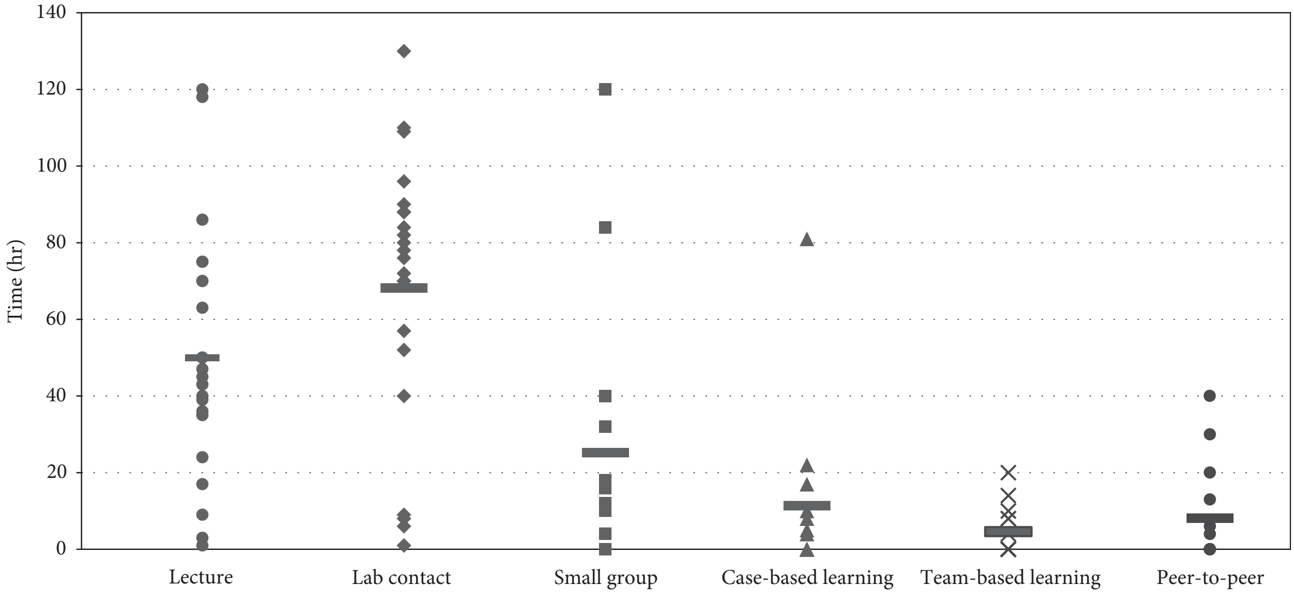

FIGURE 2: Time engaged in different teaching modalities prior Fall 2020. Bar indicates the mean.

TABLE 1: Estimated percent of time students spent engaged in each of the following during lab contact hours prior to 2020–2021 scholastic year (all schools).

Activity	Percent of time (SD)[a]
Embalmed cadaveric dissection	60.3 (32.0)
Nonembalmed dissection	3.1 (9.9)
Histology	8.1 (13.6)
Prosections	4.2 (5.8)
Plastinated specimens	1.9 (5.6)
Demonstrations	4.2 (11.7)
Plastic/Physical models	1.1 (2.4)
Computer 3D anatomy	0.7 (2.2)
Virtual tables	2.5 (8.6)
Virtual reality	0.05 (0.2)
Medical imaging—US	2.0 (4.7)
Medical imaging—MRI/CT/X-ray	5.5 (11.1)
Simulation models	0.8 (2.3)
Dissection videos	3.0 (5.3)
Body painting	2.4 (9.6)

[a]Values reported as percent of total time (SD), responses normalized to 100.

TABLE 2: Percent of respondents who adapted specific educational tools to a virtual format in Fall 2020.

Educational tool/activity	N (%)
Cadaveric dissection	14 (46.7)
Histology	13 (43.3)
Lecture	26 (86.7)
Case-based learning	13 (43.3)
Team-based learning	10 (36.4)
Peer-to-peer teaching	8 (26.7)
Small groups	13 (36.4)

cadavers ($n = 17$, 56.7%) or a multiple-choice wet practical with tagged cadavers ($n = 3$, 10.0%) to test anatomical knowledge. Other methods included using preprepared digital images of gross anatomy ($n = 11$, 36.7%), histology images ($n = 12$, 40%). Assessment of anatomic knowledge using long essays and skills assessments ($n = 1$, 3%, respectively), short essays ($n = 3$, 10%), and oral exams and qualitative faculty assessments ($n = 4$, 13.3%, respectively) were used to a lesser degree.

3.3. Anatomy within Clinical Curricula. Among the respondents in our sample 70% ($n = 21$) reported there were additional opportunities available for students to return to the anatomy lab during core clerkships ($n = 6$, 29.0%), clinical electives, and/or subinternships electives ($n = 20$, 95.0%) in their curriculum. The majority of these opportunities are in the format of regional-based (38.6%) and/or surgical procedure-based (31.8%) labs. The remaining formats included system-based labs (18.0%) and student chosen/developed activities (11.4%). The majority of these schools ($n = 14$, 66.7%) report the use of multiple teaching modalities. In contrast to the preclinical curricula, the majority of reported clinical anatomy opportunities involved practicing/performing a clinical procedure (90.0%) compared to embalmed cadaveric dissection (71.4%). Less than 50% of schools reported the use of medical imaging (CT/MRI/X-ray/ultrasound), nonembalmed cadaveric dissection, simulation, or demonstration by a preceptor within these clinical year opportunities.

3.4. Changes to Preclinical Anatomy Curricula during Fall 2020. Among our sample, 29 (97.0%) respondents stated that the format of the anatomy curriculum was significantly changed for Fall 2020–2021 academic year with 26 (86.7%) of respondents changing lectures to a virtual delivery format (Table 2). Approximately half of the respondents ($n = 14$,

Table 3: Estimated percent of time engaged in each during lab contact hours in preclinical curricula prior to 2020 and during 2020–2021 by status of in-person learning in 2020.

	All schools	Virtual learning			In-person learning		
	Prior to 2020	Prior to 2020	2020–2021	*p*-Value	Prior to 2020	2020–2021	*p*-Value
Embalmed cadaveric dissection	60.3 (32.0)	53.5 (32.03)	8.3 (28.9)	**0.002**	73.1 (24.7)	39.8 (33.8)	0.06
Nonembalmed dissection	3.1 (9.9)	6.4 (13.9)	2.8 (9.6)	0.48	**0.16 (0.5)**	5.8 (20.8)	0.35*
Histology	8.1 (13.6)	9.7 (16.8)	1.98 (6.0)	0.14	7.4 (10.9)	10.2 (14.9)	0.56
Prosections	4.2 (5.8)	2.1 (3.6)	8.5 (19.9)	0.33	4.7 (10.9)	11.4 (16.7)	0.25*
Plastinated specimens	1.9 (5.6)	1.65 (3.2)	0.08 (0.3)	0.16*	2.4 (7.6)	1.4 (5.0)	0.84
Demonstrations	4.2 (11.7)	5.7 (15.5)	6.5 (20.0)	0.92	3.1 (7.6)	1.1 (3.2)	0.21
Plastic/physical models	1.1 (2.4)	2.3 (3.2)	1.3 (4.2)	0.55	0	0.6 (1.1)	0.07
Computer 3D anatomy	0.7 (2.2)	1.5 (3.1)	33.3 (38.5)	**0.02***	0	0.3 (1.1)	0.34
Virtual tables	2.5 (8.6)	4.2 (12)	3.5 (9.8)	0.49	1.1 (3.4)	1.4 (5.0)	n/a
Virtual reality	0.05 (0.2)	0	0.08	0.37	0.1 (0.3)	0	0.33
Medical imaging—US	2.0 (4.7)	1.4 (3.1)	0.26 (0.6)	0.28*	0.75 (1.6)	2.2 (5.6)	0.37
Medical imaging—MRI/CT/X-ray	5.5 (11.1)	2.6 (3.9)	3.9 (4.4)	0.46*	4.1 (5.2)	9.3 (14.2)	0.91
Simulation models	0.8 (2.3)	1.6 (3.3)	1.5 (3.8)	0.96	0.1 (0.3)	0	0.86
Dissection videos	3.0 (5.3)	2.3 (3.6)	22 (35.4)	0.07*	3.1 (6.7)	16.5 (19.6)	**0.05**
Body painting	2.4 (9.6)	5.17 (13.7)	5.8 (20)	0.94	0	0.2 (0.7)	n/a

Values reported as percent of total time (SD), responses normalized to 100. Bold values indicate significant difference. All *p*-values were calculated using an unpaired *t*-test. Those denoted with an asterisk (*) were calculated using Welch's test due to unequal variance.

46.7%) also changed cadaveric laboratory to a virtual format, whereas 26.7%–43.4% changed their other teaching methods (histology, case-based, team-based, small group, peer-to-peer). Among the schools that transitioned cadaveric labs to a virtual format, a variety of methods were reported for virtual dissection, including Zygote Body, Complete Anatomy (3D4 medical), Anatomage table, YouTube, Anatomy.TV, and Sectra. Several schools reported the use of live streaming of a dissection performed by faculty. Overall hours spent in lecture and lab/lab-equivalent educational activities was roughly equal between schools that conducted in-person sessions compared to schools that engaged in virtual learning, with an average of 40.5 hr of in-person lecture vs. 59 hr of virtual lecture and 49 hr of in person lab vs. 51 hr of virtual lab.

Among the schools that conducted in-person dissection in Fall 2020 ($n = 13$, 52% of respondents), there was a decrease in the percent of time spent in direct contact hours using embalmed cadaveric dissection, though not statistically significant (Table 3; 73.1% in Fall 2020 vs. 39.8 % prepandemic, $p = 0.06$), and a significant concomitant increase in dissection video use (3.1% in Fall 2020 vs. 16.5% prepandemic, $p = 0.05$). There were negligible changes to other educational modalities (Table 3). Among the schools of which students completed in-person labs in Fall 2020, the average reported ratio of students to cadaver/table of 4.40 did not differ significantly from prepandemic (average ratio of 4.60). However, the ratio of students to preceptors decreased from 18.16 students/preceptors to 16.1 ($p = 0.04$, $d = 0.595$).

Among the schools that did not complete normal in-person dissection labs in Fall 2020 ($n = 12$, 48% of respondents) there was a statistically significant decrease in the percent of contact hours in a lab setting (8.3% vs. 53.5% prepandemic; $p = 0.002$) paired with a concomitant significant increase in the use of virtual 3D anatomy tools (33.3% compared to 1.5% prepandemic; $p = 0.02$). There was also an increase in this cohort in dissection video use, though not statistically significant ($p = 0.07$). There were negligible changes to other educational modalities (Table 3).

4. Discussion

Given the different ways anatomy has been incorporated into the ongoing changes in curricula structures between schools over the past decade, a comparison across different formats (fully integrated versus partially integrated versus not integrated) is needed. We attempted to measure whether students across institutions are receiving the same amount of total contact time within these curricular structures. This includes surveying schools teaching anatomy as a stand-alone block in the first year alone, foundations plus further integration, and schools with a fully integrated systems-based structure, as well as whether or not anatomy is offered during the clinical years of medical education.

The results of this study indicate that, among our sample, the majority of anatomy is still taught during the first year of medical school. There are also limited opportunities to return to anatomy within the clinical years despite one study surveying students and clinical educators that reported a desire for opportunities in anatomical education beyond the preclinical years of medical school [6]. Of schools that do have clinical year exposure to anatomic education, embalmed cadaveric dissection, and practice performing a procedure are the predominant teaching modalities used. Among the respondents in this study, there is also a relatively equal distribution of how anatomy has been integrated into preclinical curricula across three distinct curricular formats:

block based, partially integrated with a foundations block followed by systems anatomy, and fully integrated with anatomy only in systems on a national scale.

A large body of literature in recent years has encompassed reviews of the broad categories of teaching modalities that have been incorporated into anatomy education as well as institution-based assessments of the implementation of specific technological tools or teaching practices [1, 7–10]. A recent meta-analysis of broad categories of anatomy laboratory teaching approaches suggests that a multifaceted approach that includes multiple forms of instruction is best equipped to meet the needs of different types of learners [4]. However, across all curricular formats in the schools we surveyed, the majority of students' time is still spent in lectures and in anatomy lab, where embalmed cadaveric dissection remains the modality encompassing the greatest percentage of lab contact time. Our findings are similar to the percentages of time in lecture and cadaveric dissection versus other small-group/team-based learning reported by Shin et al. [2]. Interestingly, despite its relevance to anatomy, medical imaging had limited representation in anatomic curriculum prior to COVID-19 (Table 1).

Our study also separated how schools assess anatomical knowledge across curricular formats. Among our sample, the percent of anatomy questions on other assessments was lowest in programs that only taught anatomy as an isolated block. Interestingly, among our participants, assessment methods were diverse with only 70% using multiple choice and 50% or fewer using some form of gross anatomy practical to assess anatomical knowledge. Shin et al. [2] also found differences in how schools assess anatomical knowledge—namely 8% of their respondents had no form of practical evaluation. These findings suggest that a smaller range of examination methodologies are implemented by schools for assessing anatomical knowledge.

In our sample, 14 respondents (46.7%) switched to virtual dissection in Fall 2020—10 of whom reported terminating all in-person anatomy lab sessions in response to the pandemic—consistent with Shin et al. [2]. When we assessed the relative use of different teaching modalities, there were no significant differences in lab contact hours in schools that continued in-personal learning. However, we observed that there was less time spent in team- or case-based exercises in aggregate. This may be due to a reduction of in-person activities outside of anatomy lab that necessitate group formats as a pandemic accommodation. Additionally, while there were no changes to student per cadaver ratio there was a significant decrease in preceptor-to-student ratios. This could be due to a decrease in time spent in other modalities allowing for more instructor time dedicated to dissection labs. Conversely, schools that reported switching to an all-virtual format saw an overall decrease in total contact time in lab and lecture, with a significant decrease in embalmed dissection and concomitant increase in virtual computer-based 3D anatomy. However, some embalmed cadaveric dissection was still reported by almost all of those schools, although with substantially reduced hours. Overall, there was no significant difference in "lab contact hours" among these schools when considering virtual labs to hands-on dissection labs, suggesting that the switch to a virtual format did not reduce total time spent with material. However, it is unclear how much of that time was active versus passive learning as a virtual environment is radically different from a team-based, hands-on laboratory dissection program.

4.1. Limitations. This study only looked at allopathic medical schools in the United States, therefore it does not encompass curricula at osteopathic schools of medicine or international schools. Our survey also asked individuals to estimate the percent of time, total days, and total hours spent in certain elements of curricula. The process in which individuals calculate this may vary, particularly with how respondents parse contact hours within a tightly integrated systems curriculum. For example, if there are 5 min of anatomy in 60 min of a systems lecture, that may not have been accurately captured by respondents, leading to slight cumulative underestimations of anatomy time present within integrated curricula. Although not statistically significant given the current sample size, integrated curricula did appear to have slightly lower listed contact hours/days of anatomy. Lastly, while response rate is well represented by school size/region, as with all surveys analysis is limited to a subset of medical schools and may not capture the full diversity of approaches used in nonrespondent schools.

5. Conclusions

The teaching of anatomy is a foundational discipline in medical schools around the world, and approaches undertaken by US medical schools are broadly applicable to many international curricula, which are facing similar technology and curriculum changes to medical education. This is the first study to attempt to quantitatively describe which specific tools and teaching modalities are used by medical schools to teach anatomy across preclinical years and curricular formats, clinical years as well as the relative percentage of total curricular lab time each tool comprises. It is also the first to delineate modality use across the three major integration formats for anatomy in preclinical medical education and attempt to quantify/compare total time in days of anatomy across each. Our data demonstrate a wide range of teaching tools and modalities have now been incorporated across schools, but the learning of anatomy remains based upon hands-on cadaveric dissection and lecture-based learning for the vast majority of contact time. This and the work of others [11] suggest that traditional methods may still be more popular as they are integrated with the newer teaching formats that have been made available and advocated for in the field.

We also delineated changes in contact time spent with different teaching tools among the schools that switched to an all-virtual format and those that did not for the 2020–2021 year for time spent engaged in different teaching modalities (lecture, group-based, and time with hands-on tools). Future work should continue to assess on a regular basis how the relative use of different teaching tools changes as a percentage of total hands-on learning time changes within the medical education community. Of particular importance is tracking if newer teaching modalities such 3D anatomy used during the COVID-19 era, has any lasting impact on the way medical schools nationally and internationally continue to teach anatomic knowledge.

Data Availability

The authors support the principle of open sharing of data. Underlying data spreadsheets for this report may be requested from the corresponding author.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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