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Evaluation of the Necessity of Anatomy During Postgraduate Medical Education

Tıpta Uzmanlık Eğitiminde Anatomi Gereksinimine Dair Görüşler

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Öz

Mezuniyet sonrası tıp eğitimin amacı farklı uzmanlık alanlarında toplumun gereksinimlerine yönelik nitelikli hekimler yetiştirmektir. Bu süreçte verilen eğitim daha çok klinik eğitim olarak yapılmakta ve sadece Plastik, Rekonstrüktif ve Estetik Cerrahi uzmanlık eğitiminde anatomi eğitimi (rotasyonu) bulunmaktadır. Oysaki tıp eğitiminde ilk 3 yılda verilen anatomi eğitimi uzmanlık eğitimi için yeterli ayrıntı içermemektedir. Bu hipotezi araştırmak için yola çıktığımız çalışmamızda uzmanlık eğitimi alan asistan hekimlerin anatomi eğitimine gereksinimleri ve anatomiye karşı tutumlarını araştırmayı amaçladık. Çalışmamıza dahili ve cerrahi branşlarda uzmanlık eğitimi alan 222 asistan hekim katılmıştır. Katılım gönüllülük esasına dayanarak, yüz yüze anket formu dağıtılmıştır. Katılımcıların %43.2'si cerrahi branşlarda, %56.8'i dahili branşlarda eğitim almaktaydı. Cerrahi branşlarda eğitim alanların %93.8'i, dahili branşlarda eğitim alanların %69.8'i uzmanlık yaptıkları bölümde anatomi bilgilerine ihtiyaç duyduklarını belirtmiştir. Uzmanlık eğitiminde katılımcıların %72.7'si klinik anatomi eğitiminin gerekli olduğunu belirtmiştir. Özellikle cerrahi branşlarda eğitim alan katılımcılar, branşa özgü anatomi eğitimi ve anatomi laboratuvarını kullanmak istediklerini belirtmiştir. Sonuç olarak anatomi eğitimi sadece mezuniyet öncesi değil, mezuniyet sonrası klinik branşlarda da oldukça önemi olan temel bir bilimdir. Anatomi eğitiminin uzmanlık eğitimine entegre edilmesi ile asistan hekimlerin bilgi açıkları kapanarak bilgi düzeyi yeterli olan donanımlı hekimlerin yetiştirilmesini sağlayabilecektir.

Anahtar Kelimeler: Anatomi, Anket, Mezuniyet Sonrası Eğitim, Tıp Eğitimi

Abstract

Postgraduate medical education aims to train qualified physicians in different specialties to meet the needs of society. The training provided in this process is mostly clinical training and anatomy training (rotation) is only available in Plastic, Reconstructive, and Aesthetic Surgery specialty training. However, the anatomy education provided in the first 3 years of medical education does not contain sufficient detail for specialist training. In our study, in which we set out to investigate this hypothesis, we aimed to investigate the anatomy education needs of assistant physicians receiving specialty training and their attitudes toward anatomy. A total of 222 assistant physicians receiving specialty training in internal and surgical branches participated in our study. Participation was voluntary and the survey form was distributed face-to-face. 43.2% of the participants were trained in surgical branches, and 56.8% were trained in internal medicine branches. 93.8% of those trained in surgical branches and 69.8% of those trained in internal medicine branches stated that they needed anatomy knowledge in the department in which they specialize. In specialty training, 72.7% of the participants stated that clinical anatomy training was necessary. Particularly participants who received training in surgical branches stated that they wanted branch-specific anatomy training and wanted to use the anatomy laboratory. As a result, anatomy education is a basic science that is very important not only before graduation but also in clinical branches after graduation. By integrating anatomy education into specialty training, the knowledge gaps of assistant physicians will be closed and qualified physicians with sufficient knowledge will be trained.

Keywords: Anatomy, Questionnaire, Postgraduate Medical Education, Medical Education

Introduction

The reason for the existence of medical schools is to train future physicians (1). For this purpose, medical education begins before graduation and continues with post-graduate medical specialization training. Specialization training in medicine is seen as one of the most important steps, and at this stage, it is aimed to train qualified physicians to meet the needs of the society. For this reason, theoretical and practical training is provided in clinical branches during medical specialization training. While branch-specific subjects are intensively covered in theoretical training, basic medical subjects are neglected in training programs because it is thought that they have been learned completely beforehand. However, the basic medical education given before graduation corresponds to the periods (the first three years) that the student receives at the beginning of his education life and cannot fully understand its importance. In addition, the basic medical education given during these periods is given following the National Core Education Curriculum and focuses mostly on the basic knowledge that general practitioners must acquire.

For this reason, when students start their specialist training, they are far from the basic medical education knowledge they received for a long time. In addition, detailed basic medical science subjects specific to the branch in which they specialize in training may be lacking. However, when clinical sciences are considered in specialty education, the contribution of basic medical sciences in many steps from diagnosis to treatment cannot be ignored. In particular, the basic medical course that is most related to patient examination, radiological image interpretation and interventional procedures is

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anatomy. In many fields of expertise, adequate knowledge of human body anatomy is very important for correct diagnosis and treatment (2). Newly developing minor invasive clinical practices or endoscopic surgical procedures have also increased the need for detailed anatomy knowledge (3). However, unfortunately, anatomy rotation is currently deemed necessary only in Plastic, Reconstructive and Aesthetic Surgery specialty training (4).

In order to be eligible for specialist training, there is a requirement to be successful in the Medical Specialization Exam (MSE), which is administered twice a year in our country. In this exam, Basic Medical Sciences (BMST) and Clinical Medical Sciences Test (CMST), each consisting of 100 questions, are applied. The number of anatomy questions is 13 and is included in the BMST test. As of September 2022, the contribution of basic medical sciences, which was previously 0.5, has been reduced considerably in the scoring system for entry into clinical sciences in the Medical Specialization exam (Clinical Medical Sciences question coefficient is 0.7, Basic Medical Sciences question coefficient is 0.3). Changes were made again with the September 2024 period, but the coefficients were not equalized (Clinical Medical Sciences question coefficient 0.6, Basic Medical Sciences question coefficient 0.4). On the other hand, organizing dissection courses to reinforce anatomy knowledge after specialization and specialization in clinical sciences and increasing the number of these courses contradict each other.

As in every department, evidence-based data is needed to evaluate and improve pre-graduate and post-graduate medical education. A survey was planned for physicians receiving specialty training in order to increase the quality of medical specialty training programs and to identify clinical branches in need of anatomy. In addition, the view and attitude of physicians receiving specialty training towards anatomy education and their need for anatomy education will be determined. We aim to help identify anatomy-related deficiencies and improve the quality of different specialty training programs.

Material and Method

Ethical Approval was received for this survey study from Muğla Sıtkı Koçman University Medicine and Health Sciences Ethics Committee (Decision No: 87 dated 28.09.2023 and numbered 230080). The study includes 222 assistant physicians at different levels receiving specialty training in internal and clinical branches. Participants were selected using convenience sampling among residents who were available and willing to participate during the data collection period. Survey applications were carried out at an appropriate time and environment so as not to interfere with education and clinical functioning. The survey was conducted on a completely voluntary basis, and assistant physicians who did not want to participate in the survey were not included in the study. For the answers to be reliable, personal information such as name, surname, and phone number of the participants was not collected.

Participants were asked to fill out a survey form consisting of 30 questions regarding basic and clinical anatomy education before and after graduation. Demographic data such as age, gender, and duration of clinical experience were also recorded.

Statistical analysis

IBM SPSS program (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.) was used for statistical analysis of the data. Descriptive statistics were used to summarize the data. Categorical variables were presented using frequencies and percentages. Continuous variables were summarized using mean and standard deviation, while ordinal data were summarized using median and interquartile range (25th–75th percentiles). The suitability of the variables for normal distribution was examined with the Kolmogorov-Smirnov test. Variables that did not show normal distribution were compared between groups using the Mann-Whitney U test. Chi-square analysis was used to compare categorical variables. The statistical significance level was chosen as 0.05.

A priori power analysis was performed using G*Power 3.1 software to determine the minimum sample size. Based on a medium effect size (w = 0.3), an alpha of 0.05, and a power of 0.80, the required sample size for Chi-square analysis was calculated to be 143 participants. The final sample of 222 assistant physicians ensured sufficient statistical power.

Results

Demographic data

222 (67%) of a total of 333 assistant physicians who continue their education at MSKU Faculty of Medicine participated in the study. 43.2% (n = 96) of the participants in the study were receiving specialization training in surgical branches, and 56.8% (n = 126) were receiving specialization training in internal medicine branches.

The average age of the participants was 28.73 ± 2.71 years (min 24, max 36). 62.6% (n = 139) of the assistant physicians were male and 37.4% (n = 83) were female (Table 1). The rate of those who wanted to change the department in which they received their specialty training was calculated as 4.2% for surgical branches and 6.3% for internal medicine branches. 7% of assistants in surgical branches and 10% of assistants in internal medicine branches

stated that they were considering becoming an anatomy specialist.

It was determined that 93.8% of the residents in surgical branches and 69.8% of the residents in internal medicine branches needed anatomy knowledge in the department in which they specialized ($p<0.001$). Anatomy needs according to departments are given in Table 2.

Pregraduate Medical Education

When the participants were asked about the anatomy education they received in medical school, it was seen that the majority of them had received 2 years of anatomy education (64.4%). This was followed by those who had 3 years of anatomy training (18.0%). 56.8% of the participants stated that anatomy education at medical school was instructor-centered. Approximately one-quarter of those who did not receive anatomy education in the 4th and 5th grades of medical school (n=167) reported that they should have received anatomy education in the last two years. 58.1% of the participants reported that they had taken at least one of the clinical anatomy, radiological anatomy, and topographic anatomy courses in addition to basic anatomy training. When cadaver training was questioned in anatomy education, 86.9% said that they were trained on cadavers, while only 31.5% stated that they could perform cadaver dissection.

Table 1. Demographic Characteristics of Participants

	Surgical Branches	**Internal medicine branches**	**Total**
Number of participants	96 (43.2%)	126 (56.8%)	222 (100%)
Gender (F)	16 (19.3%)	67 (80.7%)	83 (100%)
Gender (M)	80 (57.6%)	59 (42.4%)	139 (100%)
Age (mean ±SD) (min-max)	28.33 ± 2.55 (24-36)	29.02 ± 2.80 (24-36)	28.73 ± 2.71 (24-36)

Table 2. Anatomy needs according to departments

Branch	**N**	**Yes**	**No**	**Indecisive**
Surgical Branches	**96**	**90 (93.8%)**	**3 (3.1%)**	**3(3.1%)**
Emrgency Medicine	8	75.0%	0.0%	25.0%
Department of Anesthesiology and Reanimation	18	100.0%	0.0%	0.0%
Department of Neurosurgery	3	100.0%	0.0%	0.0%
Department of General Surgery	3	100.0%	0.0%	0.0%
Department of Thoracic Surgery	2	100.0%	0.0%	0.0%
Department of Ophthalmology	8	100.0%	0.0%	0.0%
Department of Gynecology and Obstetrics	8	100.0%	0.0%	0.0%
Department of Cardiovascular Surgery	3	100.0%	0.0%	0.0%
Department of Ear Nose and Throat Diseases	14	100.0%	0.0%	0.0%
Department of Orthopedics and Traumatology	14	78.6%	21.4%	0.0%
Department of Plastic. Reconstructive and Aesthetic Surgery	2	100.0%	0.0%	0.0%
Department of Medical Pathology	3	66.7%	0.0%	33.3%
Department of Urology	10	100.0%	0.0%	0.0%
Branch	**n**	**Yes**	**No**	**Indecisive**
Internal Medicine Branches	**126**	**88 (69.8%)**	**24 (19%)**	**14 (11.1%)**
Department of Forensic Medicine	7	100.0%	0.0%	0.0%
Department of Family Medicine	22	54.5%	22.7%	22.7%
Department of Pediatrics	7	42.9%	14.3%	42.9%
Department of Child and Adolescent Mental Health and Diseases	7	0.0%	85.7%	14.3%
Department of Dermatology	11	72.7%	18.2%	9.1%
Department of Infectious Diseases	5	40.0%	20.0%	40.0%
Department of Physical Medicine and Rehabilitation	4	100.0%	0.0%	0.0%
Department of Pulmonary Diseases	9	100.0%	0.0%	0.0%
Department of Public Health	4	0.0%	100.0%	0.0%
Department of Internal Medicine	17	70.6%	17.6%	11.8%
Department of Cardiology	4	75.0%	25.0%	0.0%
Department of Neurology	10	100.0%	0.0%	0.0%
Department of Radiology	12	100.0%	0.0%	0.0%
Department of Psychiatry	7	85.7%	14.3%	0.0%

Postgraduate Medical Education

When the participants were asked about anatomy education after graduation, 69.4% stated that they needed anatomy information while preparing for MSE, while 24.7% stated that they did not need it. When asked about their general anatomy knowledge level, 20.7% stated that it was good and 53.6% stated that it was at an intermediate level. When asked about their need for anatomy resources in specialty training, 55.2% of the participants in surgical branches said they needed it, while 31.7% of the participants in internal medicine branches said they

needed it ($p<0.05$). When asked whether anatomy training was given during specialty training, 28.1% of surgical branches and 12.7% of internal medicine branches stated that anatomy training was provided.

Those who thought that anatomy education should be given in specialist training were asked to mark at least one of the methods given. Participants could make more than one mark if they wished.

Accordingly, 160 people said they wanted clinical anatomy, 155 people wanted radiological anatomy, 83 people said they wanted topographic anatomy, 46 people said they wanted anatomy rotation as an anatomy training method, and 17 people stated that there was no need for anatomy in specialty training. Anatomy education method preferences in specialty education according to surgical and internal medicine departments are given in Table 3.

Attitudes Towards Anatomy Education Before and After Graduation

They were asked to evaluate their attitudes towards anatomy education before and after graduation with a five-point Likert scale, and descriptive statistics are given in Table 4 median (25th - 75th percentile) and Table 5 (percentage).

Attitudes towards anatomy education before and after graduation were determined between those who took the exam in September 2022 and after and those who took the exam before this date, and it was found that there was no difference between the two groups in all items ($p> 0.05$).

Table 3. Preferred anatomy training methods in specialist training

Anatomy training methods	**Surgical branches (n=96)**	**Internal medicine branches (n=126)**	**All clinical branches (n=222)**
Clinical Anatomy	76 (80%)	84 (67.2%)	160 (72.7%)
Radiological Anatomy	75 (78.9%)	80 (64%)	155 (70.5%)
Topographical Anatomy	51 (53.7%)	32 (25.6%)	83 (37.7%)
Anatomy Rotation	31 (32.6%)	15 (12%)	46 (23.9%)
Not necessary	3 (3.2%)	14 (11.2%)	17 (7.7%)

Table 4. Attitudes Towards Anatomy Education Before Graduation

	Group		**p**
	Surgical branches (n=94)	**Internal medicine branches (n=125)**	
1. I was interested in Anatomy class in medical school.	4 (2-5)	3 (2-5)	0.157[m]
2. Cadaver training forms the basis of Anatomy education at the Faculty of Medicine.	4 (3-4)	4 (3-4)	0.211 [m]
3. In Anatomy practical courses at the Faculty of Medicine, current and technological materials or audio-visual resources can replace cadavers.	3 (2-4)	3 (2-4)	0.388 [m]
4. I find the Anatomy education I received at the Faculty of Medicine sufficient.	3 (3-4)	4 (2-4)	0.183 [m]
5. My level of anatomy knowledge contributed to the success of TUS.	3 (2-4)	3 (2-4)	0.340 [m]
6. My level of anatomy knowledge contributes to my clinical knowledge and skills.	4 (3-5)	4 (3-4)	0.203 [m]
7. In specialist training, I need branch-specific Anatomy knowledge.	5 (4-5)	4 (3-5)	**<0.001 [m]**
8. Branch-specific Anatomy integration in specialist training contributes to my specialist training life.	4 (3-5)	4 (3-4.5)	**0.029 [m]**
9. In specialist training, up-to-date and technological materials or audio-visual resources are sufficient for anatomy training.	2.5 (2-3)	2 (2-3)	0.493 [m]
10. I would like to use the Anatomy laboratory (model/cadaver) when I need it during specialist training.	4 (3-5)	3 (2-4)	**0.010 [m]**

m: Mann Whitney U test, Descriptive statistics are expressed as median (25th – 75th percentiles).

Table 5. Attitudes Towards Anatomy Education Before Graduation (Distribution of percentages)

	Strongly disagree		**Disagree**		**Partially agree**		**Agree**		**Strongly agree**	
	IMB* n (%)	**SB** n (%)**	**IMB* n (%)**	**SB** n (%)**	**IMB* n (%)**	**SB** n (%)**	**IMB* n (%)**	**SB** n (%)**	**IMB* n (%)**	**SB** n (%)**
1. I was interested in Anatomy class in medical school.	19(15.2)	12(12.8)	24(19.2)	14(14.9)	28(19.2)	14(14.9)	22(17.6)	26(27.1)	32(25.6)	28(29.7)
2. Cadaver training forms the basis of Anatomy education at the Faculty of Medicine.	5(4.0)	12(12.8)	12(9.6)	10(10.6)	37(29.6)	24(25.5)	44(35.2)	29(30.9)	27(21.6)	19(20.2)
3. In Anatomy practical courses at the Faculty of Medicine, current and technological materials or audio-visual resources can replace cadavers.	16(12.8)	13(13.8)	32(25.6)	17(18.1)	30(24.0)	26(27.7)	30(24.0)	19(20.2)	17(13.6)	19(20.2)
4. I find the Anatomy education I received at the Faculty of Medicine sufficient.	11(8.8)	7(7.4)	21(16.8)	13(13.8)	20(16.0)	33(35.1)	49(39.2)	29(30.2)	24(19.2)	12(12.8)
5. My level of anatomy knowledge contributed to the success of TUS.	19(15.2)	16(17.0)	23(18.4)	12(12.8)	37(29.6)	22(23.4)	31(24.8)	31(32.3)	15(11.9)	13(13.8)
6. My level of anatomy knowledge contributes to my clinical knowledge and skills.	8(6.4)	2(2.1)	12(9.6)	10(10.6)	29(23.2)	20(21.3)	52(41.6)	37(39.4)	24(19.2)	25(26.6)
7. In specialist training, I need branch-specific Anatomy knowledge.	10(8.0)	3(3.2)	7(5.6)	2(2.1)	28(22.4)	9(9.6)	49(39.2)	31(33.0)	31(24.8)	49(52.1)
8. Branch-specific Anatomy integration in specialist training contributes to my specialist training life.	10(8.0)	2(2.1)	7(5.6)	9(9.6)	28(22.4)	19(20.2)	49(39.2)	22(23.4)	31(24.8)	42(43.8)
9. In specialist training, up-to-date and technological materials or audio-visual resources are sufficient for anatomy training.	11(8.8)	6(6.4)	14(11.2)	10(10.6)	36(28.8)	31(33.0)	48(38.1)	27(28.7)	16(12.7)	20(21.3)
10. I would like to use the Anatomy laboratory (model/cadaver) when I need it during specialist training.	18(14.4)	8(8.5)	18(14.4)	11(11.7)	32(25.6)	17(18.1)	28(22.4)	22(23.4)	29(23.2)	36(38.3)

* : Internal medicine branches, **: Surgical branc

Discussion

Obtaining feedback from students and faculty members is a frequently used method to improve the quality of medical education. Thanks to this feedback, the quality of education increases and satisfaction increases (5). In our study, the needs and requirements of specialist physicians regarding anatomy during different training periods were questioned.

67% of the assistant physicians studying at Muğla Training and Research Hospital agreed to participate in the study.

Pregraduate medical Education

When pre-graduation anatomy education is evaluated, it is seen that the majority of students received anatomy education with instructor-centered education in the first two years (64%). In our faculty, anatomy education is given in a teacher-centered manner in the 1st and 2nd grades, and clinical information is also included in each course. Additionally, radiological anatomy courses were added to the curriculum in the 2024-2025 academic year. In this way, students are guided on how to use their anatomy knowledge and their interest in the course is increased.

According to the results of our study, one quarter of those who did not receive anatomy education in the 4th and 5th grades stated that there should be an anatomy course in these grades. In the study of Arı et al., they reported that a clinical anatomy course should be added to the 4th and 5th grades (6). Insull et al. reported that 87% of the participants wanted to reconsider the dissection during their surgical internship (7). In the study of Acuner et al., they stated that it would be useful to add subjects such as clinical anatomy, topographic anatomy, and radiological anatomy to the program (8). Similarly, the results of the study conducted by Gülekon (9) in 2017 revealed the necessity of an anatomy course for the clinic . In a study conducted in America, eight main internships were determined (emergency medicine, family medicine, general surgery, internal medicine, neurology, obstetrics and gynecology, pediatrics, and psychiatry) and the importance of anatomical subjects were asked to be evaluated. Accordingly, 91.7% of anatomical topics were classified as either “essential” or “more important” for all body regions (10). In our faculty, the education and training coordination unit, based on student-faculty feedback, decided to add anatomy training to clinical internships (general surgery, internal medicine, gynecology, and obstetrics). It started to be implemented in the 2024-2025 academic year.

As a result, having clinical anatomy courses in the curriculum, in addition to basic anatomy education before graduation, will attract the student's attention and keep their motivation to learn actively. In this way, students will know the situations in which they can use anatomy knowledge and it will help them to retain the knowledge. In addition, since anatomy is a course based on memorization and visualization, adding reminder clinical/radiological/topographic anatomy courses to internships will help the student adapt to clinical education more quickly.

Postgraduate Medical Education

When the results of our study are evaluated, 93.8% of the residents in surgical branches and 69.8% of the residents in internal medicine branches need anatomy knowledge in their specialty training. This result reflects the fact that clinicians in many branches need to be equipped with anatomical knowledge to increase their capacity to practice effectively in the future. When the branches are evaluated one by one, the need for anatomy knowledge in the specialty training curriculum is evident in almost all surgical branches and many internal branches, especially forensic medicine, physical medicine and rehabilitation, pulmonology, and neurology (Table 2).

In our study, participants were also asked questions about their anatomy knowledge level. The rate of participants (24.7%) who think their anatomy knowledge level is good is quite low. Akkoc et al. (11) concluded that the general anatomy knowledge level of interns and new assistants was moderate. Not only in our country but also in studies from England, the Netherlands, the United States, and India, they emphasize that the anatomy knowledge level of specialist doctors is below the acceptable level (12–16). On the other hand, although the participants in our study needed anatomy knowledge and anatomy information resources, only one-quarter stated that they were given an anatomy course during their specialty training. It was revealed that the most preferred anatomy education methods to improve anatomy knowledge levels were clinical anatomy (n = 160) and radiological anatomy (n = 155).

The number of people who wanted anatomy rotation was found to be 46. In particular, all neurosurgery and plastic surgery residents stated that they wanted an anatomy rotation. It has been demonstrated in previous studies that the blending of clinical anatomy and radiological anatomy is very useful in the diagnosis and treatment of cases (17). Participants also prefer cadaver studies to increase their anatomy knowledge. In the study of Uygur et al., 86% of the participants stated that dissection on a cadaver made a significant contribution to anatomy education. They pointed out that it would be more beneficial for physicians, especially in surgical branches, to have their first interventional experience on a cadaver. These results suggest that anatomy information becomes more permanent

when repeated and blended with clinical information.

Attitudes Towards Anatomy Education Before and After Graduation

We can examine attitudes towards anatomy education under two headings: before graduation and after graduation.

Before graduation, more than half of the surgical branch assistants were interested in the anatomy course (57%), while this rate was found to be 43% in internal branches. It suggests that those who are interested in anatomy courses are more likely to choose surgical branches.

All assistant physicians, regardless of branch, have the attitude of "Cadaver forms the basis of anatomy education in medical faculty." The total of those who said "I agree" and "I definitely agree" was calculated as 54%. There was no difference between surgical and internal branches ($p>0.05$). While 38.8% of the participants think that current and technological materials or audio-visual resources can replace cadavers in anatomy practical courses, 35.6% think that they cannot. In the study conducted by Arı and Şendemir, 91.1% of the students emphasized that a cadaver was a must. Again, in many studies, they express their opinion that the importance of cadavers in medical education is very great, and that developing technology and current materials can never capture the reality of examining the human body (18–20). In addition, Buru and his colleagues state that new and technological methods should be tried in addition to traditional anatomy education (21). Our study also supports that cadaver training is an indispensable training method of anatomy. Although, with the developing technology, a method that can replace the cadaver is not yet ready; We believe that new and technological methods (mobile applications, 3D digital models, augmented reality) can be integrated into the education system and create a common model.

52% of the participants stated that anatomy education was sufficient. Previous studies have mostly been conducted with undergraduate students. In these studies, it was emphasized that theoretical course hours were sufficient and practical course hours could be increased (6,8,22). When asked at the undergraduate level, students can be expected to feel deficient in practical courses because they are worried about grades, especially during the semester they take the course. For this reason, it can be observed in the feedback received that the practice lesson hours are not sufficient. However, in terms of knowledge, we can say that students clearly find basic anatomy education sufficient, even at undergraduate and graduate levels.

One of the most important periods in medical life after graduation in our country is the MSE preparation period. For this reason, when the contribution of anatomy knowledge level to MSE success was questioned, 41% of the participants preferred the options "I agree" and "I strongly agree". When the effect of anatomy knowledge on MSE success was compared according to surgical and internal branches, no statistical difference was found between the two groups ($p > 0.05$). Participants were divided into two groups those who took the exam before and after the September 2022 MSE period (the coefficient for the Basic Medical Sciences question is determined as 0.3) and no statistical difference was found in terms of success ($p > 0.05$). On the other hand, when the contribution of anatomy knowledge level to clinical knowledge and skills is questioned, the proportion of those who say "I agree" and "I strongly agree" increases (63%). When both attitudes are evaluated together, it is expected that a course that contributes to clinical knowledge and skills will also affect MSE success at the same rate. However, in our study, these rates are quite different. It was concluded that this may be due to the low number of anatomy questions in the MSE exam and the lowering of the question coefficient score (23).

Another important period after graduation is the specialist training period. During this period Assistant physicians need branch-specific anatomy knowledge in their specialty training. In our study, it is noteworthy that the need for anatomy is higher in surgical branches than in internal branches ($p<0.05$). Norris et al. General surgery and emergency internship managers reported that anatomy was the basic science discipline in which students needed the most development (24). In the study of Akkoç et al., they showed that anatomy knowledge is very important, especially in surgical sciences, both in diagnosis and in surgical and medical treatments(11). However, Pabst and Insull pointed out that; The need for anatomy arises not only in surgical branches but also in internal branches such as pediatrics (7,25). For this reason, we believe that it would be wrong to think that postgraduate anatomy education is specific to surgical branches only.

Participants stated that branch-specific anatomy integration would contribute to specialty training (Surgical branches 67.2%; Internal branches 64%). It is noteworthy that this need is especially higher in surgical branches than in internal branches ($p <0.05$) (Table 4). In the study of Akkoç et al., the rate of those who stated that anatomy training should be given in surgical branches was 90.3%, while this rate was shown to be 64.7% in internal branches (11). In the study of Uygur et al., the rate of those who thought that anatomy education would contribute to their professional life was 74%, while the rate of those who thought that their anatomy knowledge would be used in the future was 83.6% (22).

When the attitudes of the participants regarding anatomy integration in residency training are examined, all of the residents, especially

neurosurgery, thoracic surgery, cardiovascular surgery, and plastic surgery, think that anatomy integration is necessary. In the study of Kandemir et al., more than 80% of the participants found the integration of anatomy into specialty training useful, while all Orthopedics, General Surgery, Anesthesia, and Plastic Surgery residents thought that their anatomy knowledge would be used in the future (3). Articles are emphasizing the necessity of anatomy integration not only in our country but also from different countries (7,26) With our study, we believe that theoretical and practical training should be given together, especially in surgical branches, and at least theoretical training should be given in internal branches.

Methods that can be used for anatomy practice courses in specialty training include cadaver/model as the classical method, current and technological resources (mobile applications, 3D digital models and virtual reality, etc.). When the results of this study are evaluated, internal medicine branches tend to use more technology resources, while surgical branch assistants are of the opinion that more cadavers should be the basis of anatomy education. In the study conducted by PAbst (25) in Germany, 85% of the participants stated that they wanted to attend anatomy seminars and 62% of them wanted to attend dissection courses during the postgraduate period. Additionally, the Department of Anatomy and Neuroscience at the University of Melbourne organizes an anatomy course to assist participants who are receiving surgical training and preparing for surgical exams.

In specialty training in Turkey, anatomy training was abolished as it was thought that it was not needed (With the decision of MSC No. 21/82 dated 21 - 23 / 06 / 2010, there is a one-month anatomy rotation only in the Plastic and Reconstructive Surgery department.) (4). In the light of all this information, we can say that medical specialty education should be evaluated for all branches and its content and methods used should be updated. For this, first of all, anatomy should be integrated into specialist training, and if this cannot be done, anatomy courses should be organized to provide branch-specific training and the participation of assistants should be ensured. In both methods, programs should be created by evaluating the infrastructure of anatomy departments; The number of specialist physicians who can provide anatomy training and laboratory facilities need to be increased.

Conclusion

Anatomy is one of the important building blocks of education not only before graduation but also after graduation. In contrast, worldwide, the time devoted to teaching anatomy has decreased significantly. Among the difficulties encountered especially in specialty training, anatomy education is not given due importance due to efforts to shorten the duration of medical education, underestimation of anatomy education, insufficient number of anatomy instructors, more emphasis on clinical knowledge and skills, and the heavy clinical workload. However, anatomy is absolutely indispensable for a surgeon. In order to compensate for the lack of anatomical knowledge and skills, surgeons can turn to cadaver courses by paying high amounts. In order to increase the success rate in internal sciences, which perform physical examinations and examine radiological images, as well as in surgical branches, anatomical information, which was previously thought to be detailed, has now become necessary. For this reason, anatomy integration has become inevitable in specialty training not only in surgery but also in internal sciences.

In order for physicians to be able to get rid of this financial burden and graduate better equipped, it would be useful to integrate anatomy education into clinical branches before graduation and to re-examine specialization training and prepare branch-specific programs.

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Conflict of interest statement

The authors hold no affiliations or relationships that could give rise to any potential conflicts of interest.

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