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AUTHORS: Iftar Grbz, Yasin Demiraslan, Orhun Dayan

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Students and Veterinarians Views About Clinical Anatomy and Topographic Anatomy Courses in Veterinary Education

İftar GÜRBÜZ^{1*}, Yasin DEMİRASLAN², M. Orhun DAYAN³

¹Department of Anatomy, Faculty of Veterinary Medicine, Burdur Mehmet Akif Ersoy University, Burdur, Türkiye

²Department of Anatomy, Faculty of Veterinary Medicine, Dokuz Eylül University, İzmir, Türkiye

³Department of Anatomy, Faculty of Veterinary Medicine, Selçuk University, Konya, Türkiye

ABSTRACT

In this study, it was aimed to evaluate the views of veterinarians and students about the topographic anatomy course and clinical anatomy course with the help of a survey. For this purpose, 4 separate surveys were created, 2 for the topographic anatomy course and 2 for the clinical anatomy course. For each course, one of these forms was used to the 3rd, 4th, and 5th grade students in Veterinary Medicine. Other survey forms were applied to veterinarians working in different regions in Turkey. As a result, 98% of the participants emphasized that anatomy knowledge was important for safe and adequate clinical practice. 59% of the students stated that the contents of the topographic anatomy course were not sufficient in this form, 92.3% stated that it should be explained with radiological images and, 96.2% explained with clinical sciences. Only 35.5% of veterinarians stated that the information they learned in the systematic anatomy course was sufficient for clinical practices. 92.1% of veterinarians stated that clinical anatomy courses should be present in the curriculum in recent years. According to the results, after taking systematic anatomy course, it was observed that it was a necessity to take the anatomy course associated with clinical sciences during the later periods.

Keywords: Anatomy, Course, Survey

ÖZ

Veteriner Hekimliği Eğitiminde Klinik Anatomi ve Topografik Anatomi Derslerine İlişkin Öğrenci ve Veteriner Hekim Görüşleri

Bu çalışmada Veteriner hekimlerin ve öğrencilerin topografik anatomi dersi ve klinik anatomi dersi hakkındaki görüşlerinin anket yardımıyla değerlendirilmesi amaçlandı. Bu amaçla topografik anatomi dersi için 2, klinik anatomi dersi için 2 olmak üzere toplam 4 ayrı anket formu oluşturuldu. Veteriner Fakültesi 3., 4. ve 5. sınıf öğrencilerine her ders için bu formlardan biri uygulandı. Diğer anket formları ise Türkiye'nin farklı bölgelerinde görev yapan Veteriner hekimlere uygulandı. Sonuç olarak katılımcıların %98'i güvenli ve yeterli klinik uygulama için anatomi bilgisinin önemli olduğunu vurguladı. Öğrencilerin %59'u bu formda topografik anatomi ders içeriğinin yeterli olmadığını, %92,3'ü radyolojik görüntülerle, %96,2'si klinik bilimlerle zenginleştirilmesi gerektiğini belirtti. Veteriner hekimlerin sadece %35,5'i sistematik anatomi dersinde öğrendikleri bilgilerin klinik uygulamalar için yeterli olduğunu belirtti. Veteriner hekimlerin %92,1'i son yıllarda müfredatta klinik anatomi dersinin yer alması gerektiğini belirtti. Elde edilen sonuçlara göre zorunlu (sistematik) anatomi dersini aldıktan sonra daha sonraki dönemlerde klinik bilimlerle ilişkili anatomi dersinin verilmesinin bir gereklilik olduğu kanaatine varıldı.

Anahtar Kelimeler: Anatomi, Anket, Ders

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ORCID ID: 0000-0001-9460-0645 YD: 0000-0003-3612-6142 MOD: 0000-0003-0368-4607 *Corresponding author e-mail:

iftargurbuz@mehmetakif.edu.tr

INTRODUCTION

According to the teaching methods, anatomy course is divided into subgroups such as systematic anatomy, clinical anatomy, radiological anatomy, and topographic anatomy. The systematic anatomy course examines the anatomical structure of domestic animals under the topics of locomotion, digestion, respiration, circulation, urogenital and nervous systems, and sensory organs (Demiraslan and Dayan 2021). Topographic anatomy course examines the anatomical formations regionally that make up the animal body. Here, the head, neck, chest, abdomen, dorsal areas, and front and hind limb areas are examined from superficial to profound (Dursun 2002). Radiological Anatomy is a form of topographic anatomy that has emerged with the development of technology and is increasingly important. Computed tomography, nuclear magnetic resonance imaging, positron emission tomography, and scintigraphy images, which are new methods used in the diagnosis of various diseases, are examined. These images are obtained by dividing the body from different angles into thin slices of a few millimeters (Gülekon 2017). Clinical anatomy is the branch of anatomy in which information covering systematic, topographic, and radiological anatomy is processed (Demiraslan and Dayan 2023).

Education is a process that includes mobility in its structure and therefore it changes from time to time. What form of education should be provided in veterinary faculties and which education models would be more effective are still being discussed. Efforts to improve anatomy education, which occupies an important place in veterinary medicine education, continue in Veterinary Faculties (Gültiken 2012; Gürbüz et al. 2013; Beresheim et al. 2024). Another important problem is that the boundaries of the course content in anatomy education can be drawn and what kind of anatomy education program is required can be defined by clinicians and students as well as anatomists (Phillips 1987). Anatomy education aims to prepare the student for clinical sciences and to integrate clinical sciences and education. For this reason, it is important how anatomy courses will be taught in undergraduate education (Akkoç et al. 2021).

Anatomy education is necessary to understand and solve clinical problems and diagnostic imaging methods. In recent years, radiological images and clinical anatomical problems have been frequently included in classical anatomy textbooks (König and Liebich 2004; Drake et al. 2005; Dyce et al. 2009; Demiraslan and Dayan 2023). Combining anatomy education with clinical information and radiological images is becoming increasingly important as it enables students to better understand anatomy and gives them an idea of what they may encounter in the future (Carmichael and Pawlina 2000).

The opinions of students and experts regarding education are taken into consideration. Therefore, survey-based information is considered important as a guide in shaping education (Ramalingaswami 1987). Laakkonen (2021) stated that, unlike medical education, there is little survey-based information on the use of art as a learning approach in veterinary anatomy. In this prospective, survey-based study, it was aimed to evaluate the opinions of students and veterinarians about the Topographic Anatomy and Clinical Anatomy course, which is given after receiving basic anatomy training, with the help of a survey.

MATERIALS and METHODS

Ethical Approval

The necessary permission is given to Burdur Mehmet Akif Ersoy University Ethics Committee of Non-Entrepreneurial Clinical Research (01.03/2023, The situation of Topographic Anatomy course in anatomy education: Student and Veterinarian opinions: Decision No: GO 2023/138. Student and Veterinarian opinions about Clinical Anatomy: Decision No: GO 2023/139).

Survey

In the study, a total of 4 separate surveys were created, 2 for the topographic anatomy course and 2 for the clinical anatomy course that is given after the basic anatomy course. For each course (Topographic anatomy and clinical anatomy), one of these forms was applied to 3rd, 4th and, 5th grade students (n = 160) studying at Burdur Mehmet Akif Ersoy University, Faculty of Veterinary Medicine. Other survey forms prepared separately for each course were applied to veterinarians (n=140) working in different regions of Turkey. The veterinarians who participated in the survey forms were randomly selected from among volunteers and those who were actively practicing medicine, and the students were randomly selected from among volunteers. The veterinarians stated that their field of work was 49.3% clinic/hospital, 24% public, 14.7% university, and 13.3% private sector. The questions in the survey forms were created by us using the literature (Arı and Şendemir 2003; Uygur et al. 2013; Gülekon 2017; Akkoç et al. 2021).

The first part of all survey forms included information about the definitions and course contents of systematic anatomy, topographic anatomy, radiological anatomy and, clinical anatomy. The survey forms were administered to the participants in 2023.

Survey for Topographic Anatomy Course

The survey prepared for students consisted of a total of 26 questions, including 1 demographic question, 1 open-ended question, 22 multiple-choice (agree,

undecided, disagree) questions and, 2 multiple-choice questions. The survey prepared for veterinarians consisted of a total of 24 questions, including 1 demographic question, 21 options (agree, undecided, disagree), 1 multiple-choice question and 1, open-ended question.

Survey for Clinical Anatomy Course

The survey prepared for the students consisted of a total of 17 questions, including 1 demographic question, 1 open-ended question, and 15 questions with options (agree, undecided, disagree). The survey prepared for veterinarians was composed of a total of 19 questions, including 1 demographic question, 17 options (agree, undecided, disagree) questions and, 1 open-ended question.

Collection of Data

All surveys prepared for clinical anatomy and topographic anatomy courses were administered to students and veterinarians via Google Forms. However, not all participants answered some of the questions in the survey.

Analysis of Data

Descriptive statistical values of the data were determined with the help of Google Forms.

RESULTS

As a result of the study, the opinions of veterinarians and students about the topographic anatomy and clinical anatomy courses given after the basic anatomy course were collected and each course was evaluated separately.

Results for Topographic Anatomy Course

98% of veterinarians (Vets) and 92% of students (Sts) supported the idea that anatomy is important for the clinic. 61% of Vets said, "I can make a radiologic evaluation with my knowledge of anatomy". Accordingly, the majority of participants approved that knowledge of anatomy is important for clinical sciences.

47% of Vets and 31% of Sts said, "The anatomical knowledge I have learned is sufficient for my specialization." However, it was noteworthy that 96.3% of vets stated that they felt the need to review their anatomy knowledge from time to time in their professional lives. Accordingly, it was determined that the anatomy knowledge learned during the undergraduate period was not sufficient for the majority of the participants.

The majority of participants stated that topographic anatomy (Vets: 72%, Sts: 48%), clinical anatomy (Vets: 85%, Sts: 59%) and radiological anatomy courses (Vets: 90%, Sts: 64%) should be taught compulsorily after taking the basic anatomy course. Among these courses, there was more interest in clinical anatomy and radiological anatomy courses.

Students agree with this "The abdomen and pelvis should be described in the most detail, followed by the chest and back". Accordingly, it was seen that it was necessary to teach abdomen and pelvis subjects in more detail.

Table 1 shows the opinions of veterinarians and students about the topographic anatomy course. It was concluded that the years in which the topographic anatomy course was given should be reconsidered and that the topographic anatomy course should be taught in the clinical years.

Results for Clinic Anatomy Course

35% of Vets and 56% of Sts stated that the information they learned in the systematic anatomy course was sufficient. 63% of Vets and 28% of Sts stated that another anatomy course should be given after the aystematic (basic) anatomy course. In this regard, it can be seen that the majority of students say that another anatomy course is not needed. This situation is normal due to concerns such as extra course load. Considering the experiences of Vets, it seems that after the systematic (basic) anatomy course, another anatomy course is needed in the future.

61% of Sts said that clinical anatomy should be taught instead of systematic anatomy. 38% of Vets stated that a topographic anatomy course should be taught instead of systematic anatomy, and 43% stated that a clinical anatomy course should be taught instead of topographic anatomy. Accordingly, the rate of choosing the clinical anatomy course was higher.

4% of Vets and 9% of Sts stated that they saw no difference between clinical anatomy and topographic anatomy. It was understood that the participants had sufficient knowledge about the contents of the courses. This was an important determination of the reliability of the answers. 18% of Vets and 28% of Sts stated that the information they learned in the topographic anatomy course was sufficient for clinical sciences. Accordingly, the majority of the participants did not find the content of the topographic anatomy course sufficient in terms of clinical anatomy. However, 88% of Vets and 75% of Sts stated that they would prefer the clinical anatomy course if it was an elective course.

Almost all of the participants (except for 2%) stated that practices of clinical anatomy should be performed on live animals. This was a significant rate (98%). This showed that it was necessary to provide anatomy education on live animals.

71% of Vets and 51% of Sts think that the clinical practices of a veterinarian who has not received clinical anatomy training are inadequate. However, most of the participants (Vets: 69%, Sts: 75%) said, "If I had a choice, I would deliver an adopted animal to a veterinarian who has taken a clinical anatomy course." Accordingly, it was seen that the clinical anatomy course was necessary in clinical practice.

However, a significant majority of the participants (Vets: 92%, Sts: 84%) stated that the clinical anatomy course should be included in the curriculum in the last semesters of education.

Sts stated that the subjects that should be explained in most detail in the topographic anatomy course should be the abdomen and pelvis regions (87.2%), chest and dorsal regions (62.8%), head-neck regions (44.9%) and leg regions (33.3%), respectively. However, it was stated that the best-learned subjects were the head

and neck regions (48.7%), abdomen-pelvis regions (47.4%), chest-dorsal regions (46.2%) and leg regions (32.1%), respectively.

Table 2 shows the opinions of veterinarians and students about the clinical anatomy course. When all survey results were evaluated, it was determined that clinical anatomy and radiological anatomy courses are important courses for professional life and are expected to be in the teaching plan in the last semesters of education.

Table 1. Opinions of veterinarians (Vets) and students (Sts) about the topographic anatomy course given after taking the basic anatomy courses (-: not asked in the survey)

Survey	Vets (%)	Sts (%)
Anatomical knowledge (education) is important for safe and adequate medical (clinical) practice.	98.8	92.3
In my professional life, I need to review anatomy information from time to time.	96.3	-
I can make radiological evaluation with my knowledge of anatomy.	61.3	12.5
The anatomical information I have learned is sufficient for my expertise.	47.5	27.5
After taking the basic anatomy course, a Veterinarian who has not taken the topographic anatomy course can practice her/his profession.	37.5	51
Topographic anatomy courses should be given compulsory in the future after the basic anatomy course.	72.5	-
After the basic (systematic) anatomy course, I choose topographic anatomy courses as an elective course.	-	48.7
Clinical anatomy courses should be given compulsorily after the basic anatomy course.	85	-
After the basic anatomy course, I choose clinical anatomy courses as an elective course.	-	59
Radiological anatomy courses should be given compulsorily after the systematic anatomy course.	90	
After the basic anatomy course, I choose radiological anatomy courses as an elective course.	-	64.1
Topographic anatomy course should be taught in conjunction with clinical sciences.	92.5	96.2
As a result of the topographic anatomy training, I can reconcile clinical sciences.	-	51.3
Topographic anatomy course should be taught in conjunction with radiological images.	95	92.3
As a result of the topographic anatomy training, I can reconcile radiological images.	-	37.2
The information I learned in the Topographic Anatomy course is sufficient for my professional life.	-	30.8
Topographic anatomy course should be taught with maximum detail.	48.8	43.6
Topographic anatomy course should be given in the 3rd or 4th educational years (clinical years).	61.3	42.3

Table 2. Opinions of Veterinarians (Vets) and students (Sts) about the Clinical Anatomy course (-: not asked in the survey)

Survey	Vets (%)	Sts (%)
The knowledge I have learned in basic (systematic) anatomy is sufficient.	35.5	56.3
Another anatomy course is needed after basic (systematic) anatomy	63.2	28.1
Clinical Anatomy should be taught instead of basic (systematic) anatomy	38.2	60.9
Clinical Anatomy should be taught instead of topographic anatomy	43.4	-
The information I received in the topographic anatomy course is sufficient for clinical practices	18.4	28.1
There is no difference between clinical anatomy and topographic anatomy courses	3.9	9.4
If it were an elective course, I would definitely choose the clinical anatomy course.	88.2	75
The practices of clinical anatomy on live animals are required	98.7	-
The clinical practices of a veterinarian who has not taken a clinical anatomy course will be inadequate.	71.1	51.6
If I had a choice, I would hand over an adopted animal to a veterinarian who took a clinical anatomy course.	68.4	75
Clinical anatomy course should definitely be included in the curriculum in the last semesters of education.	92.1	84.1

DISCUSSION

Feedback to prove the quality and efficiency of education and to correct any deficiencies that may exist has a very important place. For this reason, the feedback method is frequently used in that it aims to obtain successful results in education by taking students' opinions and thoughts about education (Erpek et al. 2002). In our study, questions were asked to the participants including students and veterinarians about topographic and clinical anatomy courses and course contents. Thus, the need and necessity of topographic and clinical anatomy courses in anatomy education, which have an important place in veterinary education, were examined. Since there are a limited number of survey studies on veterinary anatomy courses in the literature, data from the study were compared with the survey results regarding anatomy education in Medical Faculties.

In the teaching plan of Veterinary Faculties, basic (systematic) anatomy course is included in the 1st and 2nd education years. In these years, the practice of anatomy is given using cadavers, models or, various simulations. In the 4th and 5th education years, students are taught clinical courses such as surgery, internal medicine, obstetrics and gynecology. To learn and apply clinical skills during these years, clinical practices of previously learned anatomy is needed. Literature about medical education shows that long-term retention of anatomical information is low in interns. Therefore, reteaching the anatomy course during clinical years was perceived as beneficial by students (Gülekon 2017). Congara et al. (2017) presented a survey about the benefit of reteaching anatomy during the clinical period of education in veterinary education. Congara et al. (2017) stated that the majority of the students agreed that anatomical knowledge was necessary for clinical education, and 71% of interns would prefer anatomy to be retaught if offered as a private course. In the study conducted, similar to the findings of Congara et al. (2017), the majority of the participants stated that the clinical anatomy course should be included in the teaching plan in recent years of education and stated that they would choose the clinical anatomy course if it were an elective course.

In a study conducted at the Faculty of Medicine (Ari and Şendemir 2003), students (52.3%) stated that the information they learned in anatomy education was insufficient for their clinical years and future. However, Ayademi and Ojeifo (1988) stated in their study that students had similar attitudes. Similarly, in the study, only 35% of veterinarians stated that the knowledge they learned in anatomy courses was sufficient for their future.

It is very important to integrate basic anatomy knowledge with clinical knowledge to learn and understand anatomy (Patel and Dauphinee 1984; Crisp 1989; Baciewicz et al. 1990). Because uncertainty in anatomical information affects the

confidence and decision-making process of veterinarians working in the clinic (Wheble and Channon 1995). In this regard, teaching anatomy by associating it with a clinical case/case ensures that the subject is learned in the best way and improves the student's ability to do self-research. In this study, the majority of the participants stated that topographic anatomy courses should be taught in association with clinical and radiology anatomy.

Torres et al. (2016) organized a cross-sectional radiological anatomy course for medical students. While the success rate before the course was 56.2%, the success rate after the course was 75%. Again, after the course, 92% of the students stated that the course was more useful in learning anatomical and topographic structures, 90% stated that their anatomical knowledge improved, and 92% stated that this information would be useful to them in the future. Moscovia et al. (2015) organized radiological anatomy (Radiography, ultrasonography, CT, and MRI) courses for 1st and 2nd-grade students. At the end of the course, 48-63% of the students stated that there was an increase in their understanding of the lessons, 72-77% stated that cross-sectional anatomy made it easier for them to learn anatomical information, and 76-80% stated that they could use this information in their future lives. Schober et al. (2014) in a survey conducted at the faculty of medicine, stated that 80% of the students stated that clinical and radiological information made it easier to understand anatomy courses. In the study, the expectations of students and vets were similar to the researchers found (Schober et al. 2014; Moscovia et al. 2015; Torres et al. 2016;).

After training the basic anatomy at the faculty of medicine, a survey was conducted on the necessity of Radiological and Clinical anatomical information during the clinical years (Gülekon 2017). As a result of this study (Gülekon 2017) the majority of students stated that Clinical and radiological anatomy courses increased their motivation and helped them understand the anatomy better. Interns requested that these courses should be given as a refresher course during clinical periods. Uygur et al. (2013) stated in their study that anatomical information such as radiological anatomy, cross-sectional anatomy, and clinical anatomy should be added to the anatomy course content. In our study, it was determined that the expectations of the participants were similar to the literature. Regarding this, vets and students stated that after taking the basic anatomy course, the radiological anatomy (Vets: 90%, St: 64%) and clinical anatomy courses (Vets: 85%, St: 59%) should be taught during their clinical years.

There is a lack of guidance for educators regarding the level of anatomical knowledge required for a graduated veterinarian to be considered competent. Gummery et al. (2023) conducted a detailed study on veterinary anatomy learning outcomes to support curriculum development in this field. The study

results include eliminating unnecessary details and focusing more on the relevance of the competencies required for the new graduate. However, in the learning outcomes prepared separately according to systematical anatomy, it is emphasized that it is important for students to be able to define the functional properties of anatomical structures, their topographic relationships, their clinical significance, and the normal features of radiological images. Similarly, in the study, the majority of the participants stated that the current topographic anatomy course should not be taught in detail. However, it has been determined that it is necessary to add clinical and radiological anatomy courses to the Veterinary Anatomy curriculum in the clinical years after basic anatomy education.

CONCLUSION

As a result of the study, in the survey conducted about the content, need, and necessity of the topographic anatomy and the clinical anatomy courses given or recommended to be given after taking the basic anatomy course, it was determined that the following items were expected by the participants.

1. Arrangements regarding the years in which the topographic anatomy course is given should be made in such a way that it will be added to the education plan in the last periods of education (clinical years).
2. The content of the topographic anatomy course should be revised to include radiological anatomy and clinical sciences.
3. In the last periods of education (clinical years), the clinical and radiological anatomy courses must be included in the teaching plan.

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4. Comparative anatomy training should be given to live animals.

We believe that the success of veterinarians to be trained will increase by enriching the contents of anatomy courses to be given in the following years after receiving basic anatomy training with imaging methods and clinical sciences.

Conflict of Interest: The authors have no conflict of interest to declare.

Author Contributions: İG, YD, and MOD contributed to the project idea, design, and execution of the study. İG, YD, and MOD contributed to the acquisition of data. İG and YD analyzed the data. İG and YD drafted and wrote the manuscript. İG, YD, and MOD reviewed the manuscript critically. All authors have read and approved the finalized manuscript.

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