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Research Article

Dental Students' Perspectives on Anatomy Education in Dental Faculty

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Abstract

Aim: In dental faculties, Anatomy is taught as a basic science course in the first year of the education program. The effective delivery of this course plays a critical role in equipping students with fundamental anatomical knowledge and preparing them for professional practice. The purpose of this study is to gather feedback from dental students regarding the anatomy curriculum and teaching methods.
Material and Method: This study was conducted with the participation of students enrolled in Dental Faculties during the 2021-2022 academic year. A total of 499 students from 29 different universities who had completed at least one term of anatomy education participated. The survey consisted of 20 questions covering topics such as the role of anatomy education in dental practice, anatomy learning models, the anatomy curriculum, and its relevance to professional requirements."
Results: 63.8% of students reported feeling like doctors when they began their anatomy education, while 75.4% stated that becoming a doctor is impossible without anatomy education. 94% of students found that working on models during practical classes made it easier to understand theoretical anatomy lessons, and 92.5% found that working with 3D programs facilitated understanding of the theoretical lessons. 65.8% of students believed that the anatomy curriculum in dental education should focus solely on head and neck anatomy. Upon transitioning to professional practice, 61.8% of students stated knowing the anatomy of the entire body was unnecessary, yet 53.1% believed they would apply their anatomy knowledge in their careers.
Conclusion: Evaluating dental students' attitudes toward anatomy courses and their learning experiences is important in understanding how they approach a fundamental area of knowledge critical for their profession. We believe that this study may be useful in curriculum planning and the development of teaching methods.

Keywords: Anatomy, dentistry, education, survey

INTRODUCTION

The Faculty of Dentistry was first established in our country in 1908 (1) and gradually developed into an institutionalized structure by drawing on the traditions of general medical disciplines (2). Before beginning their professional training, dental students complete at least two semesters of basic science courses. Anatomy is a fundamental component of basic medical sciences, including physiology, biochemistry, pharmacology, pathology, and microbiology (3), and serves as an indispensable foundation for advanced applications in dental education (4). Anatomy is the oldest branch of medicine that studies the normal form and structure of the body, the organs that make up the body, and the structural and functional relationships between these organs (5). Evolving educational modalities and curricular strategies in the dental faculties have prompted anatomists to develop new teaching methods, emphasizing the integration of basic science skills into clinical practice. Assessing the effectiveness of knowledge delivery to students and fostering positive feedback are key responsibilities of basic science educators (6). The effectiveness of knowledge delivery to students and fostering positive feedback are key responsibilities of basic science educators (6). Head and neck anatomy serves as the cornerstone of anatomy education in dental faculties (7). Whether the anatomy education given to dental faculty students should cover only head and neck anatomy or whether the entire body's anatomy should be taught has been a subject of debate for many years. In 1981 and 1993, the American Dental Education Association (ADEA) recommended that dental curricula include anatomical structures of the head, neck, thorax, abdomen (including pelvic organs), and upper

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extremities. They decided that having knowledge of the anatomy and functioning mechanisms of the human body would lead to better guidance of patients by dentists (2). One of the goals in the macroscopic anatomy education in dentistry is to emphasize how anatomical areas below the neck are related to future clinical training and long-term dental practice for students (4). With the impact of evolving technology and computer systems, anatomy teaching methods have been updated, and laboratory training, which was once conducted only with cadavers, has been renewed with models and 3D programs. This has made it easier for students to visually see the organs and structures studied theoretically in the body as a whole and relate their anatomical neighbors, thus facilitating understanding in anatomy education.

While evaluations have been made by asking students about anatomy education for medical faculty students in our country (8-17), there have not been sufficient records regarding dental faculty students. Our fundamental goal is to provide anatomy education tailored to the professional needs of dentists and ensure it aligns with the requirements of their profession. In this regard, the aim of our survey study is to contribute to the literature on the restructuring of anatomy education in dental faculties or to provide input into curriculum planning and teaching method evaluations.

MATERIAL AND METHOD

This study was conducted with the ethical approval of the Scientific Research and Publication Ethics Committee of Nuh Naci Yazgan University (NNYU) under approval number 2021/4319, date 05.10.2021. It was sent electronically to the Deans of other Dental Faculties in Türkiye via the NNYU Faculty of Dentistry Dean's Office to reach students. The study was conducted in accordance with the principles of the Helsinki Declaration. The research was carried out electronically between 26 October 2021 and 27 November 2022, for dental students who had taken the General Anatomy course and were still enrolled in the faculty.

According to data published in the August 2021 issue of the Turkish Dental Association Journal, there are a total of 24,000 students in the 1st, 2nd, 3rd, 4th, or 5th year of study at dental faculties across Türkiye (18). These data represent the total number of dental students in Türkiye (n=24,000). Based on this information, the estimated number of students who should respond to the survey was calculated using a 97% confidence interval and a ±5% precision level. The sample size was determined to be n=462 (openepi.com/SampleSize). Based on this, the minimum number of students to be included in the study was identified as at least 462. This comparative and descriptive study was conducted with 499 students from 29 different universities. The students' opinions about their anatomy education were collected through a Likert scale form. To ensure the reliability of the responses, the students' names, surnames, and identification numbers were not included in the survey form. Students were asked to provide their gender, age, and the year of study they were in. The 20 questions in the survey were answered by students using the following scale: strongly disagree, somewhat disagree, undecided, somewhat agree, and strongly agree. In the analysis, for clearer interpretation of the results, responses "strongly disagree" and "somewhat disagree" were combined as "disagree," "undecided" responses remained as "undecided," and "somewhat agree" and "strongly agree" responses were combined as "agree." The final question was open-ended, asking students to provide any additional thoughts they wished to add.

The survey questions were prepared within four main areas:

1. Students' opinions on the place of anatomy education in dental education.
2. Students' opinions on learning models in anatomy education.
3. Students' opinions on the anatomy curriculum.
4. Students' opinions on the suitability of anatomy education for professional requirements.

The responses to the questions were categorized and evaluated as answers to these four questions.

Statistical analysis was performed using descriptive statistics with the SPSS software package (Version 25.0, SPSS Inc., Chicago, IL, USA). Categorical variables between groups were analyzed using the Chi-square test.

RESULTS

A total of 499 students participated in the study from 29 different universities. Among the participants, 309 were female (61.9%), and 190 were male (38.1%). Of the respondents, 232 were in the last term of their 1st year, 158 were in the last term of their 2nd year, 62 were in the last term of their 3rd year, 26 were in their 4th year, and 21 were in their 5th year.

Regarding the students' opinions on the place of anatomy education in dental schools, 350 students (70.1%) indicated that they chose dental school willingly, 56 (11.2%) chose it unwillingly, and 93 (18.6%) were undecided about whether they wanted to attend. Of these students, 462 (92.5%) stated that they knew they would receive anatomy education when they chose dental school. When asked whether they felt like a doctor when they began anatomy education, 53.8% agreed, 21.2% disagreed, and 15% were uncertain. Additionally, 75.4% of students believed that it was impossible to become a doctor without anatomy education, 16.2% thought it was possible, and 8.4% were undecided (Table 1).

Regarding cadaver-based training, 75.3% of students expressed a desire to have training on cadavers when choosing dental school, and 83.7% wanted to have practical anatomy lessons on cadavers. Furthermore, 78.3% stated that they were not afraid to study anatomy on cadavers. In response to whether working with models in practical lessons helped them understand theoretical anatomy lessons, 88% agreed, and 92.5% found 3D programs helpful in understanding theoretical lessons (Table 2).

Regarding the dental anatomy curriculum, 60.5% of students thought that the dental anatomy curriculum should not be the same as that of medical schools, while 54.1% believed that the entire body anatomy should not be taught systematically, 29.4% thought it should be, and 16.4% were undecided. Additionally, 65.8% of students thought that the anatomy curriculum in dental school should focus only on the head and neck anatomy (Table 3).

When evaluating the adequacy of anatomy education in relation to their professional needs, 59.8% of students felt that they received sufficient education, 7.8% thought it was insufficient, and 48.3% felt it was more than what they needed for their profession. Regarding the use of anatomy knowledge in their professional lives, 61.8% did not believe they needed to know the entire body anatomy, but 53.1% thought they would use anatomy knowledge in their careers (Table 4).

Table 1. Student's views on the place of anatomy education in the faculty of dentistry

	* (n)	** (n)	*** (n)	**** (n)	***** (n)
When I chose dental school, I knew I was going to study anatomy	2.2% (11)	3.2% (16)	2% (10)	18.8% (94)	73.7% (368)
When I started studying anatomy in dental school, I felt like a physician	10.8% (54)	10.4% (52)	15% (75)	35.1% (175)	28.7% (143)
I think that it is not possible to be a physician without anatomy education	8.8% (44)	7.4% (37)	8.4% (42)	26.7% (133)	48.7% (243)

*strongly disagree, **partially disagree, ***undecided, ****partially agree, *****strongly agree

Table 2. Students' views on Learning models in anatomy education

	* (n)	** (n)	*** (n)	**** (n)	***** (n)
When I was choosing the faculty of dentistry, I was terrified to study on cadavers in anatomy education	56.1% (280)	19.2% (96)	16.6% (83)	5.4% (27)	2.6% (13)
I would like to receive training in cadavers in the anatomy laboratory (practical) course	4.6% (23)	2.8% (14)	8.8% (44)	22.6% (113)	61.1% (305)
It scares me to be trained in cadavers in anatomy laboratory (practical) class	60.3% (301)	18% (90)	12.2% (61)	6.4% (32)	3% (15)
Working with models in the anatomy laboratory (practical) course makes it easier for me to understand the theoretical lessons	1.8% (9)	0.8% (4)	3.4% (17)	18% (90)	76% (379)
Working with 3D programs in the anatomy laboratory (practical) course makes it easier for me to understand the theoretical lessons	1.6% (8)	1% (5)	4.8% (24)	21.8% (109)	70.7% (353)

*strongly disagree, **partially disagree, ***undecided, ****partially agree, *****strongly agree

Table 3. Student's views on the anatomy curriculum in the Faculty of Dentistry

	* (n)	** (n)	*** (n)	**** (n)	***** (n)
Anatomy education in the Faculty of Dentistry should be equivalent to the Faculty of Medicine	40.3% (201)	20.2% (101)	12.2% (61)	15.6% (78)	11.6% (58)
The content of the Anatomy course taught in the Faculty of Dentistry should be systematically explained to the whole body anatomy	33.3% (166)	20.8% (104)	16.4% (82)	17.2% (86)	12.2% (61)
The Anatomy course taught in the Faculty of Dentistry should be explained topographically only the anatomy of the head and neck	12% (60)	13.8% (69)	8.4% (42)	27.1% (135)	38.7% (193)

*strongly disagree, **partially disagree, ***undecided, ****partially agree, *****strongly agree

Table 4. Student's thoughts on the suitability of the given Anatomy education for their professional requirements

	* (n)	** (n)	*** (n)	**** (n)	***** (n)
The content of the General Anatomy course I took in the 1st or 2nd year was sufficient for the Faculty of Dentistry	3.8% (19)	4% (20)	32.5% (162)	29.1% (145)	30.7% (153)
The content of the General Anatomy course I took in the 1st or 2nd year was too much for the Faculty of Dentistry	12.8% (64)	12% (60)	26.9% (134)	22.4% (112)	25.9% (129)
I would like to take a topographic anatomy course in 5th grade	23.2% (116)	4.6% (23)	30.9% (154)	18.8% (94)	22.4% (112)
When I graduate as a dentist, I don't need to know all the body anatomy	10.2% (51)	14.8% (74)	13.2% (66)	29.1% (145)	32.7% (163)
When I graduate as a dentist, I will not use the anatomy knowledge I learned in the courses in my professional life	28.7% (143)	24.4% (122)	17.6% (88)	18% (90)	11.2% (56)

*strongly disagree, **partially disagree, ***undecided, ****partially agree, *****strongly agree

When asked whether integrating general anatomy lessons with clinical and radiological anatomy would make them more lasting, 63% (314 students) agreed, 30.9% (154 students) were undecided, and 6.2% (31 students) disagreed.

Lastly, students were asked to provide additional comments regarding general anatomy lessons, and some of the notable responses include:

- "I think we should take a review of head and neck anatomy in the final year."
- "I believe supporting theoretical knowledge with models and cadavers will significantly improve the teaching process."
- "We went into excessive detail on body parts other than the head and neck, which both added unnecessary workload and caused me to neglect areas I should focus on. I find it illogical for dental students to memorize things like the joints, bones, and muscles of the legs. This should definitely have been lighter at my school."
- "I know that anatomy lessons are essential and will be helpful in my career, but I don't think a dental student should memorize the bones of the toes. Receiving the same level of anatomical education as medical students is overwhelming for dental students because we also have dental-specific courses, practical lessons, assignments, and exams."
- "While I think the dental anatomy curriculum is heavy, I believe focusing only on head and neck anatomy would be sufficient. However, this knowledge should be reinforced for two years with cadavers and models in a detailed and repetitive way. If a student wants additional body anatomy knowledge, an elective course can be offered."
- "I would like to apply anatomy lessons to daily life, so I want to learn them well."
- "Although we are not doctors, we should keep in mind that we will be doctors and not be afraid to go into detail."
- "I think a doctor should know a thousand things and use one, but the other 999 should guide their work. Therefore, I believe all branches of medicine should be taught in detail. This will help broaden the perspective of a healthcare professional and allow them to look at the full picture."
- "Head and neck anatomy is often overlooked. Some of the time spent on other systems could be better allocated to reviewing the head and neck anatomy. No one should graduate without knowing it well; it is essential in the clinic. We should spend more time on it rather than diving deep into systems that are less useful."
- "In dental school, we have topics similar to those in medical school, but the lessons we receive in 2 hours are equivalent to the 22 hours spent in medical school. Naturally, we can't cover everything, and I feel I am receiving inadequate anatomy education."
- "Instead of squeezing everything into the first two years, anatomy education could be more spread out, maybe over three years. This could ease the burden on students. Graduating with a more detailed knowledge of anatomy would allow students to have more accurate and well-rounded opinions in research. However, knowing only the head and neck anatomy in great detail would be more beneficial for our field."
- I don't remember anything, I struggle with it, regards.
- "I think Latin should be taught in first."

DISCUSSION

In dental schools, effective teaching of anatomy as a first year basic science course is crucial for students to acquire fundamental anatomical knowledge and prepare for professional practice. The aim of this study is to gather feedback from dental students regarding the anatomy curriculum and teaching methods. In an era of easy access to information, it is important for traditionally taught anatomy courses to be more efficient, effective, and linked to clinical situations, to improve student comprehension. Therefore, this study aims to evaluate student thoughts by evaluates students' perspectives on learning methodologies, their views on the anatomy curriculum, and the role of anatomical knowledge in professional practice.

In a survey conducted by Doğan et al., it was emphasized that surveys are crucial for evaluating feedback and reflecting the results in future education and teaching processes. Regular evaluation of the education students receive has been shown to significantly contribute to improving the quality of education, addressing identified deficiencies, and developing new educational strategies that benefit students (7). In a study by Çan, the views of dental and medical students on the anatomy course were assessed. It was stated that in both medical and dental faculties, increasing student interest in anatomy courses, avoiding unnecessary details, providing profession-related knowledge, and relating course topics to clinical situations to boost student engagement were important (19). According to our study's results, most students acknowledged that they came to the faculty knowing anatomy is a fundamental course and that they believed a doctor cannot become one without anatomy education. They also stated that the information learned in the course becomes more permanent and intriguing when linked to clinical practice. In their evaluation of the future of anatomy education in dental schools, Balcıoğlu et al. emphasized ongoing debates about integrating basic sciences with clinical content. They also pointed out that questions about how and what should be taught in this regard have emerged as significant issues in educational philosophy debates, citing conflicting articles on the matter (6). In our study, students expressed that they did not want to receive anatomy education equivalent to that of medical faculty, did not want the entire body anatomy to be taught, and preferred to learn only head and neck anatomy. We

believe this view that learning only head and neck anatomy is sufficient needs to be changed. The results we obtained suggest that students should view the human body as a whole, and topics should be taught in an integrative manner.

The impact of new educational tools used in anatomy education on preserving anatomical knowledge and developing future surgical skills remains unclear. More research is needed to evaluate the suitability of different teaching methods and student perceptions in the transition from traditional regional approaches to integrated, system-based, and multi-method teaching paradigms. Additionally, it is important to examine the ability of these methods to meet learning objectives (20). Research has shown that in recent years, dissection-based anatomy education tends to be replaced by projection and computer-based modeling (21). Despite the shift away from cadaver education, the result of our study shows that students still desire cadaver-based training and are not hesitant to work with cadavers. Although 3D programs and models play a significant role in determining the relationships, placement, and formation of anatomical structures, they cannot replace cadaver-based education, which ensures more permanent learning for students. Ostrin's study examined the role of mobile devices and application software in education and concluded that anatomy applications facilitate the observation of structures in 3D, make it easier to understand the placement and orientation of structures, and allow interaction with structures by enabling them to be rotated and layers to be removed (22). In literature reviews conducted by Hwang and Wu, they found that smartphones and tablet PCs have been strongly adopted as mobile learning devices by learners in recent years (23). In a study by Mayfield et al., it was noted that mobile devices, by enabling students to carry learning materials around the lab or cadaver space, offer advantages in anatomy learning through mobile anatomy applications developed using smartphones, providing students with learning formats best suited to their learning styles (24). It is recommended to explore such applications, suggest them to students, and integrate them into anatomy course programs (25). So far, no single teaching tool has been identified that can meet all curriculum requirements (26). The most effective way to teach modern anatomy is to combine various pedagogical resources (plastination, case-based learning (CBL), live anatomy, medical imaging, etc.) to complement each other. Students benefit the most when various and system-based teaching methods are integrated (27). The data obtained from our study supports these findings. Students have stated that working with models and 3D programs makes it easier to understand theoretical knowledge. In line with this result, we believe that while teaching theoretical lessons, it would be beneficial to make use of 3D programs, and in practical lessons, to support the learning process with models and, if possible, cadaver-based education to better understand the relationships between anatomical formations.

CONCLUSION

This study was conducted to support dental students in better understanding the fundamental concepts of anatomy and to provide a solid foundation for their professional practice. It was found that students invest a significant amount of time and effort into the anatomy course, which is filled with intense Latin terminology. Their increased interest in head and neck anatomy, in particular, suggests that this area holds more importance for students. While some opinions suggest that teaching the detailed anatomy of the entire body is unnecessary, it is concluded that students should not be content with only learning head and neck anatomy. The curriculum should be designed in a way that encourages students to learn human anatomy from a holistic perspective. Additionally, it was determined that student feedback is crucial for making educational programs more effective and adopting methods that are understandable to students. Future studies will focus on exploring the relationship between students' attitudes toward anatomy courses and their academic success, and will provide suggestions for improving educational programs based on these findings.

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