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# The Role of Anatomical Specimens in the Teaching of Anatomy

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**Abstract:** As a special subject, human anatomy is also main subject in medical education. It has abstract characteristics, complex content, and it is difficult to understand. In view of the nature of the subject, many different models and specimens are required during teaching, increasing the difficulty of its teaching. Although the mode of medical teaching is constantly updating, anatomical specimens are still important in the teaching of anatomy, as they help students to understand the organs, their positions, and structural forms as well as to better grasp the theoretical aspect. In addition, anatomical specimens and medical students contact condition can affect the teaching effect. Therefore, it is imperative to give full play to the role of anatomical specimens in anatomy teaching to improve the teaching effect. This paper summarizes the research on the use of anatomical specimens in the teaching of anatomy.

**Keywords:** Human anatomy; Anatomy teaching; Anatomical specimens

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## 1. Introduction

Human anatomy is an important subject in medical education. In the teaching of anatomy, specimens are usually used as intuitive teaching aids. Through the use of anatomical specimens, unexpected teaching effects can be brought into play. At present, with the wide application of multimedia, many new modes of teaching have been popularized and applied, and the use of specimens in teaching promotes the continuous improvement of students' attention and interest. Whether anatomical specimens can play a productive role in anatomy teaching has a positive effect on students' knowledge mastery. It can liven the classroom atmosphere, promote the combination of theory and material objects, give full play to the leading role of teachers to improve the teaching effect, help students understand and consolidate anatomical knowledge, as well as improve their knowledge level and skills [1]. Based on this, this study summarizes on how to give full play to anatomical specimens in the teaching of anatomy.

## 2. Anatomical specimens as the main tool in the teaching of anatomy

Human anatomy is not only a crucial subject for the study of human morphological structure, but also an important content in medical education. The morphological structure of humans and the law of evolution are the basic course contents in anatomy. In the teaching process, through the rational use of anatomical specimens, the role of anatomical specimens cannot be compared with multimedia pictures or drawings. For example, peritoneal formation is a key but difficult content in the teaching of abdominal structures. If the teaching only depends on multimedia, it is impossible to demonstrate each section of the abdominal structure. It is difficult for medical students to fully understand the relationship between the peritoneum

and abdominal organs. The internal, intermediate, and external organs of the abdomen are important indicators of the abdominal anatomy. Therefore, it is necessary to make full use of anatomical specimens in the teaching process to improve the teaching effect. For example, by making an anatomical specimen model with the help of sewing tools based on the changes of peritoneal development and transportation, the teacher can carry out a demonstration with the model and provide a detailed description with the help of multimedia slides. By explaining the descent of abdominal organs and their transposition in this way, students can vividly understand the positional relationship between the peritoneum and the abdominal organs, thus promoting the full absorption and understanding of the anatomical knowledge content. At the same time, through the use of anatomical specimens, it improves students' learning enthusiasm and inspires them to actively learn about embryology, so as to deepen their understanding and improve the teaching effect. In addition to that, when explaining the anatomical structure of the nervous system, students can be shown the fixed specimens of the fetal spinal cord at different gestational ages. By observing the specimens, students will be able to understand the relationship between fetal size, length, and spinal cord development, thus stimulating their interest in learning. At the same time, with specimens of anencephaly, spina bifida, and other neurological diseases, students can deepen their understanding of certain conditions and ultimately improve their anatomical knowledge. In a study [2], Na Feng and other researchers explored the effect of the application of anatomical specimens in anatomy teaching. Taking 60 medical students as their research subjects, the students were divided into a control group and a research group. The control group were taught using traditional multimedia, whereas the research group were taught using anatomical specimens in combination with multimedia. The results showed that the anatomical knowledge mastery scores of the two groups were 80.37 ± 2.56 points and 81.46 ± 2.71 points, respectively, before teaching; however, the scores after teaching were 89.13 ± 2.71 points and 94.36 ± 3.03 points, respectively. Comparing the scores of both the groups, the average score obtained by the research group was higher. In addition, the teaching model identification score of the research group (95.34 ± 2.87) was significantly higher than that of the control group (90.12 ± 2.31), where $P < 0.05$. The study showed that the application of anatomical specimens in the teaching of anatomy can effectively improve students' mastery of knowledge and help students better understand important yet difficult contents of the subject. Therefore, it has a positive role in the teaching of anatomy, which is recognized by medical students.

### 3. Strengthening the ability of medical students to make anatomical specimens

The ability to make anatomical specimens plays an important role in anatomy teaching and content understanding. In the process of anatomy teaching, it is important to train students to dissect specimens and take it as a part of practice. In regard to this, students should be encouraged to dissect and make specimens in class as well as select appropriate system specimens in consideration of the basic and actual conditions of cadavers. For instance, for fresh muscle corpses, teachers can guide medical students to make knee specimens, requiring the clear display of the inner and outer menisci as well as the anterior and posterior cruciate ligaments; for corpses with relatively poor muscle conditions but well-preserved internal organs, teachers can guide students to make specimens in consideration of the relationship among the pancreas, duodenum, right liver, and gallbladder on the anatomical map. In each semester, two cadavers should be selected: a male cadaver and a female cadaver. Students should then make specimens of the urogenital system, and the teacher should guide the students to operate by hand. For each specimen, it is not only required to be bottled, potted, and stacked, but also carefully carved to improve the quality of the specimen. Upon completion of the specimen, students should then draw corresponding diagrams in line with the specimen and add simple text descriptions, so as to deepen their understanding. The above teaching methods, which combines learning with specimen making, can maximize the role of anatomical specimens in anatomy teaching and motivate students to learn enthusiastically. Moreover, in order to produce exquisite

specimens and complete the examination task, students will automatically put in effort to learn the anatomy content, which does not only promote the learning and understanding of anatomy beyond books, but also the gradual cultivation of students' macroscopic understanding and three-dimensional thinking of the human body, so as to improve their knowledge level. In addition, this method can also save the use of teaching cadavers to a certain extent and meet the teaching needs of various anatomy practice courses. Therefore, the teaching method of guiding students to make anatomical specimens plays an important role in anatomy teaching and has become an effective teaching method. In another study [3], Cheng Li and other researchers recruited 80 medical students to explore the effect of anatomical specimens on the operation skills and cultivation of three-dimensional thinking in the teaching of anatomy. They divided the students into a control group and an observation group according to different teaching methods. The control group was taught using traditional teaching, whereas the observation group was taught by combining students' knowledge and teachers' guidance to make specimens. Before teaching, the macro-cognition and three-dimensional thinking scores of the control group were 65.37 ± 2.85 and 66.45 ± 2.74, respectively, and the specimen-making ability score was 70.24 ± 1.95; on the other hand, the macro-cognition and three-dimensional thinking scores of the observation group were 65.43 ± 2.71 and 66.28 ± 2.65, respectively, and the specimen-making ability score was 70.31 ± 2.02. There was no significant difference in the assessment scores between the two groups before teaching. However, after teaching, the macro-cognition and three-dimensional thinking scores of the control group were 70.46 ± 3.12 and 70.28 ± 3.24, respectively, and the specimen-making ability score was 73.35 ± 2.23; the macro-cognition and three-dimensional thinking scores of the observation group were 80.69 ± 3.11 and 80.12 ± 3.25, respectively, and the specimen-making ability score was 81.34 ± 2.45. From the results, the specimen-making ability, macro-cognition, and three-dimensional thinking scores of the observation group were higher than those of the control group ($P < 0.05$). This study shows that the application of anatomical specimens in anatomy teaching can cultivate and enhance students' macro understanding of the human body, their three-dimensional thinking, as well as their hands-on operation skills.

### 4. Research on the application of anatomical specimens in the teaching of anatomy

In a study [4], 50 medical students were selected as the research subjects to study the effect of anatomical specimens in anatomical teaching. In that study, anatomical teaching was carried out with applied anatomical specimens. A questionnaire to determine the teaching effect was used to investigate the situation of the students as shown in **Table 1**. All 50 medical students were highly satisfied with the evaluation of the teaching effect, which means that medical students generally recognize the use of anatomical specimens in anatomy teaching and believe that this method of teaching can improve their autonomous learning ability, stimulate their interest in learning, cultivate their thinking ability, and improve their knowledge level.

**Table 1.** Questionnaire on the teaching effect of anatomical specimens

| Project | Content | Teaching satisfaction | | |
|---|---|---|---|---|
| | | > 9 points | 6-9 points | < 6 points |
| Course content | The teaching objectives are clear, and the content meets the requirements of the curriculum. | 48 | 2 | 0 |
| | It has clear and accurate expression. | 47 | 3 | 0 |
| | The key points are highlighted, and the difficult points are explained thoroughly. | 45 | 5 | 0 |

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| Project | Content | Teaching satisfaction | | |
|---|---|---|---|---|
| | | > 9 points | 6-9 points | < 6 points |
| Teaching method | It explains in simple and vivid language in combination with practice. | 46 | 4 | 0 |
| | It guides students to think and pay attention to cultivating dialectical thinking. | 48 | 2 | 0 |
| | It helps to cultivate and form correct medical ethics and life values. | 46 | 4 | 0 |
| | It reflects heuristic teaching and helps stimulate students' innovative consciousness. | 45 | 5 | 0 |
| | It focuses on interaction; thus, the classroom atmosphere is relaxed and active. | 47 | 3 | 0 |
| | It emphasizes on the cultivation of students' core competitive ability and teaching effect. | 43 | 7 | 0 |
| Teaching effectiveness | It enables students to understand and master the basic knowledge of the course. | 49 | 1 | 0 |
| | It strengthens students' autonomous learning ability and interest in learning. | 45 | 5 | 0 |
| | It strengthens the systematicness of knowledge learning. | 50 | 0 | 0 |

## 5. Experience

As an important teaching tool, the role of anatomical specimens in the teaching of anatomy has been explored and validated by clinical research in recent years. Teaching around anatomical specimens does not only help students to effectively combine theory with practice and cultivate dialectical materialist world outlook, but also improve their specimen-making ability, their learning beyond anatomy books, and their knowledge level [5]. In addition, it also deepens students' understanding of anatomical structures and the functions of various structures, thus improving the comprehensive quality of medical students.

## Disclosure statement

The authors declare no conflict of interest.

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