Освіта в стоматології і обмін досвідом

КЛІНІЧНА СТОМАТОЛОГІЯ

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The more we know, the more we forget... (challenges of teaching dentistry faculty students for histology, cytology and embryology)

ІНФОРМАЦІЯ

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Key words: dentistry student; education; knowledge; histology; cytology; embryology.

АНОТАЦІЯ

Summary. Students of dentistry faculties need a special methodological approach aimed at the acquisition of practical skills, but the study of fundamental disciplines is different from the dental-oriented ones.
The aim of the study – to assess presumed deficits in the histology, cytology, and embryology knowledge of dentistry students at O. Bohomolets National Medical University, to identify the problems associated with it, and to address them.
Materials and Methods. Testing of students of different courses of O. Bohomolets National Medical University using the standard licensed **examination tests "Step 1 Dentistry".**
Results and Discussion. Students of the dentistry faculty have shown the level of students' knowledge at 4th and 5th years – 33.5 %. The general result of the "Step 1 Dentistry" license exam in the same students is 66.6 % (2019) and 62.2 % (2018), respectively. The percentage of this result of the test higher when checked professional direct knowledge. We found that it was determined the prevalence of correct answers in the block on the topic "Oral Cavity" at the test on histology, cytology and embryology of O. Bohomolets NMU Dentistry Faculty different courses students.
Conclusions. In accordance with the obtained results and the analysis of the problems, it is recommended to make adjustments to the curricula and control measures with a focus on the competencies that will be applied in professional activities.

Introduction. Dentistry is a prestigious and important specialty that requires hard and painstaking training. Students of dentistry faculties need a special methodological approach aimed at the acquisition of practical skills, but the study of fundamental disciplines is different from the dental-oriented ones.

Ministry of Health of Ukraine carries out systematic measures on the transition of medical schools to the European standards. Currently, the higher education system, including dental education, is based on the European Credit Transfer System (ECTS).

There have been changes in the curricula for dentistry students of all years of study, as well as new ways of teaching in addition to traditional methods, but the level of knowledge acquisition and survival requires constant attention. This problem is peculiar to first-year subjects, namely anatomy and histology.

For the clinical integration of base or preclinical science, various examples of clinical cases are provided from the beginning of studying [13].

Therefore, the purpose of our study was to assess presumed deficits in the knowledge of histology, cytology, and embryology (hereinafter histology) of dentistry students at O. Bohomolets National Medical University, Kyiv, Ukraine, to identify the problems associated with it, and to address them.

Materials and Methods. We conducted a questionnaire survey of second year students (2017 – the year when students were enrolled at the university), third year course (2016) and fourth year course (2015) with a total of 233 students with a test consisting of typical MCQ tasks that were from "Step 1 Dentistry – Dentists" (Table 1). The 30 tests were divided into three thematic blocks: oral cavity, tooth, and special histology with 10 questions in each.

Table 1. Design of knowledge deficits research on histology of dentistry faculty students of different studying years depends on research time

Year of study (the year when students were enrolled at the University)	The general result of the questionnaire on histology and the result of questioning in thematic blocks	The average grade of the exam	Step 1 and the histology subtest result
2nd year (2017)	–	2018	2019
3rd year (2016)	2018	2017	2018
4th year (2015)	2018	2016	2017

We determined the average percentage of correct answers in each of the blocks by their number (10 questions) and the average percentage of correct answers in the total histology questionnaire by their number (30 questions). Testing took 30 minutes (1 question – 1 minute). Students were not warned or prepared for it.

"Step 1 Dentistry" is a licensed integrated exam on third-year, similar to UMMS. It includes theoretical questions with a clinical situation in MCQ format in biology, normal anatomy, normal physiology, biochemistry, pathological physiology, pathological anatomy, microbiology, pharmacology, and histology. The subtest on histology is 7–11 %. The valid criterion value is 60.5 % correct answers. The exam consists of 200 questions. Testing lasts 3 hours 20 minutes (1 question – 1 minute), its positive result allows students to continue their education in a medical school.

The obtained data in the general survey were compared with the results of the histology subtest in "Step 1 Dentistry" and the average grade for the histology exam that students received at the end of their study after the first year to identify interconnections between them. The average score on the exam is calculated by the results of all its stages as the arithmetic mean score, according to graduation (unsatisfactory – 0, satisfactory – 50, good – 65, and excellent – 85).

The overall result of the dentistry faculty licensing exam of students in the various years was also examined to understand the overall picture of the studied contingent of students. The overall result and the histology results in "Step 1 Dentistry" are presented as a percentage of the total histology questions (questions according to the official test center data). Unsatisfactory results that will exclude students from the university or improved in accordance with the procedure in the future were also taken into account.

On the basis of the test results, the evaluation statistical data of the results and analysis of the literature, problems of studying in Ukraine and abroad are identified and well as the directions of their solution.

Results and Discussion. Anatomy and Histology. The study of anatomy, above all, requires memorization [10]. The possibility of spatial visualization in developing practical skills on the cadaver or on modern imaging devices provides effective acquisition of anatomical knowledge [6, 18, 20].

Histology requires the visual recognition and interpretation of two-dimensional images on microscopic and ultramicroscopic specimens, as well as an understanding of the relationship between the structure and function of cells, tissues or organs [7, 14].

In medical schools of Ukraine, these skills are practiced during practical classes and evaluated during control but do not stand in the first place, since the licensing exam "Step 1 Dentistry" is limited to theoretical knowledge. Therefore, histology requires a different approach to teaching, assessment and accordingly has other mechanisms of improving knowledge deficits.

Dental curricula. Teaching histology in Ukraine is not much different from other countries: lectures, practical classes with teachers, studying and sketching of microscopic preparations, as well

as lecture texts, PowerPoint presentations, video with lectures on the university web-page, etc.

The structure of medical school curricula varies from country to country. Over the last 20 years, many schools have adopted a content-based organization for each preclinical course (eg, cardiovascular pathophysiology, endocrine problems) [4, 8], that integrates preclinical disciplines and enhances their clinical relevance [3, 16].

Such a structure allows students to develop a deep understanding of a single system but is not an autonomous course in this approach [1, 12]. In Ukraine, anatomy and histology are studied by dentistry students as basic or preclinical disciplines in the first year, thus not spreading in different courses, but detached from the clinical content.

Moreover, there are the same disadvantages as with the integrated type of training: different allocation of time to prepare for classes and preserving knowledge, student motivation and complexity of the assessment. As noted by Hortsch et Mangrulkar, students' motivation to learn an integrated discipline must compete with the motivation to engage in the organ system addressed in that course, and it is often difficult to assess which students may be struggling within the integrated discipline, assessments are likewise dispersed with the content [9].

The motivation of Dentistry students. Dentistry students find it less important to study histology compared to anatomy, though more necessary than embryology, as confirmed by other authors [11]. Although, histology plays a significant role in dentistry education from the point of view of assessing both normal structure and pathological changes

Skills building session for dentistry students. Practical training consists of discussing a given topic, analysis of UMCLE tasks, and researching histological specimens in albums related to this topic.

Photo of microscopy slides, tables, diagrams in a presentation prepared by the teacher, used as a method to teach histology during the discussion. The conversation increased interaction between students and teachers, but it is useless in the case when the student did not prepare in advance. Using an interactive whiteboard greatly increases the visualization capabilities, but the limited availability of this resource puts students at unequal conditions. Drawing in albums helps the student visually remember histological structures, but it does take some time.

Prepare for practical teaching sessions for dentistry students. In preparation for histology classes, dentistry students have the possibility to use electronic resources, but they also used textbooks and lectures. Students also use workbooks to sketch histological specimens.

It is known from the literature that a combination of electronic materials and textbooks is commonly used by students to prepare for practical classes, with electronic resources being regularly used by the majority of students [19].

Zdenek Tauber and co-authors also noted that most dentistry students believed that introducing student-led presentations and collaborating between student groups in preparation for individual presentations improved their quality of preparation for the practice classes and increased their activity during their practice [19].

Knowledge evaluation of dentistry students. Assessment of students in different medical universities in Ukraine is different, but there are two obligatory components: determining the level by oral or writing theory and test answers. The test is an important component as dentistry students pass the “Step 1 Dentistry. Dentistry” test in MCQ format in the third year of study.

Thus, we found that it was determined the prevalence of correct answers in the block on the topic "Oral Cavity" at the MCQs test on histology, cytology and embryology of O. Bohomolets National Medical University Dentistry Faculty different courses students, wherein the 1st year was leading.

The lowest percentage was shown on the topic "Special histology" (Table 2).

Table 2. The percentage of correct answers in each of the special blocks in histology and embryology testing of dentistry students of different courses

Year of study (the year when students were enrolled at the University)	Oral Cavity, %	Tooth, %	Special histology, %
2nd year (2017)	49.5*	33.6*	28.3*
3rd year (2016)	43.6	32.4	24.0
4th year (2015)	42.1	31.9	26.0

Note: * – $p<0.05$ in comparison with the data of the other term group.

The highest percentage of correct answers in the general MCQs test on histology, cytology, and embryology was shown by students of the 2nd year of study – 37.1 %, the results of students of the 3rd and 4th years of study demonstrated equally lower results – 33.5 % (Table 3).

An interesting fact is that this contingent of 3rd year (2016) and 4th year (2015) students also had similar results with "Step 1 Dentistry" – 55.3 % (2019) and 57.1 % (2018), respectively (Table 3).

To judge the level of knowledge, we compared the examinations average grade point of histology and embryology and our testing. Accordingly, we observed an average score for the exams at the students of the 2nd year of study – 3.25 points, students of the 3rd and 4th years of study – 3.18 and 3.17 points, respectively (Table 3).

Table 3. Survival of knowledge of dentistry students in different courses

Year of study (the year when students were enrolled at the University)	The general result of our histology testing, %	Average grade of exam, points	Step 1 Histology, %
2nd year (2017)	37.1*	3.25*	–
3rd year (2016)	33.5	3.18	55.3 (2019)
4th year (2015)	33.5	3.17	57.1 (2018)

Note: * – $p<0.05$ in comparison with the data of the other term group.

In the progress test of upper-year students at different universities across Germany, on average only 29.9 % of the students 'answers were correct, reflecting that the performance was significantly below the expected standard [2].

It is known that the University of Michigan medical students must have a cumulative examination score of at least 75 % to succeed. In their study, Brunk and co-author calculated that the correct answers for the question should be 60.4 % [2]. In addition, UMMS histology test and examination questions usually involve images that require the analytical skill of interpreting histological images and linking them to functional facts and physiological processes but do not include in "Step 1 Dentistry – Dentists" for Ukrainian students.

Dentistry vs general medicine students. An important fact is that dentistry students predominantly studied by contract. In other words, there is a low level of competition during admission to the university. While the availability of budgetary places for admission to the medical faculties results in a high level of competition and leads to an increasing amount of students with high learning ability on the medical faculty. Preparatory courses or studying at mid-level medicine and dentistry school are also important. It is well known that students with a previous biomedical education will be better able to cope with anatomy and histology [5, 17].

The curricula for medical students and dentists have no significant differences either in terms of subject matter or in academic time. "Step 1" subtests on histology for medical students are 4–6 %, which is almost half that for dentists.

Histology topics which examined are the same for medical students and dentists. Zdenek Tauber denies statistically relevant differences were found between the approaches of dentistry vs general medical students [19]. However, Olowo-Ofayoku notes the differences between medical students and dentists in gross anatomy and physiology/ pathophysiology training and considers that they are in applying this knowledge to the medical field compared to the skills-based dental field [15].

Indeed, the needs of the future profession are reflected in both motivation and approaches to mastering it, which leads us to find solutions to improve the deficit of the acquired knowledge.

Problems and possible solutions. Reasons, why some students have problems in histology acquisition, are the same for all countries, like previous level of students education, lack of curriculum in histology, problems with the usage of offered educational resources [17], lack of analytical thinking skills, problems with abstract perception and visual memory.

Therefore, recommendations for students are often united to such strategies: using of a more focused approach to learning; using of all available training resources; attending lectures personally, not just watching videos; proper preparation in advance and active participation in laboratory and practical classes; trainer skills for testing [9, 17]. Another problem is the untimely identification of students at risk or their help.

Brunk et al propose in early years – an integrated approach to anatomy teaching of the curriculum; in later years – promote systematically recapitulation of anatomical facts in the clinical context and in general – to critically reviewed the

trend of continuous reduction in total teaching time when revising and developing new medical curricula [2].

Conclusions. Thus, the level of dentistry students' knowledge of the 4th and 5th years of study is 33.5 %, which coincides with the data obtained from the survey of anatomy knowledge conducted by other authors. This percentage is higher when examining professional directed knowledge.

In accordance with the obtained results and the analysis of the problems, it is recommended to make adjustments to the curricula and control measures with a focus on the competencies that will be applied in professional activities. Raising the level of knowledge can be both through the integrated teaching of special histology in conjunction with other fundamental disciplines, and through the restoration of histological facts in the clinical context of upper-year students.

It is also necessary to draw more attention to professional topics (oral cavity, tooth structure, and development, salivary glands) when preparing tasks for "Step 1. Dentistry". Should not include the test-bank questions that are not directly relevant to the future profession. In the same time, should add questions for histological analysis; it would be useful to reform the histology curricula accordingly by increasing the number of academic hours for professional topics (oral cavity, structure, and development of the tooth, salivary glands) studying which necessary to know more deeply than students of medical faculties.

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Чим більше ми знаємо, тим більше ми забуваємо… (виклики з гістології, цитології та ембріології у навчанні студентів стоматологічного факультету)

Резюме. Студентам стоматологічних факультетів потрібен особливий методологічний підхід, спрямований на набуття практичних навичок, при цьому вивчення фундаментальних дисциплін відрізняється від стоматологічних.

Мета дослідження – оцінити передбачуваний дефіцит знань із гістології, цитології та ембріології у студентів стоматологічного факультету Національного медичного університету імені О. О. Богомольця, виявлення проблем, пов'язаних з цим, і їх рішення.

Матеріали і методи. Тестування студентів різних курсів Національного медичного університету імені О. О. Богомольця проводилося з використанням стандартних ліцензійних екзаменаційних тестів «Крок-1. Стоматологія».

Результати досліджень та їх обговорення. Студенти стоматологічного факультету показали рівень знань студентів на IV і V курсах – 33,5 %. Загальний результат ліцензійного іспиту «Крок-1. Стоматологія» у тих же студентів становить 66,6 % (2019 р.) і 62,2 % (2018 р.) відповідно. Відсоток цього результату тесту вище при перевірці безпосередньо професійних знань. Ми виявили превалювання правильних відповідей у блоці на тему «Ротова порожнина» при тестуванні з гістології, цитології і ембріології студентів різних курсів стоматологічного факультету НМУ імені О. О. Богомольця.

Висновки. Відповідно до отриманих результатів і аналізу проблем, рекомендується внести корективи в навчальні плани і заходи контролю з акцентом на компетенції, які будуть застосовуватися в професійній діяльності стоматологів.

Ключові слова: студенти-стоматологи; освіта; знання; гістологія; цитологія; ембріологія.

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Чем больше мы знаем, тем больше мы забываем… (вызовы по гистологии, цитологии и эмбриологии в обучении студентов стоматологического факультета)

Резюме. Студентам стоматологических факультетов нужен особый методологический подход, направленный на приобретение практических навыков, при этом изучение фундаментальных дисциплин отличается от стоматологических.

Цель исследования – оценить предполагаемый дефицит знаний в области гистологии, цитологии и эмбриологии у студентов стоматологического факультета Национального медицинского университета имени А. А. Богомольца, выявление проблем, связанных с этим, и их решение.

Материалы и методы. Тестирование студентов разных курсов Национального медицинского университета имени А. А. Богомольца проводилось с использованием стандартных лицензионных экзаменационных тестов «Крок 1 Стоматология».

Результаты исследований и их обсуждение. Студенты стоматологического факультета показали уровень знаний студентов на IV и V курсах – 33,5 %. Общий результат лицензионного экзамена «Крок 1 Стоматология» у тех же студентов составляет 66,6 % (2019 г.) и 62,2 % (2018 г.) соответственно. Процент этого результата теста выше при проверке непосредственно профессиональных знаний. Мы обнаружили преобладание правильных ответов в блоке на тему «Ротовая полость» при тестировании по гистологии, цитологии и эмбриологии студентов разных курсов стоматологического факультета НМУ имени А. А. Богомольца.

Выводы. В соответствии с полученными результатами и анализом проблем рекомендуется внести коррективы в учебные планы и меры контроля с акцентом на компетенции, которые будут применяться в профессиональной деятельности стоматологов.

Ключевые слова: студенты стоматологи; образование; знания; гистология; цитология; эмбриология.

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