

INTEGRATING SURGICAL SKILLS TRAINING INTO ANATOMICAL EDUCATION USING EMBALMED WET LAB SPECIMENS WITH TRADITIONAL HERBAL CONSERVATION AND NOVEL FIXATION METHOD

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SUMMARY

Objectives: To apply the intergration of surgical skill into anatomical education using embalmed wet lab specimens with tradiational herbal conservation and novel fixation method. Subjects and methods: 40 students were taught by integrated surgical skills training into anatomy using embalmed specimens. 20 canine internal organ blocks were harvested and then preserved using the ethanol-glycerin-acetic acid-saturated salt solution fixation with traditional herbal conservation method. The students were surveyed to assess satisfaction with the new curriculum. Results: The students said that the course was relevant to their current training. 50% of the students stated that their interest in surgery increased and 100% of students were satisfied with using embalmed specimens. Our preservation method had a sufficient antibiotic effect. All embalmed specimens were preserved for three months but still similar to the fresh specimens. Conclusion: Surgical skill training can be integrated into first-year anatomy course without detracting from didactic instruction in anatomy. Using wet lab specimens serves well to training purposes, surgical skills training as well as anatomical education. Our embalming method brings many benefits, enabling a wider use for medical education.

** Keywords: Anatomy education; Embalmed wet lab specimens; Surgical skills.*

INTRODUCTION

In education, generally the concept of integration is understood as the combination, composing the content from different subjects and areas of study into a new subject. It can also be understood that integration is the incorporation of essential content on the inherent content of the subject. Integrated teaching makes the

learning process meaningful by engaging more learning content with practice, in relation to specific situations that learners will encounter later.

In terms of medical education, anatomical and practical surgeries are two subjects that are closely related. However, in the traditional program, these two subjects are rarely taught at the same time.

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They are often organized into separate classes. Students are taught anatomy in the first year that is mainly on available models and are rarely allowed to dissect directly cadavers due to lack of basic surgical skills. This makes students forget quickly what they learn and not to catch up with the basic knowledge of anatomy and the more advanced knowledge such as neurovascular structure... By the end of the second year, students have just been exposed to surgical skills and they have not had many opportunities to practice on surgical models. After being in clinical practice, there are few students handling the basic surgical techniques and they are often embarrassed when they have to participate in surgery.

There have been a number of researches on medical education around the world which showed that early practice and repeated surgical skills help increase students' confidence and skill proficiency. In addition, teaching surgical skills integrated into anatomy to create excitement, increase the ability of acquiring anatomical knowledge and help learners have the opportunity to practice surgical skills. Therefore, recently we have built a teaching program that integrates surgical skills into anatomy. Since the number of corpses used for teaching and learning at most medical schools over the country are not enough, we have used other models from animals instead. Anatomically, people and dogs have many similarities. On the other hand, this is the most used animal in researches and medical education, so it is possible to practice surgical skills in dogs. In this study, we applied the integration of surgical skills into anatomy using the biological

samples that were taken from dogs and preserved by traditional medicines and new fixation methods to evaluate the effectiveness of this method concurrently.

SUBJECTS AND METHODS

1. Subjects.

40 first-year students who were learning in the Department of Anatomy, Military Medical University were included in the study.

2. Methods.

** Biological samples:*

20 blocks of internal organs from dogs were harvested according to the human multi-organ retrieval method. Then, they were flushed and preserved with ethanol-glycerin-acetic acid and saturated saline in combination with the traditional medicine herbs following the formula:

** Ingredients (in 10 liters):* ethanol: 60%; glycerin: 5%; acid acetic 1%; natri clorid: 2 kg; water: 3.4 L; herbs (cinnamon, Illicium verum...) 0.5 kg.

The biological samples were preserved for 3 months, before being used to teach learners. They were checked for quality (antimicrobial test, histopathology, usability...).

** Integrating surgical skills training into anatomical education:*

First, all students are taught basic surgical skills, including: (1) How to use surgical instruments; (2) Tying knot techniques; and (3) Stitching techniques. The learning content has been developed into videos-based on the Royal College of Surgeons of England curriculum (RCSE - Royal College of Surgeons of England).

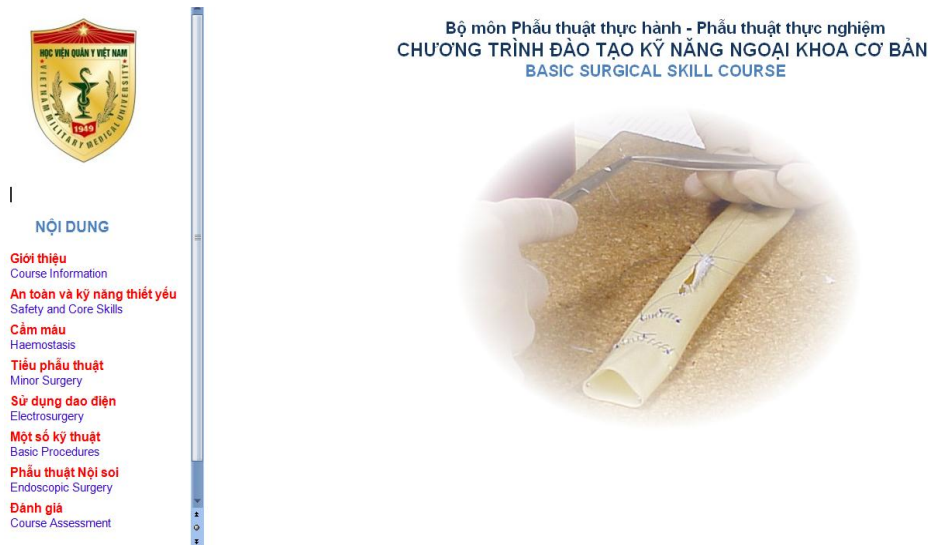


Figure 1: Main interface of the software used for training.

At each session, students will be reminded of the anatomy (heart-lung, liver, kidney...), and then practice the dissecting techniques and train the surgical skills on the preserved biological samples.

* *Survey on the effectiveness of the curriculum:*

The effectiveness of the curriculum would be assessed according to the following methods:

- Lecturer attends and observes students' learning process to evaluate some students' aspects: concentration, attention, participation in raising questions and discussion after lesson... After that these comments were collected from directly responsible teacher and observing teachers.

- Ask participants to participate in an evaluation survey, including the following criterias:

- + Ability to master anatomical knowledge after the lesson.
- + The mastery of surgical skills learned.
- + The level of interest in the lessons.

- + The level of interest in the specialization of surgery.

- + Satisfaction when using preserved biological samples.

RESULTS

1. Quality of biological products after preservation.

At 3 months after preservation of biological products, the following characteristics were examined:

- Antimicrobial test: no growth of bacteria and fungi.
- Histopathological test: microstructure of preserved tissue.
- Ability to use preserved tissue:
 - + The color of tissue is little changed.
 - + Aromatic scent of herbs.
 - + Can easily be cut with electrosurgery.



Figure 1: Biological set after 3 months' storage.

2. The effectiveness of the curriculum.

** Qualitative assessment:*

With observation of the lesson, the students were very excited, focused, enthusiastic to participate in the lecture. Feedback after the lectures of the participating teachers was also very positive with highly appreciation of the effectiveness of this new method.

** Quantitative assessment:*

- 100% of participants felt that integrating surgical skills with anatomy is essential in the curriculum. Up to 80% of participants said that when they learned the new method, they got a better grasp of anatomical knowledge than traditional methods, especially complicated contents such as heart surgery, liver vascular ...

- More than 60% of participants believed that they were confident in mastering basic surgical skills after the course and can perform these skills on the operation.

- 50% of the participants said that after the course, they would be more interested in surgery and would orientate future career towards surgery.

- 100% of students were satisfied with the use of post-preserved biological products and said that biological products had a pleasant smell, clear organizational structure, the implementation of surgical skills is easy and was not as inferior as fresh biological samples.

DISCUSSION

The results of our study showed that the surgical skill curriculum can be fully integrated with anatomy for first-year medical students. This program not only helps students acquire the anatomical knowledge longer, but also helps them have the opportunity to have the exposure and practice basic surgical skills early. Thanks to this, the level of maturity and confidence can increase when they come to clinical practice later. In the world, there have been some studies that highly appreciate the effectiveness of this teaching method.

The surgical skill curriculum being applied is based on the curriculum of the Royal College of Surgeons of England. This is one of the leading prestigious organizations with surgical training courses held in many countries of the world. Our syllabus includes elaborately built videos with clear script, high pedagogical explanations, clear image quality, appropriate views to easily observe the entire technique. This curriculum has also been approved by VMMU's (Vietnam Military Medical University) Scientific Council of medical innovations in 2016.

During the training process, due to insufficient number of corpses, students

can use live animals, fresh or preserved samples. The use of live animals can be considered as a viable option, but due to the cost and complexity of the application process, most medical universities now use fresh or preserved tissue for teaching and research. Fresh biological products show many advantages: retention of color, elasticity, softness of tissue. However, it also reveals many limitations such as the need for a strict preservation process, short-term utilization (only few weeks) due to the decomposition of tissue after being thawed. On the other hand, the risk of infection during the use of fresh tissue is also an issue that needs to be attended. For the above reasons, we choose to use preserved biological products. Preserved tissue can be stored for a long time due to the resistance to decay and the penetration of microorganisms such as fungi, bacteria. Presently used preservative solutions contain formalin. This substance has a major drawback that causes color changes and atrophy. In addition, exposure to a large amount of formalin is harmful to humans and adversely affects the environment. Therefore, we have successfully researched and applied the new method of preservation and fixation with ethanol-glycerin-acetic acid and saturated saline in combination with traditional herbs. This study was also reported at the 15th Asia-Pacific Medical Education Conference (Asia Pacific Medical Education Conference) held in Singapore in 2018 and highly appreciated by the Conference.

CONCLUSION

Once again, we emphasize that the surgical skill curriculum can be integrated into the anatomical course for first-year medical students. This program helps students increase their cognitive abilities of anatomy and basic surgical skills, interest in surgical specialties. Thereby, it improves the quality of teaching and learning of the Department of Anatomy as well as the Department of Practical Surgery. At the same time, the use of new bio-preservation samples is suitable for training surgical skills and anatomy, so it can be widely used in medical education.

TÀI LIỆU THAM KHẢO

1. Nguyễn Văn Cường, Bernd Meier. Lý luận dạy học hiện đại: Một số vấn đề về đổi mới phương pháp dạy học. 2012.
2. Đỗ Hương Trà. Nghiên cứu dạy học tích hợp liên môn: những yêu cầu đặt ra trong việc xây dựng, lựa chọn nội dung và tổ chức dạy học. Tạp chí Khoa học Đại học Quốc gia Hà Nội: Nghiên cứu giáo dục. 2015, 31 (1), tr.44-51.
3. Nguyễn Văn Tuấn. Lý Luận dạy học. Trường Đại học Sư phạm kỹ thuật TP. Hồ Chí Minh. 2009.
4. Peter Cantillon, Diana Wood et al. ABC of learning and teaching in Medicine. 2010, 2nd edition.
5. Niels Hammer, Pierre Hepp et al. Teaching surgical exposures to undergraduate medical students: an integration concept for anatomical and surgical education. Arch Orthop Trauma Surg. 2015, 135, pp.795-803.
6. Harras Zaid, Derek Ward et al. Integrating surgical skills education into the anatomy laboratory. Journal of Surgical Research. 2010, 158, pp.36-42.