



# Exploration and Practice of Multi-Patterns Comprehensive Pathology Practice Under the Guidance of Early Clinical Experience

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**Abstract.** In modern medical education, the early clinical experience is integrated into pathological practice teaching, and a variety of teaching techniques are applied to pathological experiment teaching to form a comprehensive experimental teaching mode. The purpose is to narrow the gap between pathological experiment teaching and clinical pathological diagnosis work, enable students to contact and understand the requirements of clinical pathological diagnosis earlier, and strengthen the sense of objective of undergraduate learning, which is expected to be shortened after teaching reform the training cycle of pathologists.

**Keywords:** Early clinical · Pathology · Comprehensive practice teaching

## 1 Introduction

Pathology is a basic medical discipline that studies the etiology, pathogenesis, pathological changes, development and prognosis of diseases. It is an important bridge between basic medicine and clinical medicine. Pathology is also a highly practical discipline.

“Early contact with clinic” is one of the trends in the curriculum reform of higher quality of medical education in the world. It was even proposed that students should be arranged to contact with the clinic from the first year, week and day of their admission to medical colleges, to contact and understand patients, to learn to sympathize with and care for patients, and to establish the professional idea of serving patients for life [1, 2]. The early clinical experience may strengthen the clinical thinking and speed up the training of pathologists [3, 4].

According to its knowledge characteristics, pathology plays an important role in the medical education system. On the basis of integrating the knowledge of various disciplines of basic medicine, it is an important link in constructing the knowledge structure of medical students to open the learning and understanding of clinical medical knowledge. Under the guidance of “early clinical” education for medical students, the

knowledge points of pathology teaching need to be reorganized, and the connotation and extension of knowledge need to be increased.

How to integrate early clinical experience into pathology teaching? The time of theoretical courses is limited, and the explanation of basic knowledge takes up more time, while the practice courses are diversified in form and relatively abundant in time. The application of rich teaching methods to supplement the learning content in the classroom and after class can fully mobilize the enthusiasm of students for active learning. Simulate the work scene will be helpful of the transition between preclinical and clinical education. Based on this idea, we propose and design a comprehensive practice course that combines multiple modes, that is, PBL, CBL, flipped classroom and network teaching mode are applied to the comprehensive teaching mode of practice course. More clinical pathology knowledge will be orderly integrated into daily teaching to enhance students' adaptability and shorten the transition period in internship. We set 275 undergraduate students of clinical medicine specialty as the comprehensive mode experimental teaching group and 244 students as the traditional experimental teaching group. We conducted comprehensive mode teaching and traditional mode teaching respectively, and observed the learning state and learning effect of the two groups of students.

Based on this idea, we propose and design a comprehensive practice course that combines multiple modes, that is, PBL, CBL, flipped classroom and network teaching mode are applied to the comprehensive teaching mode of practice course [5–7].

## 2 Preparation for Multimode Comprehensive Practice Course

First of all, teachers should do a lot of preparation before the comprehensive practice class. The practice class no longer focuses on the recognition of gross specimens and slices, but integrates the observation of pathological changes into case analysis, which is the combination with CBL teaching mode [8, 9]. The students should be guided to explore their learning interests with cases, and the keypoints of basic knowledge should be reappeared in the cases, and students may focus on the key points spontaneously [10–12].

The cases should be selected from the data of clinical patients as much as possible, but they should be properly modified and designed to better serve the needs of disease interpretation. In daily work, we should pay attention to collecting appropriate case data, and try our best to explain the combination of pathological diagnosis and clinical treatment, so that the clinical pathological connection can be demonstrated in real cases. At the same time, it is not only necessary to apply case teaching in the practice class, but also in the theoretical learning stage, the case guided course teaching should be integrated into the daily theoretical classes that take more time. In this stage, more analysis can be given to students, so that students can deeply understand the theoretical knowledge they have learned.

Before the comprehensive practice class, students can preview the cases. Students can attend the practice class with questions and try to find answers in the class instead of passively accepting information from teachers.

### **3 The Case Tracking and Knowledge of Clinical Pathology is Integrated into Teaching**

It is the most important link to integrate the work of clinical pathological diagnosis into practical teaching to help students to establish early clinical thoughts. A series of cases will be arranged for follow-up study. Starting from the observation of materials, systematic follow-up study will be carried out on slides, staining, conventional staining observation, immunohistochemistry staining or special staining observation, molecular detection, reports and supplementary reports, so as to understand the whole process of pathological examination from submission to report issuance.

It will be very helpful if we regularly carry out clinical pathology study and probation during basic pathology teaching. On the one hand, the observation and learning of biopsy is added in the pathology practice course, students can observe and touch the specimens closely (the specimens that have been sent for storage can be reported after the material collection); On the other hand, a series of cases will be arranged for follow-up study. Starting from the observation of materials, systematic follow-up study will be carried out on slides, staining, conventional staining observation, immunohistochemistry staining or special staining observation, molecular detection, reports and supplementary reports, so as to understand the whole process of pathological examination from submission to report issuance. Through the study, students can form a more complete understanding of the application of pathology in clinical work, shorten the process of getting familiar with the work to a greater extent and enter the role more quickly for students who choose the regular training of pathology department.

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### **4 Teaching Probation in Pathology Department in Spare Time**

We will arrange probation classes by stages and batches in qualified departments. The students can participate reading slides and diagnosis.

At the undergraduate study stage, many students know little about the work of the pathology department in hospital, even many students did not know the role of pathology department in a hospital. Through comprehensive practice courses, students' blind spots in pathology learning can be reduced, and experimental teaching can increase students' sense of experience in pathology work. First of all, we will arrange probation classes by stages and batches in qualified departments. Before the probation, we will learn about the working process of the pathology department, and let students experience all aspects of the pathology department. Before class, the teacher selects the cases that the students know well and explains them. The students can participate reading slides and diagnosis.

## **5 Pay Attention to Updating and Integrating the Latest Scientific and Technological Frontier Hot Spots and Diagnostic and Therapeutic Norms in Teaching**

In fact, it is easy to find basic disciplines in clinical diagnostic work. Basic knowledge and scientific research trends are increasingly cross connected and infiltrated. In recent years, many popular research results have been included in the diagnosis and treatment guide.

To strengthen the correspondence between basic knowledge points and clinical knowledge points, that is, to talk about basic knowledge in teaching but list clinical practical cases, students are more interested in learning, and knowledge is easier to remember, and it will be easier to apply in future work. With the renewal and development of medical knowledge, pathology has become a discipline integrating teaching, clinical testing and scientific research. Basic teaching knowledge and scientific research trends are increasingly cross connected and infiltrated. In recent years, many popular research results have been included in the diagnosis and treatment guide. Only by integrating the updated and newly added contents of the diagnosis and treatment guide into the course teaching can the teaching content will be closer to the practical application and prevent the outdated teaching knowledge.

## **6 Make Full Use of Network Teaching Resources in Comprehensive Practice Courses**

The network teaching resources is getting richer, in recent years. Not only there are abundant and flexible learning materials such as MOOC launched by various teaching platforms, but also professional rain classroom teaching software, DingDing, Tencent conference and other software are applied to field teaching and network teaching [17]. At the same time, the teaching effect is also analyzed and evaluated by the objective data provided in real time.

These resources are the enrichment and expansion of traditional teaching. Classroom teaching time is very limited, and online teaching resources can well apply fragmented time learning, which is a very beneficial supplement to classroom teaching. On the one hand, we can make use of the short time and little content micro lessons to guide students to preview and improve their interest before class. We can enter the class with questions or have a curious attitude and want to know more about the knowledge to be learned. On the other hand, network resources are conducive to students' knowledge expansion. While learning the classroom teaching, many knowledge that has no time to involve in the classroom but is closely related to future work can be supplemented in the after-school online learning. The rich network teaching resources make up for the limitations of classroom teaching, increase the diversity of teaching forms, and more importantly, expand the depth and breadth of teaching content.

## **7 Teacher Carry on More Interaction with Students Before and After Class**

Increasing teaching interaction is an important means for teachers to master students' needs and students to understand teachers' teaching intentions [18, 19]. The teaching of pathology practice should make full use of network resources to complete the teaching function and conduct repeated and in-depth discussion of knowledge. For example, pay attention to the preview before class and the completion of homework after class: cultivate students' consciousness of knowledge intake, actively expand the theoretical knowledge learned in class, and use flipped classroom to discuss and understand students' learning and make timely adjustments. The students who adopt the comprehensive experimental teaching mode show better enthusiasm for learning, have better feedback on the learning materials pushed by the network, and are more active in answering questions.

## **8 Conclusion**

Through the curriculum reform, the comprehensive pathology practice teaching mode enables students to obtain diversified learning methods, enrich learning content and strengthen the depth of learning. At the same time, the new learning method saves teaching resources and solves the problems of insufficient teachers and teaching hours to a certain extent. The flexible arrangement of course learning enables students to make full use of fragmented learning time to complete the learning of important knowledge and make learning more efficient. The online interaction with teachers is closer to the distance between students and teachers. Compared with the single classroom teaching, the model of students leaving after receiving knowledge and teachers leaving after class is more friendly and interesting, and students are more willing to accept it. Flip the classroom and discuss the medical record, give students enough time to study and think, make students feel the fun of independent learning, and enhance their ability to learn independently, explore and solve problems.

At present, there are only about 10,000 pathologists in China. Facing the demand of medical work in major hospitals, there is a huge gap for pathologists. Pathology integrates early clinical thinking in the basic teaching process, so that more medical students can understand clinical pathology work early and cultivate their interest in clinical pathology. When entering the stage of clinical practice and regular training, the pathology department may gain more backup strength. The teaching reform integrating early clinical thinking will be of great significance in pathology teaching in the future. It goes without saying that the workload of teachers will be greatly increased by applying the comprehensive teaching mode to practice teaching, but the traditional teaching mode or learning mode can not well meet the needs of medical students' training, but sincere efforts and time accumulation will certainly help to harvest more pathological talents.

Pathology integrates early clinical thinking in the basic teaching process, so that more medical students can understand clinical pathology work early and cultivate their interest in clinical pathology.

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