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# Discussion on Differentiated Teaching of Standardized Training for Residents in General Surgery

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***Abstract:*** *In order to explore the effect of differential teaching in the standardized training of general surgery residents, 102 residents who received standardized training in general surgery from October 2022 to January 2024 were selected for analysis and randomly divided into three groups: Group A adopted traditional teaching, group B adopted PBL teaching model combined with CBL teaching. Group C adopts PBL teaching mode instead of CBL teaching. Through analysis and comparison of teaching satisfaction, teaching achievement, teaching quality, knowledge mastery rate and other indicators, the results showed that group B was superior to group C in student interest, knowledge consolidation effect, literature retrieval learning, clinical thinking improvement, doctor-patient communication ability and other aspects. They were better than group a in clinical practice such as case analysis, medical record writing, physical examination and basic theoretical knowledge scores. The teaching satisfaction and knowledge mastery rate of group B were better than those of group C. Group C was better than group A, and the difference was statistically significant ($P < 0.05$). In conclusion, in the standardized training of general surgery residents, the combination of PBL teaching model and CBL teaching model has a better effect, the overall performance of residents is higher, the comprehensive level is significantly improved, and the shortcomings of a single teaching model are made up for and the teaching quality and satisfaction are guaranteed.*

***Keywords:*** *General surgery; A resident physician; Standardized training; Differentiated teaching; PBL teaching method; CBL teaching method; Teaching satisfaction*

## 1. Introduction

General surgery is one of the more important departments in the medical field, which is the basis of surgery and also one of the main departments requiring rotation during the standardized training of residents [1-2]. The standardized training of resident doctors, which originated in 1993, is an important teaching stage for medical students after graduation, covering professional courses, public required courses, professional required courses, clinical practice and so on. Through the standardized training of residents, the medical quality can be guaranteed and the comprehensive level of clinicians can be actively improved. At present, with the continuous progress of medical technology in China, attention should be paid to the quality characteristics, basic ability and knowledge structure of new medical talents during the training, so as to further promote the leapfrog growth of medical students to doctors [3]. According to the research, the general surgery department has a large number of patients with complex disease types and different disease progression degrees, and the traditional exposition teaching cannot meet the needs of current clinical diagnosis and treatment. In general, traditional teaching methods are used to teach residents, but the teaching mode is too general, the content is single, there is no detailed content, and the teaching quality is general [4]. PBL teaching method is more novel in clinical practice, especially in the teaching of medical field, focusing on students' learning interests, taking problems as guidance and students as teaching subjects, understanding the shortcomings of residents during standardized training and learning, and providing effective guidance and teaching for residents in a timely manner. CBL (Case Study Base Learning) teaching mode advocates typical case teaching, takes students as the main body and teachers as guides in real situations, and cultivates students' ability to think independently and solve problems, with good clinical application effect. In this paper, 102 patients with standardized training of general surgery residents were selected to study, and the differentiated teaching effects were recorded as follows.

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## 2. Data and methods

### *2.1. Clinical data*

A total of 102 residents with standardized training in general surgery were selected from October 2022 to January 2024 and randomly divided into groups. Group A implemented traditional teaching, group B implemented PBL teaching mode combined with CBL teaching, and group C adopted PBL teaching mode without CBL teaching, with 34 patients in each group, aged 20-27 years old. The average age of 34 nurses was (23.58±1.08). There were 16 males and 18 females. Group B was 21-26 years old, with an average age of (23.61±1.12) years old. Among the 34 nurses, 11 were male and 23 were female. Group C was 22-25 years old, with an average age of (23.72±1.22) years old. Among the 34 nurses, 15 were male and 19 were female. There was no significant difference in age and gender ($P > 0.05$), indicating comparability.

Inclusion criteria: (1) voluntary participation in standardized training; (2) During the period did not quit, go out to study; (3) Engaged in clinical general surgery work;

Exclusion criteria: (1) residents who do not volunteer; (2) suffering from mental disorders; (3) Residents who take leave during the period.

### *2.2. Method*

Group A implemented traditional teaching, only explained the relevant professional knowledge of general surgery diseases and diagnosis and treatment, and systematically answered the key and difficult points.

Group B implements PBL teaching mode combined with CBL teaching. Specific teaching contents: (1) Data reference: Before teaching, teachers should clarify the teaching objectives according to the teaching contents and propose teaching cases, such as clinical diagnosis and treatment of acute appendicitis and diagnosis and treatment of cholecystitis. After clarifying the teaching cases, the teaching contents should be distributed to students, and students should be informed 3 days in advance. Students are required to consult textbooks, literature and materials on the basis of the cases, and make personal analysis and insights. Understand the teaching objectives and teaching plan in advance. (2) Classroom teaching and analysis: Before the formal teaching, the students were divided into groups, in groups of 7, according to the teaching content, the cases that have been distributed were selected, and questions were raised, such as what are the clinical symptoms of patients with cholecystitis? What are the differential diagnosis methods of patients with acute appendicitis? The team members are required to discuss according to the questions, during which the teacher can give a complete description of the condition of the case, and the students are required to answer the questions according to the content they have consulted and the knowledge they have mastered. The team selects a leader to give a unified answer, and then guides the teacher to evaluate and explain the diagnosis and treatment procedures and measures of the actual cases, correct the answers of the students, and ask questions again. Ask the group to discuss and analyze. (3) Teacher summary: After the analysis is completed, the teacher should summarize the classroom content, evaluate the learning results of the group and members, propose the teaching content of the next lesson, require students to consult and preview materials after class, inform students of the case of the next lesson, and establish a complete teaching process.

Group C adopts PBL teaching mode and does not implement CBL teaching. The teaching idea is the same as Group B. The specific teaching content is as follows: According to the types and actual conditions of diseases treated by the general surgery department at the present stage, questions are raised, and students are guided to collect their own medical history, screen for general surgery diseases and read relevant materials. The students are independently collected and sorted out the materials. The teacher focuses on core knowledge points, and the students analyze and demonstrate the diseases by studying and consulting relevant literature. Students make a summary according to the information and the teacher's explanation.

The teaching time of the three groups was the same, the teaching cases selected in the teaching were the same, and all were taught by the same teacher. At the end of the course, the results of theoretical knowledge and practical skills are assessed. The theory examination paper is unified, and the closed book examination is organized by the department. The full score of the paper is 100, the examination time is 45 minutes, and the examination type is closed book examination. The practical skills assessment was scored using a unified operation score table, and the exam was supervised by two invigilators at the same

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time, and the theoretical and practical skills test scores were finally obtained. The theoretical and practical skills scores of the three groups of subjects were analyzed for significant differences.

### *2.3. Observation index*

(1) Teaching quality: The teaching quality assessment analyzed the improvement of enrolled students' interest, knowledge consolidation effect, literature search and learning, clinical thinking improvement, and doctor-patient communication ability improvement, all of which were evaluated according to yes or no, and the proportion of answers answered yes was summarized.

(2) Objective score: Each score is worth 100 points, the higher the score, the more ideal the score.

(3) Teaching satisfaction: including the number of very satisfied, relatively satisfied and dissatisfied cases.

(4) Knowledge mastery rate: students' knowledge mastery rate includes complete mastery, general mastery and non-mastery.

### *2.4. Statistical significance*

(1)The analysis data were analyzed using SPSS 23.0 software, with a percentage (%) to describe the counting data, and the comparison between groups was conducted by $\chi$(2)The measurement data were described by ($\bar{x}$ ±s), and the independent sample t test or paired t test was used for comparison between groups. P<0.05 was considered statistically significant.

## 3. Results

### *3.1. Teaching quality*

The improvement of students' interest, knowledge consolidation effect, literature search learning, clinical thinking improvement, and doctor-patient communication ability was better in group B than in group C than in group A, and the difference between groups was significant and statistically significant (P < 0.05).(As shown in table 1)

*Table 1:The improvement of students' interest, knowledge consolidation effect, literature search learning, clinical thinking improvement, and doctor-patient communication ability of the three groups of nursing staff (%)*

| Group | Number of cases | Student interest promotion | Knowledge consolidation effect | Document search learning | Clinical thinking enhancement | Improved doctor-patient communication |
|---|---|---|---|---|---|---|
| Group A | 34 | 21(61.8%) | 22(64.7%) | 20(58.8%) | 23(67.6%) | 21(61.8%) |
| Group B | 34 | 33(97.1%) | 34(100%) | 34(100%) | 33(97.1%) | 33(97.1%) |
| Group C | 34 | 26(76.5%) | 25(73.5%) | 27(79.4%) | 26(76.5%) | 24(70.6%) |
| P | | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |

### *3.2. Grade*

The scores of case analysis, clinical practice such as medical record writing, physical examination and basic theoretical knowledge were significantly different (P < 0.05).(As shown in table 2)

*Table 2:Comparative analysis of case analysis, clinical practice such as medical record writing, physical examination and basic theoretical knowledge of the three groups of students $\bar{x}$ (±s)*

| Group | Number of cases | Case analysis | Medical record writing | Physical examination | Basic theoretical knowledge |
|---|---|---|---|---|---|
| Group A | 34 | 70.22±1.65 | 69.88±1.62 | 71.48±1.72 | 79.23±1.28 |
| Group B | 34 | 83.25±1.46 | 86.33±1.75 | 89.66±1.55 | 93.11±1.64 |
| Group C | 34 | 77.26±1.35 | 73.42±1.19 | 81.54±1.08 | 85.33±1.63 |
| P | | <0.05 | <0.05 | <0.05 | <0.05 |

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### *3.3.Teaching satisfaction*

Teaching satisfaction of group B was better than that of group C than that of group A, $P < 0.05$.(As shown in table 3)

*Table 3: Teaching satisfaction of the three groups of students (%)*

| Group | Number of cases | Very satisfied | Relatively satisfied | Dissatisfy | Overall satisfaction |
|---|---|---|---|---|---|
| Group A | 34 | 9 | 15 | 10 | 80.0% |
| Group B | 34 | 22 | 11 | 1 | 97.1% |
| Group C | 34 | 16 | 12 | 6 | 82.4% |
| P | | - | - | - | <0.05 |

### *3.4. Knowledge mastery rate*

The knowledge mastery rate of group B was better than that of group C than that of group A, $P < 0.05$.(As shown in table 4)

*Table 4:Knowledge mastery rate of the three groups of students*

| Group | Number of cases | Complete mastery | General mastery | Not master | Knowledge mastery rate |
|---|---|---|---|---|---|
| Group A | 34 | 12 | 14 | 8 | 76.5% |
| Group B | 34 | 22 | 11 | 1 | 97.1% |
| Group C | 34 | 17 | 11 | 6 | 82.4% |
| P | | - | - | - | <0.05 |

## 4. Discuss

To become a qualified clinical medical worker, not only need to have perfect theoretical knowledge, but also need to continuously improve the personal level in clinical practice, closely combine the theory and practice content, integrate, and ensure that the comprehensive operation meets the needs of clinical development. According to the report, most highly effective medical students have completed systematic theoretical knowledge learning in the hospital, but they are unable to complete complex clinical diagnosis and treatment work in a short time. Especially in the general surgery department, there are more patients admitted to the department every day, the condition is complex, and the comprehensive level of clinicians is required to be higher. In order to ensure the degeneration of medical students to clinicians, it is imperative to implement standardized resident training. Another study pointed out that due to the limited teaching hours and practical operation of medical students during school, and the certain limitations of traditional teaching, students are lacking in the grasp of clinical theory and practical operation knowledge. When they come into contact with patients, especially complex cases, students often feel confused and fearful, which severely affects their initiative [5]. Therefore, during the standardized training of general surgery residents, attention should be paid to the teaching methods, novel teaching models should be selected to make up for the shortcomings of traditional teaching, and the quality of regular training should be actively improved to ensure the teaching effect. Under the traditional teaching method, teachers did not fully explain the basic medical courses during the course of teaching, but only took practical, sufficient and necessary as the main teaching principles, and paid more attention to the cultivation of students' operational ability and professional skills, resulting in the poor quality of the combined teaching of theoretical knowledge and practical skills. Based on this, this paper proposes to provide PBL teaching method and CBL teaching model for standardized training residents.

PBL teaching method is more novel in clinical practice, especially in the teaching of medical field, focusing on students' learning interests, taking problems as guidance and students as the main body of teaching, understanding the shortcomings of residents' training during the study, and providing effective guidance and teaching for residents in time. In addition, under the demand of China's teaching mode reform, the implementation of CBL teaching program can help students enhance their interest in learning, stop facing boring knowledge, and expand their scope of knowledge and understand deeper content. This teaching mode selects appropriate cases to introduce teaching contents during the application period, and puts forward problems related to the cases. It pays attention to students as the main body of teaching, teachers assist teaching, and improves the teaching atmosphere in the form of group discussion.

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According to other studies [6], the implementation of CBL teaching method is not only applicable to various disciplines, but also eliminates the boundaries between disciplines and prepares comprehensive content after raising questions, which can improve students' learning novelty and innovation, ensure students' learning enthusiasm and initiative, solve problems and complete teaching goals while understanding new knowledge theories. The experimental results of this paper show that the improvement of students' interest, knowledge consolidation effect, literature search learning, clinical thinking improvement and doctor-patient communication ability is better in group B than in group C than in group A, and there are obvious differences in the scores of case analysis, clinical practice such as medical record writing, physical examination and basic theoretical knowledge. The teaching satisfaction and knowledge mastery rate of group B were better than that of group C, and group C was better than that of group A. The difference between groups was significant and statistically significant ($P < 0.05$). It can be seen that the effect of only implementing traditional teaching mode or PBL teaching mode is not ideal. It is necessary to combine PBL teaching with CBL teaching program to fully improve students' learning enthusiasm and initiative, enhance students' academic performance, and have a high degree of teaching satisfaction.

In addition, in today's increasing demands on doctors, continuous learning is particularly important for doctors. The improvement of scientific research and teaching ability can affect the future development direction of residential training students, and is also an important part of improving the comprehensive quality of residential training students [7]. Therefore, during the standardized training and teaching of general surgery residents, teachers should pay attention to the cultivation of differentiated and hierarchical scientific and educational abilities, improve the paper analysis ability of students while ensuring their literature review and retrieval ability, and require them to read at least two high-quality papers per month. During this period, I guided residential training physicians to understand CBL teaching method and PBL teaching method, and gradually increased their interest in clinical topic writing. In this way, I cooperated with the teaching teachers to collect clinical case data, fully understood the composition and process of classroom content, and promoted the interest and enthusiasm of residential training physicians [8].

To sum up, the implementation of CBL teaching model combined with PBL teaching method to ensure teaching effect and teaching quality during the standardized training of general surgery residents can effectively improve students' learning enthusiasm and initiative, ensure teaching performance and improve students' teaching satisfaction.

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