Innovative Practice of Acupuncture Teaching based on Case-Based Reasoning

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Abstract

The purpose of medical education is to train professional talents with basic professional theoretical knowledge and skilled operation skills. Reform the traditional teaching mode of acupuncture and moxibustion, focus on classroom teaching innovation and practical teaching innovation, and pay attention to cultivating students' practical and innovative ability. The transformation of acupuncture teaching based on case-based reasoning into a flexible and vivid learning mode with students' learning as the dominant position is a necessary and feasible attempt in the teaching reform of acupuncture and massage specialty. Through students' different choices, they record their behaviors, thus "learning" the teaching sequence and requirements of knowledge points that students like, and becoming reusable "experience". Realize the dynamic explanation of examples and answer simple questions raised by students.

Keywords

Case reasoning; Acupuncture teaching; Innovation.

1. Introduction

Case-based reasoning (CBR) is a kind of machine learning and reasoning method, which stores the previous experience of solving problems in the form of cases and serves as a reference for future problem solving [1]. It has advantages in unstructured knowledge representation and is superior to rule-based representation in knowledge acquisition. Cognitive psychologists believe that classroom is a complex environment, and teachers often rely on past cases instead of general principles when dealing with emergencies or teaching problems. Case-based reasoning can be applied to the teaching field through hypermedia learning system [2].

Acupuncture and moxibustion, which is an important part of Chinese medicine and an essential part of Chinese medicine teaching, is a discipline that studies the use of acupuncture, moxibustion and other therapeutic methods acting on acupoints to regulate the meridians, qi, blood and viscera to prevent and treat diseases.

Acupuncture is a highly practical course, and the cultivation of practical and innovative ability of TCM students is the focus of higher medical education reform [3]. It is necessary to start with teaching reform, change the concept of education and teaching, improve the teaching mode and improve the teaching quality. The teaching method of integrated teaching has been applied to the field of medical education with the aim of integrating theoretical teaching with practical teaching. We have reformed the teaching methods in the teaching process of acupuncture and moxibustion. Case-based reasoning teaching method can narrow the gap between theory and practice, thus making up for the deficiency of students' clinical practice.
2. Case-based Reasoning

The main reason for the rise of CBR is that the traditional rule-based system has difficulties in acquiring knowledge, and can't make exceptions to cases, so its overall performance is very fragile. Combining knowledge teaching with clinical skill operation, and focusing on cultivating students' clinical operation ability and clinical diagnosis and treatment ability [4]. The essence of case-based reasoning teaching students' learning is a process of knowledge acquisition and transformation, that is, the external knowledge in books and cases is internalized through reading, memory and other learning activities, and transformed into stored and accumulated tacit knowledge.

The basic principle of CBR is shown in Figure 1. When a new problem is raised, it is first abstracted as a new instance, and then the closest instance (that is, the previous experience) is extracted from the case base, and its solution is adopted as the reference solution of the new instance. On this basis, examples are revised to meet practical problems.

![Figure 1. CBR reasoning cycle](image)

Case-based reasoning teaching can fully mobilize students' learning initiative, improve students' ability to analyze and solve problems, and cultivate team cooperation consciousness and cooperation ability in the process of case discussion. CBR reduces the difficulty of knowledge acquisition. It doesn't need to obtain accurate and abstract knowledge like rules, but directly uses knowledge fragments which imply that it is difficult to extract rules. It can not only learn positive experiences, but also learn negative experiences [5].

3. Innovative Ideas of Teaching

After graduation, students majoring in acupuncture are mostly engaged in acupuncture clinical or teaching work. They should not only understand the characteristics and clinical advantages of acupuncture, but also systematically and comprehensively grasp the basic theory of Chinese medicine and the specific operation of acupuncture. According to the patient's personal information and symptom information, combined with the theory of traditional Chinese medicine, the syndrome information of the patient and the explanation of the patient's symptoms are given, that is, "syndrome differentiation"; According to syndrome differentiation and drug characteristics, combined with predecessors' prescription experience, the prescription was prescribed and the corresponding treatment scheme was put forward [6-7]. On this basis, examples are revised to meet practical problems. The revised new examples and their solutions are stored in the case library to realize the learning of problem-solving experience [8].

After theoretical study, arrange long-term specialized clinical practice. The case analysis function can realize the analysis and evaluation of teaching cases, and the case solving function can retrieve the source teaching cases which are most similar to the cases to be solved in the teaching case database. Through the research and study of these similar teaching cases, the teaching case knowledge can be better shared and transformed. The most important point is
that they can also combine all kinds of diagnosis and treatment experience with the diagnosis and treatment of current diseases. Through this questioning case-based reasoning teaching method, students not only learn relevant theories and knowledge, but also learn how to think and make decisions in the face of complicated situations.

Case-based reasoning teaching is not divorced from textbooks, but helps students deepen their understanding of what they have learned and expand on the basis of book knowledge. According to the diagnosis of each group of students, the teacher makes the treatment teaching according to their diagnosis. In the process of observation and teaching, students should supplement their own diagnosis and make clear the key points of treatment. In the global teaching planning based on case-based reasoning, the previously adopted learning sequence of similar students' knowledge points can be used as a reference for the following learning sequence of students' knowledge points. Each student in each group is responsible for the circulation of one meridian, the operation of key acupoints, the indication and the explanation of acupuncture and moxibustion methods, and under the guidance of the teacher, the students carry out cupping and moxibustion operations one by one.

4. Innovative Classroom Teaching Mode

4.1. Problem Guidance, Clear Purpose and Strong Operability in the Treatment Process

After mastering the basic acupuncture techniques, students have a conceptual comparison. Clearly recognize a kind of basic acupuncture technique, which is flexible in operation and can treat different clinical diseases; For example, the application of lifting and inserting technique in acupuncture can make up and relieve diarrhea in treatment, and can also make up and relieve diarrhea. Set specific teaching routes, teaching methods, teaching materials and setting of teaching environment (such as background, music, etc); The teaching mode system of integration of theory and practice aims to train students’ clinical practical ability to combine with theory, integrate and sort out various teaching links, formulate adaptive teaching syllabus and teaching plan, and implement them through specially designed teaching links.

Experienced Chinese medicine experts can not only fully combine various theoretical knowledge of Chinese medicine in these two stages. This diagnosis and treatment experience can be transformed into case expression, so as to realize the intelligent diagnosis and treatment system of traditional Chinese medicine by case-based reasoning. Therefore, the idea of applying case-based reasoning technology to the development of TCM diagnosis and treatment expert system is put forward. The diagnosis model of TCM diagnosis and treatment expert system based on case-based reasoning is shown in Figure 2.

![Figure 2. Diagnosis model based on CBR](image)

In Figure 1, the patient information includes the patient's past medical history, daily living habits, physical signs, etc. The CBR reasoning machine conducts reasoning according to the
patient information and the information of four diagnosis symptoms, and the nearest case extracted from the diagnosis case database is sent to the case correction module, and the output after case correction is the diagnosis result of the current medical record.

Change the passive teaching mode in the past and set students as the main body. This can not only fully mobilize the enthusiasm of students to participate, but also promote students to find their own weak links in the participation, and find out their possible clinical deficiencies in advance, so as to make targeted corrections. Pay attention to the combination of practice and theory. In view of this topic, the purpose of the integrated teaching of acupuncture theory and practice is to better train medical talents in line with the current medical development direction within the specified class hours.

4.2. Training of Practical Ability

Students’ ability to apply theoretical knowledge and experimental skills to solve practical problems. At this stage, we focus on creating practical conditions for students, proposing experimental directions and problems to be solved, encouraging students to design experiments and operations independently or cooperatively, and submitting experimental analysis reports after completion. Modern medicine will have stricter requirements on the quality of doctors, and it is far from enough to instill theoretical knowledge into medical undergraduates. You can provide the memory and explanation of concepts first, and then provide examples and demonstrations; If the cognitive ability of “understanding” or “analysis” level is strong, examples can be provided to explain the concept first, and then a complete concept expression can be provided. Let students learn in practice, integrate practice and teaching organically, and make students master and improve clinical operation skills after building a strong interest in learning.

Case interpretation has two important purposes in TCM diagnosis and treatment expert system, one is patient-oriented interpretation, which is used to explain the causes of patients’ symptoms; Second, the explanation for system users, which can be further transformed into a case-based auxiliary teaching system of Chinese medicine. Whenever a student expounds his own point of view, the instructor will immediately put forward the counter-evidence and smash the student's point of view, unless the student's point of view is impeccable. It is precisely these counter-evidences that reflect the profound knowledge and strong thinking ability of teachers. It can be considered to adopt the same standards in the selection of evaluation forms and evaluation topics, so as to reflect students’ learning effects closest to their true abilities.

4.3. Reasonable Arrangement and Innovative Teaching

Only by clearly positioning and reasonably arranging courses, can we directionally select appropriate teaching contents in all Chinese medicine course contents, distinguish primary and secondary, and improve teaching quality [9]. Teachers can find the deficiencies in teaching by participating in students’ discussions, and give timely supplements and in-depth explanations. At the same time, they can tap the inherent potential of students’ learning and mobilize their initiative in learning. For the global teaching strategy, different learning types should set different knowledge point structure charts and their initial assessment requirements, and allow students to choose to learn from the learnable knowledge points. At the same time, the recorder records truthfully, including the whole disease treatment process. It is convenient to summarize after class.

Traditional teaching mode, acupuncture teaching is mainly taught by teachers, which affects students' subjective initiative. Acupuncture and moxibustion is a highly clinical course, and the simple passive acceptance traditional way is not conducive to the cultivation of students' clinical ability. Therefore, for teaching, which is a complex field, and for the solution of teaching cases, which is a special form of instructional design, this system allows teachers to directly
reuse similar cases (which can be multiple cases) retrieved and integrate useful solutions of old cases to find solutions to new problems. In case analysis, teachers usually don’t give standard answers. Even telling students what the decision-makers actually do in the case doesn’t mean that this is the only correct answer. Through this interactive feedback mode, the probability of misdiagnosis of the system is further reduced and the accuracy of the system is improved; At the same time, it is also helpful to improve the level of students who use the system.

4.4. Case Revision, Learning and Explanation

Because the extracted cases can’t be completely consistent with the problems to be solved, it is necessary to adapt the extracted cases according to the problems to be solved and some revised rules, in order to better meet the requirements of users. Ensure the running speed and efficiency of the system on the premise of ensuring the effectiveness of teaching cases. Student-centered teaching activities to help them find answers to questions emphasize problem orientation and process, and focus on cultivating their comprehensive practical ability to solve clinical problems; Instilling teaching often makes students pay attention to listening and recording, and it is easy to slip into the mud without analysis. Therefore, in the face of the differences of similar cases retrieved, it is difficult for the system to adjust and modify according to effective rules.

Compared with the traditional teaching method, the case-based reasoning teaching method puts forward higher requirements for both teachers and students. For example, taking care of one thing and losing the other, the choice of body position during operation, the choice and judgment of acupuncture depth angle; After the treatment, whether the articles can be classified in an orderly manner and the humanistic care for the patients can be achieved. Therefore, a very important part of the teaching strategy model based on case-based reasoning is the teaching rule base. The rules in the base should not be specific learning sequences of knowledge points or specific teaching routes and teaching methods, but should be general and universal guiding rules. In the specific operation training, students are divided into several groups, and students stick needles and moxibustion with each other, so that students have the feeling of practicing in person, with high interest in learning and good results.

5. Conclusions

The teaching strategy model based on case-based reasoning is the embodiment of “student-oriented” teaching thought, and the records of students’ behaviors under the control of certain general teaching rules are taken as teaching strategy cases. Attach importance to students’ main role; There is more than one answer, which encourages students not to stick to existing concepts and actively explore; Teachers apply the case solutions recommended by the system to their own teaching practice after proper modification, which reduces the difficulty of teaching scheme design and duplication of work. Let students divide into groups to point on the human body, so as to achieve the teaching goal, and improve the clinical operation ability by acupuncture, cupping and moxibustion at some commonly used acupoints. Teaching reform is a systematic project. Only when schools, teachers and students actively participate in it can the reform of teaching methods achieve practical results.

References


