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Exploration and Reflection on the Integration of MDT with CBL in Undergraduate Clinical Education Based on the Organ System-based Teaching Model

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Abstract: *This paper discusses the application of organ system integrated teaching model combined with multi-disciplinary team (MDT) and case-based learning (CBL) in undergraduate clinical teaching. This teaching model aims to overcome the limitations of the traditional teaching model and promote students' active learning, clinical thinking and teamwork ability by integrating interdisciplinary knowledge and taking typical clinical cases as the guidance. This article describes the implementation strategy of this model, emphasizes its important role in cultivating high-quality medical talents, and provides a new idea and direction for undergraduate clinical teaching.*

Keywords: *Organ-Systems-Based Curriculum, Case-Based Learning, Multi-Disciplinary Team*

1. Introduction

The Organ-Systems-Based Curriculum (OSBC) model was proposed in 1952. This curriculum model follows the internal organic connection between medical courses, attaches importance to the penetration, horizontal cross and integration between courses, weakens the discipline boundaries, integrates the curriculum content, emphasizes the integrity of the knowledge system, pays attention to the cultivation of students' ability to solve problems with comprehensive application of knowledge, solves the problems of duplication among courses, and strengthens the connection between basic courses and clinical courses [1]. The "organ system-based" medical education reform is the key direction of teaching reform in international and domestic medical colleges. Medical educators at home and abroad have made a lot of exploration and practice on the organ system-based medical education reform, and have achieved certain results [2]. Clinical teaching is carried out in the process of clinical diagnosis and treatment, and the setting of clinical departments is not consistent with the organ-system integrated teaching curriculum. Therefore, several teachers from each clinical department can be selected to form a teaching team to share part of the integrated curriculum. How to truly realize the consistency of clinical department setting and organ system teaching reform curriculum from the system and mechanism is the bottleneck problem to be explored and solved.

Case-Based Learning (CBL) in clinical teaching is based on real clinical cases and has shown significant advantages in cultivating the clinical thinking and practical ability of standardized training doctors by encouraging students to actively analyze and solve problems [3]. As an innovative diagnosis and treatment mode, Multi-Disciplinary Team (MDT) integrates multidisciplinary resources, breaks disciplinary boundaries, and provides patients with comprehensive and personalized diagnosis and treatment plans, which significantly improves the effect of clinical diagnosis and treatment [4]. This article discusses the application of MDT model combined with CBL teaching method in undergraduate clinical teaching based on organ system integration teaching model.

2. The establishment of curriculum and the selection of curriculum model

2.1 Reform and innovation of multi-disciplinary integrated curriculum and construction of integrated curriculum based on organ system

To realize the transformation from discipline-centered to organ-system-based interdisciplinary integration teaching mode[5], and integrate clinical departments according to organ system. It is

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integrated into a clinical diagnosis and treatment center for circulatory system diseases, respiratory system diseases, digestive system diseases, nervous system diseases, blood system diseases, endocrine system diseases, reproductive system diseases, urinary system diseases, bone and joint motor system diseases. Establishment of clinical medical technology and skill training center. The management team of each department was integrated at the center. The key is to set up a clinical teaching and research section consistent with the clinical diagnosis and treatment center. As a bridge between medical education and clinical practice, the teaching and research section should be committed to promoting the deep integration of theory and practice, as well as the intersection and integration between disciplines [6]. The teaching and research section is responsible for formulating unified teaching standards, including teaching objectives, teaching content, teaching methods, teaching evaluation and other aspects, to ensure the consistency and stability of teaching quality. Regular training and communication activities were organized for clinical teachers to improve their teaching level and clinical practice ability, and promote communication and cooperation between disciplines. Establish a resource sharing mechanism, including teaching materials, clinical cases, research results, etc., to promote resource sharing and cooperation within and across teaching and research departments. Communicate with the clinical diagnosis and treatment center, understand the actual clinical needs and development trends, and adjust the teaching content and methods in time.

2.2 Combined use of teaching methods to implement curriculum construction strategies

Clinical practice is the application stage of comprehensive medical knowledge and the most basic stage to cultivate qualified doctors with solid theoretical basis, superb clinical skills and humanistic care spirit [7]. This is inseparable from the flexible use of a variety of teaching methods. CBL teaching method can be traced back to the dialogue teaching concept of the ancient Greek philosopher Socrates, which builds a bridge between theory and practice for students through real or fictional clinical cases [8]. With clinical relevance as the core, it emphasizes problem-oriented, group cooperation, autonomous learning and emotional connection, aiming to comprehensively cultivate students' clinical thinking and autonomous learning ability. The case-based teaching method, which is close to clinical practice, can stimulate students' learning interest and motivation. By participating in case discussions, students can have a deeper understanding of clinical problems, so as to be more active in learning [9]. However, the CBL teaching method also has some shortcomings, such as the strong interdisciplinary in the field of medicine, and it is difficult for students to fully grasp the case in a short time and put forward preliminary diagnosis opinions, which further increases the difficulty of application of CBL teaching method in clinical practice.

In recent years, the MDT diagnosis and treatment mode emphasizing patient-centered and multidisciplinary team cooperation has gradually become the mainstream of the development of medical field. With the continuous improvement of medical education and the continuous innovation of teaching methods, more and more medical institutions have begun to integrate MDT model into clinical teaching practice, and have achieved remarkable results [10]. Breaking the knowledge barriers between various disciplines, so that medical students can adapt and integrate into the actual working environment faster. Teachers from multiple departments participated together to form an interdisciplinary teaching team, which solved the limitations and one-sidedness that may be brought by single discipline teaching. It is helpful to cultivate medical students' clinical comprehensive diagnosis and treatment thinking, and promote the organic integration and transformation between basic medical knowledge and clinical diagnosis and treatment ability. By simulating real clinical scenarios, students can face complex clinical cases, so as to exercise and improve their clinical practice ability in practice. This teaching method encourages students to use their knowledge to solve practical problems and helps to shorten the distance between theory and practice. Guide students to understand and master the knowledge and technology of different disciplines. Students can learn how to integrate knowledge from different disciplines to form a comprehensive clinical diagnosis and treatment plan during the discussion of specific cases [11].

3. Set up a teaching team, strengthen collective lesson preparation, and implement the integration of curriculum content

According to the needs of the course of organ system diseases, a new interprofessional teaching team is set up. This team will break the traditional discipline boundaries and gather excellent teachers and teaching backbone from different specialties and departments. They will not only have deep professional knowledge, but also work together to integrate interdisciplinary concepts and methods into

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the teaching of organ system diseases, so as to provide students with a more comprehensive and in-depth learning experience [12]. Members from different departments within the group worked together to develop teaching plans, case studies, and teaching methods. A resource sharing platform was established, including teaching materials, case database, research results, etc. Members are encouraged to upload and share their own teaching resources to facilitate knowledge sharing within the team. According to the teaching objectives and the expertise of the members, the detailed curriculum content and teaching methods are planned. Ensure that the curriculum covers all aspects of organ system disease, including pathophysiology, diagnosis, treatment, and prevention. Team members are encouraged to attend training, seminars, and academic conferences etc. to stay informed about the latest advances in the medical field. To promote knowledge sharing and experience exchange among team members, and jointly improve the teaching level.

In clinical teaching, the collaborative preparation of various departments is a complex but crucial process, which helps to integrate the professional knowledge of different departments and provide students with a more comprehensive and in-depth learning experience. Each department should discuss and determine teaching objectives together to ensure that the content of lesson preparation is consistent with the syllabus. According to the professional fields of each department, the task of lesson preparation was reasonably distributed. Ensure that each department is responsible for what it is good at, while considering the convergence and intersection with other departments. Regular meetings were arranged for representatives of various departments to share the progress of lesson preparation and discuss problems and solutions. The teaching resources of each department, such as case database, pictures and videos, were integrated to form rich and diverse teaching materials. These resources can help students better understand disease knowledge and improve learning interest.After the integration of the lesson preparation content, a unified teaching plan was made, and the teaching progress, teaching methods and evaluation methods were clarified. The teaching plan should take into account the actual situation and learning needs of students to ensure the pertinency and effectiveness of teaching. They should be cross-checked to ensure the accuracy and completeness of the content. During the review process, suggestions for changes can be made to optimize the lesson preparation content.

4. Key points and implementation plan of the curriculum

The goal of CBL course is to consolidate and deepen the knowledge of disease diagnosis and treatment learned in the past, master the clinical decision-making thinking skills of "selecting the best in multiple schemes", and use the clinical decision-making thinking skills learned to formulate individualized treatment plans for specific specialized disease patients [13]. The key and difficulty of CBL teaching is the content of the course case and the design of guiding questions. Based on the complete medical records, CBL courses should design guiding questions for multiple decision-making links, and guide students to discuss different levels and different types of problems in multiple steps. In the discussion of the choice of treatment, the focus should be on learning the logical relationship among the decision conditions, treatment methods or programs, and decision rules. The completeness of the case data needs to meet the implementation of the teaching curriculum.

Typical cases were selected and combined with case teaching method to create a teaching plan in line with the concept. Taking case analysis as the breakthrough point and clinical problems as the orientation, students were guided to learn knowledge of a disease system with problems [14]. In the course of teaching, the students were asked to answer the preset questions using the knowledge they had learned, so that they could enter the simulated clinical environment and deepen their understanding of the knowledge they had learned. The detailed knowledge of various treatment methods of a disease is placed in the appendix of each chapter, which is conducive to the students to consult the specific implementation of the treatment plan. To summarize the principles of diagnosis and treatment of a disease, so as to make students' understanding of disease diagnosis and treatment more clear. Guide students to access the latest literature and cultivate students' innovative thinking in scientific research [15].

The MDT classroom teaching method has changed from the traditional single classroom teacher to the multi-classroom teacher closely related to a certain disease. It is necessary for multiple teachers of different specialties in the MDT team to enter the same classroom. According to typical teaching cases, teachers of different specialties teach the content of their own specialties, guide students to speak actively, mobilize students' enthusiasm, and improve students' understanding of the disease. Simulation of MDT allows students to experience the clinical MDT process and deepen their understanding of MDT. At the end of the corresponding teaching chapters, "simulated MDT" corresponding to the

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teaching content can be organized. The cases of MDT were assigned to the students, and the students were divided into groups, each group representing an expert group of a department. After the prescribed preparation time, the teachers organized and guided the students to actively speak in the simulated multidisciplinary consultation, and gave the best treatment plan for the patient's current condition. The teachers gave opinions and guidance for the students' performance. This method can enable students to sublimate theoretical knowledge and strengthen clinical thinking in the process of simulating real clinical practice, promote them to find their own shortcomings, and stimulate their learning motivation. At the same time, students are encouraged to actively consult books, read the latest discipline progress and other relevant literature to improve their mastery of knowledge, and help them establish keen clinical thinking. We should give full play to students' initiative, encourage students to express different views, emphasize the flexible use of basic theoretical knowledge, pay attention to the cultivation of clinical thinking, and give consideration to information retrieval, grasp cutting-edge knowledge, and form innovative spirit [16]. At the end of the discussion, the teachers summarized the related problems, pointed out the shortcomings, and put forward suggestions for improvement.

5. Optimize the assessment and evaluation mode

The traditional assessment model mainly includes theoretical knowledge assessment and skill assessment, while the new teaching model requires students to not only master theoretical knowledge, but also be able to correctly analyze real clinical cases and make treatment decisions [17]. Under the new teaching model, the examination forms include adding case discussion questions to the examination paper. Participated in clinical MDT discussions and expressed opinions, and wrote case analysis reports. Writing disease-related reviews. MDT case discussion questions were used as the key assessment form. Students were asked to participate in clinical MDT consultation to make the best comprehensive treatment decisions for patients, and write case analysis reports, including disease overview, diagnostic basis, treatment plan, etc. Through the writing of analysis reports, students' analytical ability, logical thinking ability and written expression ability were evaluated. Teachers gave comments and suggestions on students' decision-making to further improve students' knowledge level and clinical thinking. Because of the rapid development of clinical diagnosis and treatment technology and the constant update of knowledge, students can be encouraged to understand the latest progress of the discipline and improve their ability to access literature by writing reviews. The evaluation methods were combined with various methods to comprehensively evaluate the learning effect and clinical ability of the students. First, MDT was used to evaluate the students according to the requirements of post competency by several senior specialists. The evaluators directly observed the discussion process of the students and scored them separately. Objective structured case analysis (OSPE) was used to evaluate students' clinical thinking ability, diagnosis ability and treatment planning ability by providing case data and related questions. 3. Students are required to write a self-reflection report to review and summarize their experiences, gains and problems in the learning process. Students deeply reflect on their own learning, identify their strengths and weaknesses, and make improvement plans. At the same time, teachers can also understand the learning situation and psychological state of students by reading students' reflection reports, so as to provide a basis for providing personalized teaching guidance. Fourth, in group discussion or case analysis, peer review can be used to allow students to evaluate each other's performance. This approach can enhance students' sense of participation and responsibility, while also helping them learn from each other and draw on experiences. A questionnaire survey was conducted to evaluate students' satisfaction with the teaching effect. The contents of the questionnaire included: the stimulation of learning interest, the subjective initiative of learning, the ability of knowledge extension, the improvement of clinical thinking ability, the ability to guide healthy life style, the ability to deal with complications, the ability to guide the rehabilitation of patients, the ability of rational use of drugs, the awareness of team cooperation and the willingness to accept this teaching method. Feedback was formed for the new teaching model.

6. Conclusion

The traditional teaching model is teacher-centered and focuses on one-way teaching. Students are often in a state of passive acceptance of knowledge and lack of opportunities to actively participate in discussions and put forward personal opinions, which directly limits students' initiative, enthusiasm and participation in learning. In terms of clinical practice teaching, the traditional model focuses too much on the training of a single skill and ignores the cultivation of students' overall clinical thinking ability, clinical decision-making ability and team cooperation ability, which is difficult to meet the demand for

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high-quality medical talents in the modern medical field [18].

In order to overcome these limitations, organ-system-centered teaching model began to explore new teaching methods. The case-based learning (CBL) method was based on typical clinical cases, combined with the characteristics of organ systems, and students were organized to conduct group discussions. Through in-depth analysis of the structure and function of organ systems involved in cases, the occurrence and development of diseases and the treatment process, students can better understand the relationship between diseases and organ systems and improve their clinical practice ability [19]. At the same time, the group discussion also cultivated students' teamwork spirit and communication skills. As a leading concept in the field of modern international medicine, MDT diagnosis and treatment mode is also suitable for organ-system-centered teaching. MDT model is aimed at specific diseases, based on evidence-based medicine, and integrates the wisdom of multidisciplinary experts to jointly formulate the best treatment plan for patients. The introduction of MDT model in teaching can help students break the limitation of a single discipline and achieve interdisciplinary knowledge integration [20]. By participating in the discussion and practice of the MDT team, students can have a more comprehensive understanding of the relevant knowledge of organ systems and the clinical decision-making process, and improve their clinical thinking ability and teamwork ability.

The organ-system-centered teaching concept was combined with MDT and CBL models to form a new teaching model. This model not only makes up for the shortcomings of the traditional teaching model, but also stimulates students' enthusiasm for active learning and strengthens the cultivation of team cooperation spirit. In the process of participating in team discussion and collaboration, students learned how to communicate and collaborate effectively with others and solve clinical problems together. These skills are essential for future teamwork and patient management in clinical work. At the same time, with the continuous progress of medical technology and the transformation of medical model, medicine will pay more attention to interdisciplinary collaboration and individualized treatment in the future. MDT combined with CBL teaching method can cultivate students' interdisciplinary collaboration spirit and individualized treatment thinking, so that they can better adapt to the development needs of future medicine.

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