Vol.1 No.10 2020
https://doi.org/10.37420/j.cer.2020.112

Probe into the Reform of Sports Anatomy Based on PBL Mode

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Abstract: *Sports anatomy teaching is undoubtedly of importance for physical students, whose methods however are controversial at present. This article explores how problem-based learning (PBL) was used in sports anatomy teaching as a way to supplement traditional sports anatomy teaching. First, an analysis is made of the problems occurring in the present sports anatomy teaching of China. Second, the feasibility of introducing the PBL mode into sports anatomy teaching is presented, and PBL teaching process is introduced. Third, PBL may foster skills and competencies related to the combination of theory and practice. In this case, specific implementation is summarized. Finally, future directions for research on PBL are suggested to explore its benefits to sports anatomy.*

Keywords: *PBL teaching mode; Sports anatomy; Physical education; Teaching methods*

Introduction

As an important basic theoretical course of physical education, sports anatomy has long been mainly given by teachers. With the implementation of teaching reform, the original teaching model has gradually presented its limitations. Currently, how to help students to gain more knowledge in a limited time, learn better and improve their learning effectiveness is an urgent problem to be solved in sports anatomy. In the sports anatomy courses for Chinese sports majors, the content of textbooks is mostly set in the mode of medical schools, focusing on the knowledge of human anatomy and neglecting practical content. It has been found that traditional sports anatomy teaching methods have obvious weaknesses, including centering on teachers, excessively depending on rote learning and failing to combine basic knowledge with physical training (Chang, Jiang, 2018). In traditional sports anatomy teaching, the large-class teaching mode is generally adopted and on the basis of didactic lectures and dissection classes which are full of slides from two-dimensional (2D) static anatomical illustrations to demonstrate structure and function. However, students often feel bored, difficult to master knowledge, dull and unable to achieve good results if teachers provide a great amount of information too fast during a lecture. The poor recall or comprehension of sports anatomy or the incapability of applying theory to practice is likely to affect the follow-up course learning, physical education teaching and physical training of physical education students, and lead to the detrimental public cognition of this profession. Complex in content, highly specialized, extensive and in-depth, sports anatomy contains a large number of professional terms, which is thus difficult for students majoring in Physical Education. Apparently, it is always hard for physical students to understand and retain information on sports anatomy and apply it to physical practice. In spite of claiming to like and have interest in sports anatomy, physiology and related subjects, a lot of students perform poorly in these subjects. Based on the current situation, it is necessary for

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teachers to reduce students' burden of memorizing factual materials and details, teach them more concepts and principles, improve their ability to study independently and solve problems, increase their combination of theory and practice, and interact more frequently with students. The goal of teachers is to help students to study actively rather than passively, which will be beneficial for students to acquire life-long learning and problem-solving skills. Therefore, it is worthwhile to further think about how to adjust teaching methods to guide the active rather than passive learning of students and explore a subject according to their own interests.

Despite its wide application in many disciplines, the problem-based learning (PBL) teaching model is in the exploratory stage in the teaching of sports professional theory courses, especially sports anatomy, which can develop the skills of students in communication, teamwork and critical thinking. Barrows held that PBL contains the important elements of 'Centering on students, learning involves small group teaching; facilitators provide guidance for these small groups; the acquisition of new information relies on self-directed learning; problems serve as a vehicle for developing clinical problem-solving skills' (Barrows, 1996). PBL makes use of real or simulated case scenarios. Integrating the knowledge learned by them into their knowledge base and bearing it in mind for future reference, students attach importance to combining theory with practice and improve their retention and comprehension of content (Mayner, Gillham & Sansoni, 2013). Aimed at developing effective critical thinking and problem-solving skills, enabling learning in a relevant context, encouraging skills related to work and promoting self-directed learning (Mete & Sari, 2008). PBL should enhance the ability of students to integrate knowledge, which is consistent with the goal of teachers. To help students to study actively rather than passively, PBL pedagogy is different from the conventional lecture format and emphasizes small facilitation groups where all learning is based on problems. Emphasis is laid on inquiry and activities which are self-directed and center on students. This strategy basically involves advance preparation, team construction, readiness assurance testing as well as group application exercises and evaluation (Ganske, Su, Loukas & Shaffer, 2006). It is obvious that a shift takes place from 'traditional' education centering on teachers, depending largely on lectures and regarding students as passive information recipients to 'innovative' education centering on students and focusing on the active and self-directed learning of students working individually or in groups (Bergman, Prince, Drukker, van der Vleuten & Scherpbier, 2008). Therefore, students can be allowed to start from problems (related to sports) for learning and seek relevant knowledge and solutions from it. According to the criteria underpinning this learning and teaching method centering on students, learners need to equally reflect on their enquiry skills and knowledge accumulated. Working in groups and breaking problems into several parts, students communicate with classmates, make an attempt at identifying their knowledge and need to address problems. Hence, it is considered that PBL is helpful in cooperative learning because students solve problems and discuss ideas by working together (Dangerfield, 2006). PBL centers on students rather than teachers. Working in small groups enables students to identify and resolve the deficiencies in their knowledge through the application of four learning concepts in PBL, including constructive, self-directed, collaborative, and contextual learning (Kilroy, 2004), thereby making it necessary to apply this teaching method to sports anatomy for proper analysis.

In view of current sports anatomy, it was proposed that an interactive teaching mode—PBL should be introduced into sports anatomy teaching to emphasize the association between the content of sports anatomy and physical training in the process of combining theory with practice.

Organization and Implementation of PBL Teaching in Sports Anatomy

In this research, PBL is a problem-based teaching method where students are the main body, problems are the core, and learning content is designed to find solutions to these problems, and which emphasizes the full integration of teaching practice, namely neither too much control nor indulgence in the independent exploration of students. Teachers are required to have good ability in providing guidance, designing teaching activities and controlling students in the classroom as the decomposers of teaching goals, the proposers of problems, the designers of teaching activities and the evaluators of teaching. Specific links of PBL teaching are as follows:

Problem Design and Presentation

The design and presentation of problems are the keys to implementing the PBL teaching mode. Problem-driven teaching is conducive to combining the theoretical knowledge of books with practical problems and cultivating the speculative ability of students. The design of problems requires teachers to make adequate preparations and needs to reflect the syllabus. The topics selected are enlightening, interesting and close to daily life or sports practice. In addition, some questions requiring comprehensive thinking need to be chosen to cultivate students' innovative and problem-solving ability. For example, teachers can ask questions about the definition and cause of tennis elbow, sports prone to cause tennis elbow and ways to prevent it when talking about the structure of the humerus. When it comes to the structure of the scapula, teachers can raise questions about the definition of scapula protraction and winged scapula, their difference, the cause of formation and ways to deal with them. The PBL model developed around teaching problems is more conducive to stimulating the learning interest of students, enhancing their learning motivation and improving their learning initiative, active thinking and ability to discover and solve problems.

Group Discussion and Cooperative Learning

Prior to this study, teachers need to inform students of some specific information, including the core content and implementation process of PBL, precautions and ways to find literature and resources (virtual resources, interactive three-dimensional (3D) models and video atlases), etc. According to the special sports and intentions of students, they should be divided into small groups (four to six) to ensure their quality, effectiveness and equality in order to achieve required learning objectives. Questions carefully prepared by teachers were conveyed to group representatives well in advance of the course date. Group representatives clearly divided work among group members and organized them to extensively collect information on those questions. Students were provided with adequate out-of-class time to first read, get familiar with materials and discuss questions in groups, and in-class time to work in small groups and utilize the 'jigsaw' strategy of piecing together the findings of separate groups. Each group cooperated to present solutions and realized sharing between groups, contributing to the multi-dimensional discussion and the mastery of core issues. Teachers created situations around questions, provided resources and learning support, and actively guided students to understand questions, pay attention to subject knowledge itself, combine the theoretical knowledge of books with practical problems and cultivate their thinking ability. In the learning process of

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discovering and solving problems, students activated original knowledge and acquired new knowledge by means of cooperative learning and independent exploration.

Evaluation and Summary

Each study group elected a representative to explain the preliminary plan of anatomy in the form of a PowerPoint (PPT) report and paper manuscript. After the completion of reports, evaluation adopted three methods including self-evaluation, peer review and teacher evaluation, and involved six aspects, namely the novelty of content, the level of PPT production, the ability of language expression, the situation of question answering and teamwork as well as the degree of participation. In order to reflect team collaboration, evaluation is generally associated with group achievement rather than individual performance. The process of evaluation is as follows. Under the guidance of the teacher, the members of each group discussed and spoke around questions. Each group raised questions and suggestions on presentation content, engaged in inter-group interaction, helped to break cognitive limitations, promoted in-depth interaction, and evaluated the performance of other groups separately to achieve inter-group evaluation. After discussion, the teacher made a summary, affirmed the achievements of each group member, analyzed the doubts and difficulties in solving problems, and pointed out shortcomings, which not only increased the interest of students in learning but also improved their reasoning and communication skills.

Key Problems and Solutions to the PBL Teaching Mode in Sports Anatomy Teaching

The traditional learning model focusing on “teaching” and “classroom” cannot meet the demand of society for talents and the individual needs of students anymore. How to effectively combine traditional teaching with PBL teaching to construct a sports anatomy learning model meeting the needs of realistic teaching? In the process of making such a combination, matters needing attention were expounded through the following aspects.

Coordinate the Combination of PBL and Traditional Teaching

Teaching is supposed to combine PBL and traditional teaching modes. The development of PBL requires students to have a certain knowledge structure and thinking ability. When carrying out PBL learning, teachers still need to teach systematic knowledge through lectures, case and situational teaching as well as group discussions. With regard to the content of important chapters, teachers attempt to use the PBL teaching mode to further discuss and solve selected key content and achieve knowledge consolidation. PBL does not require its implementation in every part of the subject, but emphasizes the integration of course essence into PBL learning so that PBL and traditional learning can complement each other and achieve complementary advantages. It is worth noting that PBL calls for a great deal of time and energy. As a result, teachers should carefully select content, which will otherwise lead to insufficient input of students and reduce the implementation effect.

Precautions for Teachers

Teachers should have an in-depth understanding of the PBL teaching model and be clear about their role transformed from a "translator of knowledge" to a "facilitator of learning", whose main task is to organize and guide the learning process. The PBL teaching mode has higher requirements for the quality and teaching skills of teachers. According to Mete et al., the behavior of teachers is a major factor affecting the successful delivery of PBL, which highlights the necessity of developing PBL facilitators (Mete & Sari, 2008). Students' input and sense of gain vary greatly and depend on the expertise, resources and technical skills of students, which thus makes it necessary for teachers to continuously improve themselves according to the requirements of information. The process design of PBL is neither tolerant nor detailed. Question selection should be of appropriate difficulty. A study found that the application of PBL teaching by teachers will be affected by teaching tools, school contextualization, project characteristics, the roles of teachers and students, and obtained results (Gómez-Pablos, del Pozo & Muñoz-Repiso, 2017). Teachers should create a favorable learning environment for the effective implementation of these active learning methods. Nevertheless, it must be kept in mind that the introduction of PBL aims to foster the ability of students in applying what they have learned instead of helping them to acquire a vast amount of knowledge. Compared with other approaches, PBL should propel students to integrate knowledge, transfer concepts to new problems, apply basic scientific concepts to clinical problems, show intrinsic interest in subject matters, develop skills to tackle problems, learn how to learn, realize self-directed learning and have a motivation for lifelong learning (Monkhouse, 1992; Dahle, Brynhildsen, Fallsberg, Rundquist & Hammar, 2002). Therefore, it is a must for teachers to adopt an important teaching mode to instill professional values such as teamwork, reflective practice and explicit professional teaching by use of case scenarios.

Adjust the Time of Sports Anatomy Teaching

The current teaching of sports anatomy course adopts a variety of teaching methods such as questioning, heuristics and multimedia, but it is impossible to carry out active classroom discussions due to the limitation of teaching hours. Now, courses still adopt traditional teacher-centered teaching methods. Throughout the learning process, students are lacking in the ability to actively think about and solve problems. Requiring more time and energy than traditional teaching, PBL teaching will increase the preparation and teaching time of teachers and the after-class time of students, thereby making it necessary for teachers to do a good job in time management in advance and make reasonable arrangements according to teaching content. Therefore, a foundation should be laid for the successful implementation of PBL teaching reform by appropriately adjusting the teaching hours of sports anatomy and reasonably allocating the time of theoretical, experimental and PBL teaching.

Supporting Hardware Conditions

Sufficient teaching resources are required by the PBL teaching model so that students can maximize information resources about related issues, including a variety of teaching facilities and equipment like laboratories and libraries in addition to some software resources such as books, teaching and research networks, audios and videos. In particular, 3D anatomy has been gradually put into use in medical laboratories

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with the development of virtual reality, whose application however has been adopted in most areas because of high prices. Therefore, the country should increase investment in education and strengthen the development of related teaching resources and the construction of school hardware facilities so as to provide students with a better learning environment and more abundant learning resources.

Establish an Assessment System Compatible with PBL Teaching

At present, the assessment of teaching effectiveness adopts a combination of the final exam and usual results. Accounting for 70% of the total score, the final exam is a unified exam for the entire course after its completion and taken in a closed-book format. Due to the long teaching process, the majority of students take the exam with short-term memory, which is not beneficial to correctly assessing the true level of students. PBL teaching cultivates the ability of students in many aspects. In general, it is not comprehensive enough to test and evaluate students through their answers in the written tests of traditional courses. The assessment of the PBL mode can be based on the number of speeches, the review of quality and data, and the written reports of students in each seminar to conduct a comprehensive assessment on basic concepts, problem-solving ability, methods, ideas and discussion activities. The PBL model can be classified into modules for decentralized evaluation, encouraging students to make persistent efforts. Therefore, teachers should establish a reasonable evaluation system to avoid the simplification of evaluation methods.

Conclusion

In the teaching process of sports anatomy, teachers need to carry out the reform of sports anatomy teaching according to the teaching mode and characteristics of the course, the actual situation of students and the teaching environment. The integration of traditional and PBL teaching provides a new idea for the curriculum reform of sports anatomy teaching. In the future, case-based learning will be combined with the use of high-quality network resources for sports anatomy teaching.

Funding

This work was supported by the School-level Teaching Reform Research Funding of the Hunan University of Science and Engineering [No. XKYJ2018028].

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