Application of 3D Head and Neck Model in Clinical Teaching of Otolaryngology

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Abstract: Abstract: Specialized endoscopic techniques in otolaryngology, head and neck surgery are one of the indispensable and important techniques for the diagnosis and treatment of specialized diseases. Endoscopic techniques have been rapidly developed in recent years, and the use of minimally invasive endoscopic techniques is the preferred technique in otolaryngology, head and neck surgery. With the development of science and technology, minimally invasive technology has been continuously developed and improved, and has been widely used in the treatment of various diseases, such as early malignant tumors, and other diseases can be treated with minimally invasive endoscopic surgery. Therefore, endoscopic minimally invasive teaching is particularly important in specialized clinical teaching. In the current teaching work, the teaching mode is constantly innovating. In actual teaching, in order to improve teaching effects such as ear, nose, throat, etc., the 3D head mold method can be used in actual teaching to complete scientific teaching work, exercise students' clinical practice effects, and explore the advantages of the 3D head mold method, thereby improving students' interest and practical ability in specialized learning.

Keywords: Endoscopic Technology; Practical Teaching; Anatomy; Educational Model; 3D Head and Neck Model; Advantage Exploration

Introduction

Otolaryngology Head and Neck Surgery is a comprehensive discipline for the diagnosis and treatment of ear, nose, pharynx, larynx, head, and neck diseases. During the learning process, it is necessary to correctly master its internal structure, and understand the physiological and pathological characteristics of the patient's diseased structure. The primary method used in conventional teaching models is to teach students through a plan. However, due to the relatively detailed content and complex structure of the ear and nose, it is difficult to learn and treat. Considering that traditional graphic teaching techniques cannot help students quickly grasp various difficult content, it is necessary to consider the characteristics of deep, distant, and refined teaching work in teaching work. During the learning process, students do not have most practical opportunities, so their learning is relatively slow. The 3D headform teaching method can change the problems existing in traditional teaching. Students can not only use the planar learning method, but also obtain three-dimensional display and students. Moreover, through model construction, students can have practical opportunities to improve the overall teaching quality and lay a solid foundation for the development of student teaching work.

1. Advantages and current status of virtual simulation technology

1.1 Advantages of virtual simulation technology

The principle of virtual simulation technology is to use computer technology to simulate a new environment, which can create and experience virtual reality three-dimensional dynamic scenes, cooperate with modern computer simulation systems,

and carry out practical teaching work. The use of simulation technology requires integrating various image data, creating a virtual reality world through computer technology, and more importantly, creating realistic visual, auditory, and tactile contexts. Through various interactive sensing devices, surgical instruments can simulate virtual human organs to meet the requirements of surgical training. In medical teaching, the traditional teaching methods used by teachers are mostly planar structural anatomy, which makes it difficult for students to view and learn various contents and cannot quickly grasp various knowledge points. Moreover, it is not possible to deeply study the spatial thinking relationship between the positions of various local anatomical structures and the surrounding vascular tissues and organs, and it is not possible to integrate diagnosis and related surgery. Affected by external issues, there are hot and difficult issues in medical teaching.

With the rapid development of society, people's living standards are constantly improving, and medical teaching work is also continuously developing. Currently, virtual simulation technology can achieve a high degree of restoration of various scenes. Through virtual reality technology, it can simulate ear microsurgery situations, conduct clinical exercises on various surgical operations, and teachers can guide, correct, and comment on students nearby. To train students to master correct surgical methods, improve the skills of using various surgical equipment, and prevent injuries to patients during the treatment process. The use of this technology can achieve a solid anatomical effect to a certain extent. Due to the development of tools such as the network information era and various small programs, more and more 3D model-related software has been developed and used. Through the extensive use of virtual reality technology, medical students can exercise their skills, strengthen psychological training, and improve their understanding and memory of anatomy.

The use of 3D virtual simulation technology enhances the learning effect in medical research, while making learning more convenient and three-dimensional for students. Students have significantly improved their mastery of anatomical structures, completing their understanding and memory of specialized knowledge. The anatomical structure can be more profound and coherent. Combining specialized virtual simulation technology teaching to further enhance students' interest in learning knowledge and ensure that students have interest and enthusiasm in learning medical knowledge. At the same time, through a large amount of training, it can ensure that medical students reduce various operational errors in future work. The multi touch virtual anatomy method system improves the shortcomings of insufficient autopsy heads, further reducing the cost of non reusable autopsy heads, The repeated use of teaching resources has been improved, and the teaching effect has also been comprehensively improved.

1.2 Current status of virtual simulation technology

However, there are still many difficulties in the use of virtual reality technology in current medical teaching, and it is difficult to effectively implement the promotion work. Firstly, the equipment used is relatively expensive, and the cost is limited for many underdeveloped regions. Secondly, as a specialist in otolaryngology, head and neck surgery, funding is more limited and it is difficult to bear the cost of this equipment. Therefore, there is still a long way to go to fully promote 3D virtual technology.

2. The application, advantages, and current status of 3D head and neck teaching model in the training of residents' endoscopic skills

2.1 Improvement and advantages of 3D head and neck teaching model on clinical teaching practice ability in specialized colleges

In the traditional teaching mode, the operation and practice of endoscope are generally performed by students to communicate with each other, but this method inevitably leads to local mucosal damage. Due to the fact that students are mostly beginners, nervousness or panic is inevitable. If errors occur in the operation, it is likely that students will be psychologically burdened in the future and unable to engage in related work. For virtual reality technology, in the current professional teaching work, virtual reality technology can complete the exercise of diverse abilities, deepen the improvement of proficiency in endoscopic operation, complete control work in advance, prevent various frictions or injuries during

operation, and improve the skill confidence of medical students. Virtual reality technology has many advantages. In actual work, it is necessary to improve students' self-confidence and initiative, Constantly practice the operation of equipment such as nasal endoscope and fiberoptic nasopharyngoscope to prevent mucosal loss due to improper operation. While practicing, this method can be used to achieve autonomous coordination. In the inner ear canal, special problems such as foreign bodies in the ear canal and external cerumen can be practiced for treatment. While practicing endoscopic examination, it can exercise the operation of endoscopic techniques and continuously enrich teaching models and case studies.

2.2 Current status of 3D head and neck teaching model

Head and neck surgery in the Department of Otolaryngology mainly includes diseases of the ear, nose, throat, and head and neck. Not only is the complexity of three-dimensional anatomy, multiple anatomical sites, narrow and deep surgical field of vision, and high operational difficulty factors, making it quite difficult for students to learn and understand, but also students have a relatively short internship time in the Department of Otolaryngology Head and Neck Surgery. How to effectively learn has always been a problem for our specialty. This teaching model can fully integrate theory and operation, increasing the repetition of students' learning. To enable students to truly realize the transition from "asking me to learn" to "I want to learn" in experiencing the joy of learning, and from "passive indoctrination" to "active learning.". The 3D head and neck teaching model increases the repetition of learning, allowing students to actively learn, operate, and discuss independently before class. It also makes it easier for students to understand and master knowledge in the classroom, allowing them to learn and review virtual anatomy at any time after class as needed.

3. Summary

In summary, endoscopic technology plays an important role in the learning process of medical knowledge in subjects such as ear, nose, and throat. In clinical teaching, using this technology can not only improve students' learning interest, but also further cultivate students' autonomous learning ability and practical operation ability. In recent years, with the continuous improvement of various science and technology, virtual technology has been used in multiple fields. In medical teaching, the use of this technology can enrich students' learning paths, but the use of this technology has been affected by limited funding, and many tasks cannot be carried out smoothly. However, virtual reality technology does not require high funding requirements. In teaching, it can complete seemingly practical exercises and operations to better improve the scientific use of funds within the specialized department. It aims to analyze the internal structure of biology, exercise the practical operation effect of students, and summarize various experiences, completely improving the doctor-patient relationship. With the rapid development of science and technology, people's research direction for this technology continues to deepen, Therefore, technology will be further developed to better cultivate surgical professionals with more specialized qualities.

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