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Letter to Editor

How to improve the effect of online teaching of hip-related knowledge during the COVID-19 pandemics?



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Dear Editor,

The world today is experiencing significant changes unseen in this century. The global pandemic of the new crown pneumonia epidemic has accelerated the evolution of this unpredictable changes. Economic globalization has encountered a countercurrent. The international economy, technology, culture, security, and politics are undergoing profound adjustments and entering a period of turbulent change. To make crucial decisions on preventing the rapid spread of new coronavirus pandemic and actively promote the innovation and development of medical education, we need to further explore the practical research of hand-and-foot teaching in clinical education, especially during this special period. To make the teaching progress easier, many medical schools around the world have adopted the method of online teaching. How do we improve the online clinical teaching quality and interactions are incredibly important? Currently, the advantages of “Hand as Foot” teaching method are particularly prominent.

Our first “Hand as Foot” teaching^{1,2} replaced traditional illustrations and model explanations many years ago, making boring anatomical knowledge more vivid, which helps students easily understand and memorize what they are learning in all aspects. The online lectures allow teachers to explain the anatomy of the hip joint and its complicated blood supply by hand, which increases the interactions between teacher and students and dramatically improves the students’ learning efficiency in the classroom. Below we will introduce the anatomy of the hip joint and its complicated blood supply with “Hand as Foot” method.

To better understand this, we need to make a fist using right hand and ulnar deviation (Fig. 1A). The finger part represents the femoral head, the palm part represents the femoral neck, the distal end of the thumb can represent the femoral head ligament, the radial side of the transverse stripes of the wrist represents the greater trochanter, and the ulnar side of the transverse stripes of the wrist represents the lesser trochanter. This is the foundation for our further understanding of the hip joint. For the blood supply

of the hip joint (Fig. 1B), the most important part is the medial and lateral femoral circumflex arteries, both of which originate from the deep femoral artery. The branches are important nutrient arteries for the femoral head and neck. The lateral femoral circumflex artery is distributed in front of the femoral neck, and the medial circumflex femoral artery surrounds the posterior of femoral neck (Fig. 1B). They each move in the direction of the greater trochanter and form an arterial ring at the base of the femoral neck, which sends out many branches without connections (Fig. 1C), including the joint branches, muscular branches, and bone branches, etc. These branches are sent from the internal, external, anterior, and posterior directions called the ascending carotid artery, which passes the hip joint through the base of the femoral neck and then enters the femur. The neck supplies part of the blood to the femoral neck and head. The medial femoral circumflex artery is located at the reflection of the joint capsule synovial membrane at the bottom of the femoral neck and is divided into three groups of blood vessels entering the femoral head, namely the lateral epiphyseal artery (thumb), the superior metaphyseal artery (indicator finger) and the inferior metaphyseal artery (Middle finger) (Fig. 1D). Among them, the lateral epiphyseal artery supplies the blood circulation in the 2/3–4/5 area of the femoral head. We can use the thickness of the thumb and middle finger to indicate the proportion of blood supply, which can be better understood. The lateral artery is the main blood supply source for the femoral head. The femoral neck adduction fracture with external rotation and upward movement is prone to damage the lateral epiphyseal artery arising from the medial femoral circumflex artery, causing avascular necrosis of the femoral head. The lateral femoral circumflex artery mainly supplies blood circulation at the metaphysis of the proximal femur,³ but its branches only account for a small part of the blood supply to the femoral head. Therefore, medial femoral circumflex artery injury is the main cause of avascular necrosis of the femoral head.⁴ It should be mentioned that the concave artery in the femoral head ligament (Fig. 1A) is relatively small, with an average diameter of 0.3 mm, which only supplies blood to a small area near the femoral head concave. Some small arteries get locked up with age, so they do not have a big impact on the blood supply of the femoral head. When the lateral femoral head epiphyseal artery is injured, the unclosed pit artery can expand its blood supply range. In addition, when the joint capsule is removed for hip joint surgery, it is important not to strip too much of the joint capsule attached to the femoral neck, so as not to affect the blood supply to the femoral head.

During the pandemic situation, how to improve the learning efficiency of online teaching is worth discussing. “Hand as Foot” teaching method increases the classroom interactions and greatly

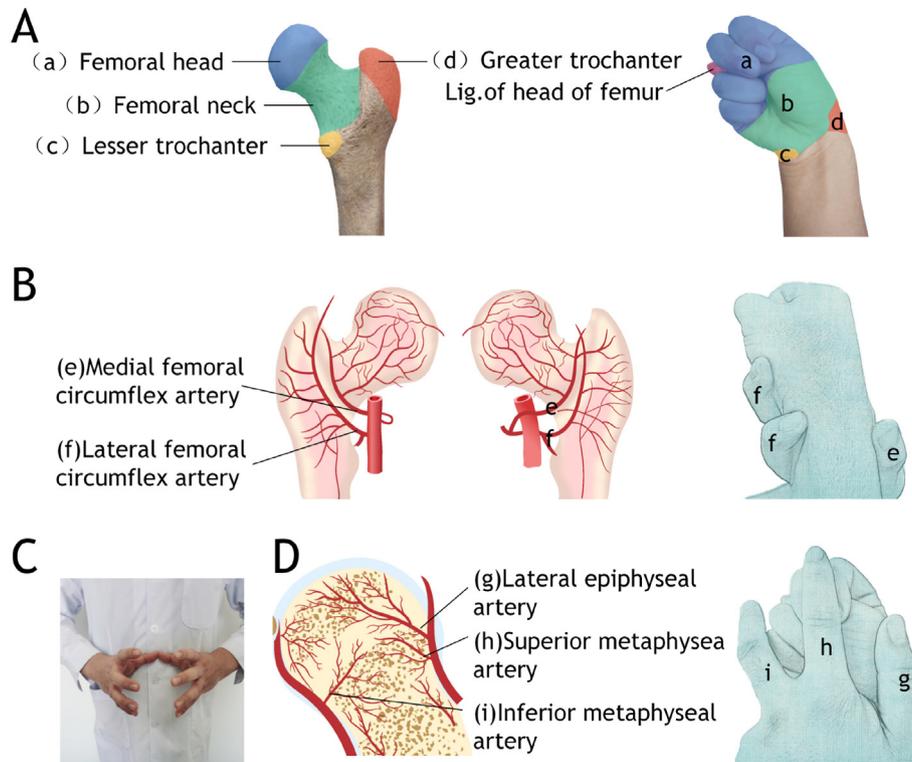


Fig. 1. “Hand as Foot” teaching method in blood supply of femoral head.

improves the classroom efficiency and quality of online teaching. This method needs to be further promoted.

Declaration of competing interest

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Xuzhong Cui, Rui Liu, Jianmin Zhao, Yizhou Li*
 Department of Orthopedics, Affiliated Hospital of Inner Mongolia Medical University, Hohhot North Street, Inner Mongolia, 010050, China

* Corresponding author. Department of Orthopedics, Affiliated Hospital of Inner Mongolia Medical University, Hohhot North Street, Inner Mongolia, 010050, China.
 E-mail address: yzliyizhong@163.com (Y. Li).

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