Informed Consent Form

AF42 – The Second Affiliated Hospital, Zhejiang University School of Medicine

Dear Student,

We invite you to participate in a clinical study entitled **"Comparison of the Effects of Artificial Intelligence–Assisted Instruction and Peer Learning on Lumbar Puncture Training for Resident Physicians."** Before you decide whether to participate, please read the following information carefully. It will help you understand what this study is, why it is being conducted, the study procedures and duration, and the potential benefits, risks, and inconveniences of participating. An introduction to the study is provided below:

I. Study Background and Objectives

Lumbar puncture is a core clinical procedural skill that resident physicians must master, and the degree to which it is performed in a standardized manner directly affects the safety and quality of diagnosis and treatment. The training models commonly used in clinical practice include traditional bedside teaching, peer-assisted learning, and artificial intelligence–assisted instruction; however, the differences among the three models in training effectiveness and long-term skill retention remain unclear.

This study aims to compare the effectiveness of traditional teaching, peer learning, and artificial intelligence–assisted instruction in lumbar puncture training for resident physicians, thereby providing a scientific basis for optimizing clinical skills training programs for residents.

II. Specific Procedures and Process

This study falls within the scope of medical education research. It involves only clinical skills training and the evaluation of teaching effectiveness; it does not involve any new treatment measures, medications, or invasive procedures. All training is performed on medical simulators, and no procedures are performed on real patients.

Training schedule:

- **Centralized training:** early March 2026, 20–24 participants per class, 2 academic hours of instruction;
- **After-class practice:** at least one self-directed practice session of no less than 20 minutes each month;
- **Training content:** theoretical lectures, standardized video learning, and simulator-based operative training (three rounds).

Assessments and evaluations (3 time points in total):

- **Pre-training:** theoretical examination (baseline assessment);
- **Immediately post-training (T0):** theoretical examination, procedural skill scoring, DOPS assessment, and procedural time recording;

• **3 months post-training (T1):** theoretical examination, procedural skill scoring, DOPS assessment, and procedural time recording;

• **Satisfaction survey:** an anonymous teaching satisfaction questionnaire after all training is completed.

Data collected:

• **General information:** age, sex, educational background;

• **Assessment scores:** theoretical scores, procedural skill scores (pre-procedure preparation, procedural process, post-procedure management, overall evaluation);

• **DOPS scores:** preoperative assessment, procedural standardization, aseptic concept, professional competence;

• **Procedural time:** total time to complete the simulated lumbar puncture procedure;

• **Satisfaction ratings:** teaching content, course resources, classroom interaction, teaching methods, learning burden.

III. What Is Required of You If You Participate

• Attend classes on schedule;

• Complete the relevant assessments and the satisfaction survey.

IV. Potential Benefits of Participating in This Study

Benefits to medical education: This study will help clarify the differences in training effectiveness among different teaching modalities for lumbar puncture, providing a scientific basis for optimizing residency standardized training programs.

Benefits to you:

• You will receive systematic and standardized lumbar puncture training; regardless of which group you are assigned to, you will obtain standardized skill instruction;

• Assessments immediately after training and 3 months later will help you understand your own skill mastery and its trends over time;

• The peer learning group can enhance mutual evaluation and learning skills, and the AI group can experience cutting-edge intelligent teaching technology.

V. Potential Adverse Reactions, Risks, and Risk Prevention Measures

1. **Time cost:** This study requires you to attend centralized training, complete after-class practice, and undergo multiple assessments, which may occupy your personal time.

2. **Psychological stress:** Assessment and evaluation may bring certain psychological pressure, and unsatisfactory assessment results may affect your self-evaluation.

3. **Confidentiality risk:** Although we will strictly protect your personal information, there remains an extremely small risk of information leakage. We will minimize this risk through measures such

as replacing real names with codes and restricting data access rights.

VI. Explanation of Costs

No additional costs will be incurred.

VII. Compensation for Participation, Including Compensation for Injury

As there are no special adverse reactions or related risks, no additional costs will be incurred, and no additional injury compensation is provided.

VIII. Alternative Options

If you are unwilling to participate in this study, there are no alternative options, and your participation or non-participation will not affect regular teaching activities.

IX. Confidentiality of Your Personal Information

Your teaching results will be kept at the hospital in accordance with regulations. In addition to the researchers, ethics committee members, and other relevant personnel who are permitted to review your records, other persons unrelated to the study have no right to access your personal information without permission. Public reports of the study results will not disclose your personal identity. We will make every effort within the permitted scope to protect the privacy of your personal information.

X. Withdrawal from the Study

Whether to participate in this study is entirely voluntary. You may refuse to participate, or you may withdraw from the study at any time during the study without giving any reason; this will not affect your academic assessment or evaluation. In addition, your participation in this study may be terminated for the following reasons:

- You fail to complete the after-class practice as required, or are repeatedly absent from assessments without justification;
- You simultaneously participate in other similar clinical skills teaching studies (violating the inclusion criteria);
- The investigator determines that terminating your participation is in the best interest of your training rights.

XI. Ethics Committee

This study has been reported to the Human Research Ethics Committee of the Second Affiliated Hospital, Zhejiang University School of Medicine. After comprehensive review by the committee, including an assessment of risks to students, the study has been approved. During the study, ethical and rights-related matters may be directed to the Human Research Ethics Committee of the Second Affiliated Hospital, Zhejiang University School of Medicine. Telephone: daytime 0571-87783759; night (on-duty administrator): 13757118366; email: HREC2013@126.com.

I confirm that I have read and understood this informed consent form, that I voluntarily accept the study procedures, and that I agree to the use of my learning data for publication of this study.

Signature of Participant:	Contact Information:	Date:
Signature of Legally Authorized Representative (if needed):	Relationship to Participant / Contact Information:	Date:
Witness (if needed):	Contact Information:	Date:

I confirm that I have explained the details of this study to the student, including his/her rights as well as the potential benefits and risks, and have given him/her a copy of the signed informed consent form.

Signature of Investigator:	Contact Information (Mobile):	Date: