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THREE-DIMENSIONAL PELVIS: NEW METHOD OF TECHING FEMALE PELVIC ANATOMY

Hypothesis / aims of study
A clear understanding of the intricate spatial relationships among bladder, urether, uterus, vagina, rectum, anal canal and the structures of the female pelvic floor is essential for the treatment of female pelvic organ prolapse. Virtual-reality technology allows improvd visualization of three-dimensional structures over conventional media because it supports stereoscopic-vision perspective, large angles of view, and interactivity. We describe a new virtual-reality three-dimensional female pelvis designed to teach pelvic anatomy, pathology, and surgery.

Study design, materials and methods
A female volunteer's pelvis was scaned by multiple-slice CT and data was strored in DICOM. Then the data was put in Dextroscope (Volume interactions Pte, Ltd, Singapore) and was transferred into a three-dimensional pelvis under virtual-reality environment of Dextroscope. A standard examination of ten basic female pelvic anatomy questions was administrated to medical students and gynaecologic residents. A workshop using the three-dimensional female pelvis was then given the standard examination was readministered so that it is possible to evaluate the effectiveness of the digital pelvis as an educational instrument.

Results
Training on the female three-dimensional pelvis produced substantial improvements in the overall average test scores for the two groups, with an overall increase of 38% ($p<0.001$) and 31% ($p<0.001$). for medical students and gynaecologic residents, respectively. Resident evaluations also confirmed the effectiveness of understanding female pelvic anatomy using three-dimensional pelvis.

Interpretation of results
The application combines audio, avatars (manipulated by participants), virtual three-dimensional model, and computation into an into an integrated system and allows manipulator to experience a concrete three-dimensional dynamics model with stereoscopic images that cannot be duplicated in a standard two-dimensional presentation, such as textbook or film. This way, medical students and gynaecologic residents can appreciate the physical interrelationships of anatomic structures as they related to the pelvis.

Concluding message
Three-dimensional female pelvis provides an innovative interactive educational framework that allows educators to overcome some of the barriers to teaching complex pelvic anatomy. Using the interactive and virtual-reality environment, students can manipulate components of the three-dimensional pelvis freely to achieve the educational goals.

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What were the subjects in the study?	**HUMAN**
Was this study approved by an ethics committee?	**Yes**
Specify Name of Ethics Committee	**Fuzhou Ethics Committee**
Was the Declaration of Helsinki followed?	**Yes**
Was informed consent obtained from the patients?	**Yes**