

Development of Virtual Patient with Fixed Cranial Nerve Pathology

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Audience: Medical educators interested in demonstrating fixed abnormal findings that cannot be reproduced by simulated patients.

Description: Medical educators have a critical need for educational tools that expose and test students on rarely-experienced patient conditions. Missing these experiences negatively impacts medical student education, diagnostic skills, and resulting patient care. Immersive virtual patients (VP) could fulfill this important educational role. VP's would complement existing educational tools such as simulations, standardized patients and hospital rotations. The greatest benefit of VP's may be realized by addressing conditions that can not be easily reproduced using traditional education approaches. Conditions of the neurologic system that are principally manifest as a disorder that can be visually evaluated are particularly suited for virtual simulation; for example, tremors of the hand, dyskinesias, and cranial nerve injuries.

We have developed a VP that presents with blurred vision. The student can interact with the VP using speech recognition software. The student can also examine the VP in the same manner that they would approach a real patient. That is, we have programmed the VP for a comprehensive visual examination including visual acuity; range of motion, pupil response, and retinal imaging. The VP has been programmed to present with blurred vision but can be manipulated to feign cranial nerve (CN) injuries to CN3, CN4 or CN6.



Figure 1 – VPs showing a (*left*) cranial nerve III defect, (*center*) fixed pupillary dilation, and (*right*) extraocular motor palsy.

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All conditions begin with a similar starting interview. But as the interview progresses, the student needs to employ careful visual observation and interactive examination. Blurred vision is difficult to reproduce with standardized patients and has no existing mannequin or physical simulators.

Abstract:

Introduction: The injured cranial nerve virtual patient (VP) simulator has been developed and is being tested in faculty and students for “debugging” purposes.

Methods: The VP is presented in a clinical environment. A standard physician-patient evaluation occurs.

Results: Excellent immersion is noted by both faculty and students. The evaluator is immediately engaged by the physical findings and the history. The interaction is quite natural.

Conclusion: VPs will fill a niche in medical education and testing for catastrophic or rare conditions that cannot be mimicked otherwise.