Oral Communication

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The Efficacy of an Virtual Reality Educational Program in Improving the Visuospatial Skills of the Residents in Physical and Rehabilitation Medicine

Topic: Education (Medical Student, Residency & Post-Graduate)

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BACKGROUND

In Physical and Rehabilitation Medicine (PMR), the knowledge of anatomy and the visuo-spatial skills are of fundamental importance during clinical examination and therapeutic approaches, e.g., invasive procedures or manual therapy. The traditional anatomic learning model relies on books, videos, and anatomical models, which are often not very engaging. Virtual Reality (VR), in particular Mixed Reality (MR), integrating 3D digital objects into the real world, offers a new, more interactive educational approach. This pilot study aimed to evaluate the effectiveness of MR through the HoloLens 2 headset and AnatomyX software on musculoskeletal anatomy learning and the satisfaction of residents in PMR.

METHODS

We designed a randomized single-blind study involving 40 residents in PMR, randomly assigned into two groups: MR group received a series of 60-minute lessons on the anatomy and biomechanics of the principal articular districts using the HoloLens 2 headset. The control group attended traditional frontal lessons of the same duration. The study program was identical. Learning was assessed through specific post-lesson questionnaires divided into three areas: general knowledge, functional knowledge, and spatial knowledge. Additionally, a general satisfaction questionnaire and a specific questionnaire for the use of HoloLens 2 were administered to the AR group.

RESULTS

We included 25 residents (13 in the MR group and 12 in the control group). The Cronbach's alpha calculated for both the total knowledge scores (general, functional, and spatial knowledge) and the satisfaction questionnaires (general and specific) exceeded 0.7, indicating good internal reliability of the questionnaire proposed. No significant differences emerged in general knowledge between the two groups. However, the AR group demonstrated significantly higher scores in both functional (22.69 ± 9.27 *vs.* 12.08 ± 2.23; $p = 0.006$) and spatial knowledge (28.07 ± 2.687 *vs.* 24.12 ± 5.68, $p = 0.041$). Moreover, general satisfaction was significantly higher $p = 0.044$ in MR group (5.61 ± 1.75) compared to the control group (8.58 ± 3.42). Furthermore, we found a significant correlation at the Pearson correlation test between the total knowledge scores and the overall satisfaction scores ($R = -0.035$; $p = 0.043$)

CONCLUSION

Mixed Reality significantly improved the functional and spatial knowledge of musculoskeletal anatomy compared to traditional lessons. Additionally, students reported higher satisfaction compared to the traditional method. Integrating this technology into medical education can offer a more engaging teaching method improving the physician technique during clinical examination and interventional procedures.

Statement of Disclosures

The study was founded By Cariparma 2023. The authors declare no conflict of interest.

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