Visual feedback and pseudo–haptic feedback improve manual lifting performance.

ABSTRACT

This paper investigates the effect of visual feedback and pseudo-haptic feedback to enhance participant performance in virtual lifting simulation. The aim of this study was to reduce lower back pain by enabling participants to monitor their lower back condition in terms of Lifting Index (LI) values, whilst moving an object from one location to another. This work examines various types of visual feedback techniques to support lifting operation in Virtual Environments (VEs). Several factors were analysed and used to identify the appropriateness of each visual feedback technique. The results showed that the addition of visual feedback did introduce an improvement in manual lifting tasks. The results also revealed that the combined visual feedback techniques performed better than singular feedback techniques. This paper also studies the effect of introducing pseudo-haptic feedback (or tactile augmentation) to increase participant performance in virtual environments. It was found that the introduction of a real weight provides the participant with pseudo-haptic feedback without affecting their performance.