

Research Trends in Using Virtual Reality for the Analysis and Treatment of Lower-Limb Musculoskeletal Injury of Athletes: A Literature Review

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Abstract : There is little research applying virtual reality (VR) to the treatment of musculoskeletal injury in athletes. This is despite their prevalence, and the implications for physical and psychological health. Nevertheless, developments of wireless VR headsets better facilitate dynamic movement in VR environments (VREs), and more research is expected in this emerging field. This systematic review identified publications that used VR interventions for the analysis or treatment of lower-limb musculoskeletal injury of athletes. It established a search protocol, and through narrative discussion, identified existing trends. Database searches encompassed four term sets: 1) VR systems; 2) musculoskeletal injuries; 3) sporting population; 4) movement outcome analysis. Overall, a total of 126 publications were identified through database searching, and twelve were included in the final analysis and discussion. Many of the studies were pilot and proof of concept work. Seven of the twelve publications were observational studies. However, this may provide preliminary data from which clinical trials will branch. If specified, the focus of the literature was very narrow, with very similar population demographics and injuries. The trends in the literature findings emphasised the role of VR and attentional focus, the strategic manipulation of movement outcomes, and the transfer of skill to the real-world. Causal inferences may have been undermined by flaws, as most studies were limited by the practicality of conducting a two-factor clinical-VR-based study. In conclusion, by assessing the exploratory studies, and combining this with the use of numerous developments, techniques, and tools, a novel application could be established to utilise VR with dynamic movement, for the effective treatment of specific musculoskeletal injuries of athletes.

Keywords : athletes, lower-limb musculoskeletal injury, rehabilitation, return-to-sport, virtual reality

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