INPLASY PROTOCOL

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Conflicts of interest:
None declared.

Effects of Exergames on rehabilitation outcomes in patients with osteoarthritis. A systematic review protocol

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Review question / Objective: **To analyze the effects of non-immersive exergames on relevant outcomes of the rehabilitation process in patients with osteoarthritis.**
Condition being studied: **OA is a degenerative disease that affects the synovial joints characterized by the progressive deterioration of the hyaline cartilage, the subchondral bone, and the synovial membrane. Clinically, OA is accompanied by joint pain, crepitus, stiffness, and local inflammation. OA affects 302 million people in the world, being one of the main causes of disability. OA is also associated with reduced quality of life. The reduction of postural balance, muscle strength and proprioception increase the risk of falls in patients with OA, in addition, their levels of physical activity and social participation are also restricted. At the cognitive level, it is presumed that OA may be related to dementia, although the evidence is still scarce. Musculoskeletal pain in patients with OA is associated with the deterioration of periarticular structures, however, it can also be recognized from the interaction of biological, psychological, and social factors related to loss of functionality. Better physical performance leads to decreased pain, increased functionality, social interaction, mental health, and quality of life.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 23 July 2021 and was last updated on 08 December 2023 (registration number INPLASY202170072).

INTRODUCTION

Review question / Objective: **To analyze the effects of non-immersive exergames on relevant outcomes of the rehabilitation process in patients with osteoarthritis.**

Rationale: Virtual reality (VR) has had a progressive relevance in rehabilitation processes. VR is classified as immersive, semi-immersive, and non-immersive according to the sensation of presence within the virtual environment. A low level of immersion characterizes non-immersive VR, and its interaction is through computer monitors or television screens. Exergames are video games promoting functional movement, including strength, aerobic endurance, balance, and flexibility exercises. Regarding the feasibility of non-immersive VR-based exercise programs, a recent study shows that they provide an enjoyable experience, increasing motivation and adherence. In general, they are systems with adequate usability with attractive and easy-to-use designs, allowing users to see their scores and progress while exercising. According to recent reviews, the efficacy of exergames has been studied mainly in neurological conditions. However, there is less information on musculoskeletal conditions, and only one recent systematic review analyzed the efficacy of exergames in patients with knee/hip OA and knee/hip arthroplasty, suggesting benefits in several functional components. Therefore, there is a need for a systematic review focused exclusively on patients with OA in any joint complex.

Condition being studied: Osteoarthritis (OA) is a degenerative disease affecting the synovial joints characterized by progressive deterioration of the hyaline cartilage, subchondral bone, synovial membrane, and ligaments, among other structures. Clinically, OA is accompanied by joint pain, crepitus, stiffness, and local inflammation. OA affects 302 million people worldwide and is a leading cause of disability associated with reduced quality of life. Reduced postural balance, muscle strength, and proprioception increase the risk of falls in patients with OA. In addition, physical activity levels and social participation are also restricted. At the cognitive level, it is presumed that OA may be related to dementia, although evidence is still scarce. Musculoskeletal pain in patients with OA is associated with impairment of periarticular structures; however, it can also be recognized from the interaction of biological, psychological, and social factors related to loss of function. Improved physical performance leads to decreased pain and improved functionality, social interaction, mental health, and quality of life.

METHODS

Search strategy: Medical Subheading (MeSH) and usual terms linked by boolean operators (OR and AND). The search terms are: Osteoarthritis, Hip[MeSH]; Osteoarthritis, Knee[MeSH]; Osteoarthritis, Spine[MeSH]; Osteoarthritis[MeSH]; osteoarth*; Virtual reality[MeSH]; Video games[MeSH]; Exergaming[MeSH]; exergam*; exergam*; Wii; Nintendo; Kinect; Xbox; Playstation; "serious gam*"; "active videogam*"; "non immersive".

Participant or population: Adults with OA.

Intervention: Non-immersive VR exergames.

Comparator: Physical exercise (not exergames) or controls not intervened with exercise.

Study designs to be included: Randomized controlled trials (RCTs).

Eligibility criteria: Inclusion criteria: Population: Adults diagnosed with OA (any joint complex, etiology, or severity); Intervention: Exergames (exclusive or adjunct to other physical exercise modalities) applied through non-immersive VR systems; Comparator: Any physical exercise modality (other than exergames) or control groups not intervened with exercise; Outcomes: Measures of physical performance, cognitive performance, musculoskeletal pain, and psychosocial aspects; Type of study: Randomized controlled trials (RCTs); Setting: Without restriction; Language: English.
Exclusion criteria: Studies involving children or adolescents, patients undergoing arthroplasty, and exergames performed with fully immersive VR

systems. Abstracts, theses, and gray literature are also excluded.

Information sources: Electronic databases: Pubmed, CINAHL, Scopus, Web of Science, and PEDro. In addition, a review will be performed in Google Scholar, as well as the reference list of the included studies.

Main outcome(s): Measures of physical performance, cognitive performance, musculoskeletal pain, and psychosocial aspects.

Additional outcome(s): None.

Data management: (1) Search results from the databases will be imported into the Rayyan electronic platform, (2) Duplicate records will be eliminated, (3) Screening will be performed according to titles and abstracts, (4) Studies will be selected by full-text review, (5) Information will be extracted from included studies using a standard form, (6) Two independent authors will perform the screening and data extraction phases respectively, and a third author will act as a mediator in case of discrepancies.

Quality assessment / Risk of bias analysis: PEDro scale and Cochrane Collaboration (RoB-2 tool).

Strategy of data synthesis: Systematic review.

Subgroup analysis: Not applicable.

Sensitivity analysis: Not applicable.

Language: English only.

Country(ies) involved: Chile.

Keywords: Osteoarthritis; Video games; Virtual reality; Rehabilitation; Psychosocial functioning.

Dissemination plans: Peer-reviewed indexed journal.

Other relevant information: Not applicable.

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