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Impact of Using Wearable Devices in Rehabilitation of Knee Joint

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ABSTRACT

Introduction: Knee joint injuries and degenerative conditions are becoming increasingly prevalent, leading to significant physical disabilities and socio-economic burdens. Effective rehabilitation is essential for restoring function and improving quality of life. However, traditional methods face challenges, including limited healthcare provider availability, inconsistent patient monitoring, and varying adherence to treatment protocols.

Aim: This study aims to critically evaluate the evidence on wearable devices for knee joint conditions, examining their effectiveness, limitations, and potential to enhance rehabilitation outcomes.

Materials and Methods: Peer-reviewed articles in English language published between 2013 and 2024 and focussing on using wearable devices for knee joint rehabilitation were included. A computer-based search on google scholar, PubMed, research gate was done to retrieve relevant articles. The keywords used for research were knee joint, rehabilitation, wearable devices. A review of existing literature was conducted, focusing on studies that utilised wearable devices such as Inertial Measurement Units (IMUs), accelerometers, and goniometers. Key parameters analyzed included Range of Motion (ROM), joint kinematics, and physical activity levels.

Results: Wearable devices have demonstrated significant potential in postoperative rehabilitation, especially after Total Knee Arthroplasty (TKA). They improve functional outcomes, pain management, and patient satisfaction while reducing rehabilitation costs. These devices enable remote monitoring and personalised treatment plans, facilitating better recovery. However, challenges such as sensor miscalibration, limited real-world applications, and gaps in research on patient self-treatment remain.

Conclusion: Wearable devices represent a transformative approach to knee joint rehabilitation, providing accessible, cost-effective, and efficient care. Addressing existing barriers and advancing research can further enhance their integration into clinical practice, improving patient outcomes globally.

Keywords: Degenerative conditions, Inertial measurement unit, Range of motion

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