ARTIFICIAL INTELLIGENCE IN PHYSIOTHERAPY

INNOVATIONS, APPLICATIONS AND FUTURE DIRECTIONS



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CHAPTER 6

WEARABLE DEVICES USED IN REHABILITATION FOR VARIOUS MUSCULOSKELETAL CONDITIONS

Samiya Azhar Khan [1], Abdur Raheem Khan [2], Ifra Aman [3]

INTRODUCTION TO WEARABLE TECHNOLOGY IN REHABILITATION

Wearable technology plays a crucial role in rehabilitation strategies, utilizing sensors and smart devices to improve patient care and health outcomes[1]. There have been notable advancements in this field, with a strong emphasis on various applications ranging from evaluating muscle strength to recognizing limb movement and proprioception. A noteworthy study conducted by Tang et al. (2024) employed an advanced deep-learning model that combines wearable bioelectric and mechanical sensors to enhance the evaluation of muscle strength[2]. This approach enables more precise diagnostics and rehabilitation evaluations, demonstrating potential in conditions that necessitate detailed analysis of muscle function.In the field of proprioceptive rehabilitation, the use of wearable technology such as arm or upper extremity exoskeletons has shown significant advantages . These devices can be helpful in enhancing motor function and sensory feedback, especially for individuals who are recovering from upper limb impairments, as demonstrated in a study by Fox et al. (2024) [3]. In addition, the field of lower limb rehabilitation has seen significant progress with the incorporation of wearable exoskeletons that can be controlled by surface electromyographic signals. This technology, as highlighted in a study conducted by Lu et al. (2024), greatly improves mobility aids for patients by providing personalized support that aligns with the user's intended movements.The development of holistic, all-encompassing rehabilitation programs that

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