

TELEREHABILITATION IN MUSCULOSKELETAL DISORDERS: A NARRATIVE REVIEW

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Abstract

Different musculoskeletal disorders are among most prevalent causes of different disability and healthcare problems all over the world. Telerehabilitation is defined as remote delivery of rehabilitation services using digital communication technologies, has been emerging as an effective strategy to improve access to all the physiotherapy services. During COVID-19 pandemic there has been acceleration the adoption of telehealth services and highlighted the importance of remote rehabilitation models. This narrative review examines the current evidence regarding telerehabilitation in musculoskeletal physiotherapy, including its applications, effectiveness, benefits, limitations, and future scope. Evidence suggests that telerehabilitation is helpful in providing outcomes comparable to conventional face-to-face physiotherapy in selected conditions, including low back pain, arthritis, neck pain, different shoulder disorders, and postoperative rehabilitation. Advances in artificial intelligence, wearable sensors, and virtual reality technologies are expected to further strengthen the role of telerehabilitation in clinical practice.

Key word- MSk disorder, telerehabilitation, technology, telehealth

Introduction

Musculoskeletal disorders affect approximately more than half of the people globally and represent one of the leading causes of disability-adjusted life years. Common conditions include low back pain, osteoarthritis, neck pain, shoulder disorders, sports injuries, and postoperative orthopedic conditions⁽¹⁾ These disorders significantly impact quality of life, productivity, and cost of the healthcare.

Conventional physiotherapy rehabilitation have relied primarily on face-to-face interactions. But there are the barriers including geographical distance, transportation difficulties, financial limitations, workforce shortages, and public health related emergencies can restrict access to care⁽²⁾ The emergence of these digital health technologies has been helpful in transforming healthcare delivery and upgrading the development of telerehabilitation services.

Telerehabilitation always involves the use of telecommunications technologies to assess, educate, monitor, and treat patients remotely from their homes. It has become increasingly important in musculoskeletal physiotherapy because many interventions, such as exercise therapy, education, and self-management training, can be effectively delivered via telecommunication. This review aims to summarize the current evidence regarding use of telerehabilitation and discuss its implications for clinical physiotherapy practice.

Methodology

This narrative review was conducted using a comprehensive review of published literature related to telerehabilitation in musculoskeletal disorders. Electronic databases including PubMed, Scopus, Google Scholar, and PEDro were searched using keywords including "telerehabilitation," "telehealth," "musculoskeletal disorders," "physiotherapy," and "remote rehabilitation."

Studies included systematic reviews, meta-analyses, randomized controlled trials, clinical guidelines, and narrative reviews published in English. Literature addressing effectiveness, clinical applications, patient satisfaction, technological advances, and implementation challenges was reviewed and synthesized.

Concept and Models of Telerehabilitation

Telerehabilitation refers to rehabilitation services delivered using telecommunications technologies when the healthcare provider and patient are physically separated. Services can be delivered synchronously using live video consultations, asynchronously using recorded educational materials and digital platforms, or through hybrid approaches combining face-to-face & remote interventions.

Recent technological developments have expanded telerehabilitation capabilities through different mobile applications, wearable sensors, artificial intelligence systems, virtual reality environments, and remote monitoring technologies. These advances allow personalized rehabilitation programs and continuous monitoring of patient progress.

Applications in Different Musculoskeletal Disorders

Telerehabilitation has been successfully implemented in different musculoskeletal conditions.

Chronic low back pain is among the most extensively studied conditions, with evidence demonstrating improvements in pain intensity, disability, and different quality of life through remotely delivering different exercise and educational interventions.

Patients having knee and hip osteoarthritis benefit from structured exercise programs and self-management strategies delivered through telehealth platforms. Similarly, individuals with chronic neck pain have demonstrated significant improvements following video-based exercise supervision.

Telerehabilitation has also shown effectiveness in shoulder disorders, including rotator cuff pathology and frozen shoulder, as well as postoperative rehabilitation following total knee replacement total hip replacement, and ACL reconstruction.

Results

Table 1. Effectiveness of Telerehabilitation in Musculoskeletal Conditions

Condition	Intervention	Outcome	Evidence
Chronic Low Back Pain	Exercise+Education	Reduced pain and disability	Strong
Osteoarthritis	Exercise/Self-management	Improved function	Strong
Neck Pain	Video-based exercise	Pain reduction	Moderate
Shoulder Disorders	Remote physiotherapy	Functional improvement	Moderate
Postoperative Rehabilitation	Structured programs	Comparable recovery	Strong

Discussion

Current evidence indicates that telerehabilitation is a feasible, effective, and patient-centered approach to musculoskeletal rehabilitation. Systematic reviews have demonstrated that outcomes achieved through telerehabilitation are often comparable to those obtained through conventional physiotherapy.

Several factors contribute to successful outcomes, including improved accessibility, enhanced self-management, increased adherence to exercise programs, and continuity of care. Patient satisfaction with telerehabilitation is generally high due to convenience, reduced travel requirements, and flexibility of scheduling.

However, limitations remain. Certain physical examination procedures cannot be performed remotely, and technological barriers may limit access for some populations. Regulatory frameworks, reimbursement policies, and privacy concerns also require ongoing attention.

Improved access to care, cost effectiveness, convenience, continuity of rehabilitation, patient empowerment, Enhanced self-management are among the major advantages of telerehabilitation. Patients living in rural and underserved regions particularly benefit from remote rehabilitation services. Furthermore, healthcare systems may reduce costs associated with travel, infrastructure, and resource utilization.

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Conclusion

Telerehabilitation has emerged as an important parameter of modern physiotherapy practice. Current evidences support its use for different variety of musculoskeletal conditions, particularly when exercise therapy and patient education constitute the primary interventions. Future research should focus on long-term clinical outcomes, cost-effectiveness analyses, and optimization of hybrid care models. Advances in digital health technologies will continue to expand opportunities for remote rehabilitation helping to improve patient access to high-quality physiotherapy services.

Challenges and Limitations

Challenges in telerehabilitation include inability to perform manual assessment, variable internet connectivity, limited usage and digital literacy, privacy concerns, reimbursement issues, and the need for clinician training. Not all musculoskeletal conditions are appropriate for remote management.

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Future Scope

Future developments include artificial intelligence-assisted rehabilitation, machine learning-based outcome prediction, virtual reality systems, wearable motion sensors, remote biomechanical assessment, and personalized digital exercise prescription. Hybrid models integrating in-person and remote care are likely to become standard practice.

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