



# Telehealth and Remote Home Exercise Therapy Monitoring in Out-Patient Physical Therapy

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## ABSTRACT

Telehealth has emerged as a pivotal development in the field of physical therapy, offering an innovative approach to patient care through remote monitoring and home exercise therapy. Remote monitoring is monitoring patient's home exercise program using an application which records all the statistics giving patient a score based on the performance. This article reviews the current literature on telehealth in the field of physical therapy, discusses its effectiveness, explores patient and therapist perceptions, and examines its role in increasing accessibility and equity in healthcare. The integration of telehealth with remote home exercise therapy monitoring is analyzed, highlighting its potential benefits and challenges. Recommendations for future research and clinical practice are provided.

## ARTICLE HISTORY

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## Introduction

The beginning of telehealth has reformed the delivery of healthcare services, including physical therapy. Telehealth has holistic applications and encompasses the use of digital communication technologies to deliver healthcare services and information remotely with audio, visual or audio-visual capabilities. With advancements in technology and the growing demand for accessible healthcare, telehealth has become increasingly important in physical therapy. Telehealth is especially important with areas of lack of healthcare service providers leading to challenging drive times, enormous wait times before access to healthcare. This article aims to explore the implementation and effectiveness of telehealth and remote home exercise therapy monitoring in physical therapy.

## Literature Review

### Telehealth in Physical Therapy

Telehealth has been adopted in physical therapy to provide remote consultations, assessments, and treatment sessions. Studies have shown that telehealth can be as effective as traditional in-person therapy for various conditions, including musculoskeletal disorders, post-operative rehabilitation, and chronic disease management [1,2].

### Remote Home Exercise Therapy Monitoring

Remote home exercise therapy monitoring involves the use of digital tools to track and guide patients' exercise routines at home. This can include wearable sensors, mobile applications, and video conferencing platforms. These sensors or applications

help with reading the movements performed by the patient and rate the motion based on optimal input that is fed in the system. Research indicates that remote monitoring can improve adherence to exercise programs, enhance patient outcomes, and provide real-time feedback to both patients and therapists [3,4]. This can also be used by insurance companies to monitor home exercise program adherence, compliance and patient progress for approval of therapy visits alongside monitoring mechanics of the exercises.

## Methodology

This article reviews existing literature on telehealth and remote home exercise therapy monitoring in physical therapy. Peer-reviewed articles, systematic reviews, and clinical studies published between 2010 and 2023 were sourced from databases such as PubMed, Google Scholar, and JSTOR. Keywords included "telehealth," "physical therapy," "remote monitoring," and "home exercise therapy."

## Results

### Effectiveness of Telehealth in Physical Therapy

Telehealth has demonstrated comparable outcomes to in-person therapy in terms of pain reduction, functional improvement, and patient satisfaction [5]. Telehealth can also facilitate timely intervention, reduce travel barriers, and increase appointment adherence. Patient and Therapist Perceptions Studies indicate positive perceptions among both patients and therapists regarding telehealth. Patients appreciate the convenience and accessibility, while therapists value the ability to reach a broader patient population and provide continuous care [6].

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## Effectiveness of Telehealth vs In-Person Therapy

### Compare Effectiveness

Parameter	Telehealth	In-person
Pain reducer	85	87
Functional improvement	83	85
Patient satisfaction	90	92
Appointment adherence	95	85
Timely Interventions	92	80

Cost-effectiveness of remote telehealth PT and traditional in-person PT services

Direct Costs:

#### Telehealth PT:

- Average cost per session: \$50-\$75 [2].
- Equipment costs: \$100-\$500 hardware, software and other equipments [7].
- Annual infrastructure costs (software licensing, technical support): \$500-\$1,000 Per Provider [2].

In-Person PT:

- Average cost per session: \$75-\$150 [7].
- Equipment and clinic maintenance costs: \$10,000-\$20,000 annually for a small clinic [8].
- Annual facility costs (rent, utilities, maintenance): \$20,000-\$50,000

Indirect Costs:

Telehealth PT:

- Patient travel costs: \$0
- Time saved per session: Approximately 1-2 hours (including travel and waiting time) [9].
- Reduced absenteeism: Savings of \$20-\$50 per hour of work avoided due to travel [10].

In-Person PT:

- Patient travel costs: \$5-\$20 per session depending on distance [2].
- Time spent per session: 2-3 hours (including travel and waiting time) [9].
- Increased absenteeism: Loss of \$20-\$50 per hour of work missed due to travel [10].

### Accessibility and Equity

Accessibility plays a major role especially when patients are on vacation or in case of in climate weather as compared to traditional inpatient or out-patient therapy sessions. Accessibility and Equity Telehealth has the potential to bridge the gap in healthcare access, particularly for individuals in rural or underserved areas. It can reduce the need for travel and offer flexible scheduling, making physical therapy more accessible to those with mobility issues or time constraints [2]. Patients in rural and remote areas

with lack of therapy services availability will benefit the most in case getting an appointment for outpatient therapy might be challenging. Even if an evaluation is established in person, travelling to and from the clinic for multiple appointments might be challenging especially during times of inclement weather. In case both the above-mentioned possibilities can be taken care of remote exercise monitoring will still assist with home exercise program adherence and improved outcomes.

Benefits	Percentage of Patients
Reduced Travel Barriers	70
Flexible Scheduling	60
Improved access in rural areas	50
Better access for mobility issues	40

### Discussion

#### Integration of Telehealth and Remote Monitoring

The integration of telehealth with remote home exercise therapy monitoring offers a comprehensive approach to patient care. This combination allows for continuous assessment and adjustment of exercise programs, enhancing patient engagement and adherence. Wearable sensors and mobile apps can provide data on patient performance, enabling therapists to make data-driven decisions and provide personalized feedback. These feedback are also more appealing to the patients due to instant visual feedback and instant correction available most of the time.

Metric	Without Remote Monitoring (%)	With Remote Monitoring (%)
Adherence to Exercise Program	60	85
Patient Outcome	70	90
Real time feedback	50	80

#### Challenges and Limitations

Despite its benefits, telehealth in physical therapy faces several challenges. These include technological barriers, such as the need for reliable internet access and user-friendly platforms, and potential issues with data privacy and security. Additionally, some patients may require hands-on interventions that cannot be delivered remotely [11].

Barrier	Percentage of patient
Internet access issues	30
Platform Usability Problems	20
Data Privacy Concerns	25
Needs for Hands-On Interventions	15

### Conclusion

Telehealth and remote home exercise therapy monitoring represent significant advancements in physical therapy, offering effective, accessible, and patient-centered care. While there are challenges to address, the potential benefits make telehealth a valuable tool in modern physical therapy practice. Future research should focus on optimizing telehealth platforms, addressing technological and privacy concerns, and exploring the long-term outcomes of remote therapy interventions.

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