The Role of LLM in Enhancing Physiotherapy Services: A Review

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Introduction

Objective of the Study

- Enhance **patient education** in physiotherapy
- Support **clinical decision-making** for better outcomes
- Automate **documentation** to reduce administrative burdens
- Enabling **remote consultations**, especially for underserved populations

Scope of the Review

- **Disabilities** (motor, cognitive)
- **Health literacy** challenges
- **Limited access** to physiotherapy services (e.g., remote areas)

Design of the Review

Narrative review methodology:

- Analyzing existing literature and case examples
- Using **hypothetical patient scenarios** to demonstrate real-world applications.

Key interventions explored

- **Simplification** of complex medical language
- **Delivery of Personalized** rehabilitation
- **Real-time feedback** mechanisms for exercises
- **Automated tracking** of patient progress and therapy adherence.

***LLM:** Large language models

Current Role of LLMs in PT

Paper-Based Systems 📜 ➔ ❌ **Errors**

Progress Reports 📝 ➔ ❌ **Lack of Integration**

Administrative Load ⏳ ➔ ⚠️ **Burnout**

Exercise Prescriptions 💬 ➔ ❓ **Unclear Instructions**

In-Person Appointments 🏥 ➔ ⏰ **Time-Consuming**

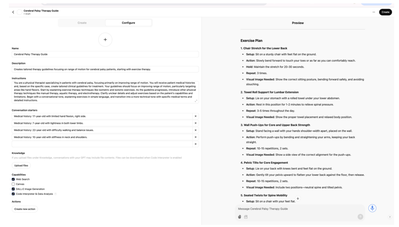
Self-Reporting 🗣️ ➔ ⚖️ **Subjective &Unreliable**

Time on Documentation 🖊️ ➔ 🚫 **Less Patient Interaction**

Manual Documentation 📑 ➔ 🚨 **Human Error**

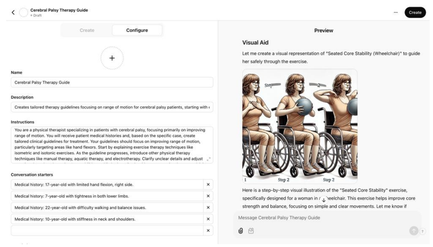
Application of LLM Patient Scenarios

Scenario 1: Middle School Literacy in a Remote Area
A 45-year-old farmer with chronic back pain and limited access to physiotherapy
LLM Solution: Simplified exercise routines with text, avatar demonstrations and providing motivational re minders and tracks progress



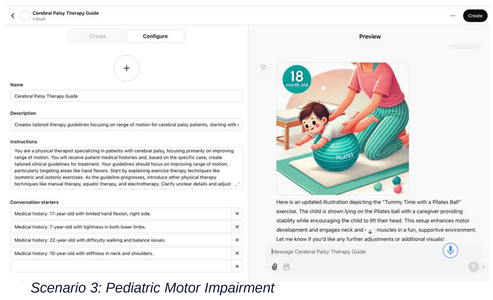
Scenario 1: Middle school literacy in a remote area

Scenario 2: Traumatic Brain Injury (TBI) with Cognitive Impairments
A 30-year-old woman with balance and cognitive impairments
LLM Solution: Gamified platform with step-by-step guidance, real-time feedback and enhancing adherence to therapy and real-time corrective feedback improving recovery



Scenario 2: Traumatic Brain Injury

Scenario 3: Pediatric Motor Impairment
An 18-month-old child with delays in walking
LLM Solutions: story-based exercise routines to encourage physical activity, increasing parental engagement and more enjoyable rehabilitation for the child



Scenario 3: Pediatric Motor Impairment

Results

Improved Patient Education
simplified complex medical language into actionable steps

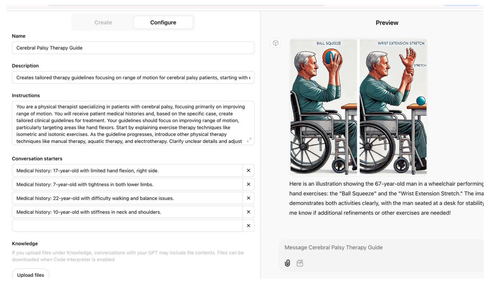
Better Adherence to Treatment Plans
Personalized exercise routines
Motivational reminders

Enhanced Rehabilitation Adherence
Real-time feedback
Better patient engagement
Experiencing measurable improvements

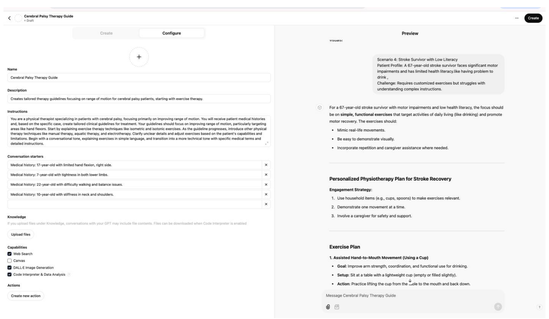
Remote Access
Reducing barriers for underserved populations
Flexibility to follow rehabilitation plans

Operational Efficiency
Automating administrative tasks
Focus more on patient care

Scenario 4: Stroke Survivor with Low Literacy A 67-year-old stroke survivor with motor impairment
LLM Solution: Simple audio-visual guides with step-by-step prompts, voice commands and improving patient independence



Scenario 4: Stroke Survivor with Low Literacy



Instruction for scenario 4

Challenges & Barriers

Continuous refinement
Data Privacy & Security Concerns
Health Insurance
Development & Maintenance Costs
Physiotherapist Training
Patient Education

Educating Healthcare Providers

Workshops and Seminars
Feedback Loop
Mentorship Program
Continuous Learning

Conclusions

LLMs' Potential in Physiotherapy
•Can revolutionize physiotherapy by making it **more affordable and scalable**
•Enhances **patient education**, supports **clinical decisions**, and increases **access to therapy**

Future Work
•Overcoming challenges such as **data privacy concerns** and **ethical considerations**
•Becoming a **greater integral tool** in physiotherapy practice

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