

# Digital Neuro-rehabilitation in Stroke – A Review of Technology-driven Innovations in Recovery: A Narrative Review

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## ABSTRACT

**Introduction:** Stroke is a leading cause of long-term disability. It affects movement, balance, and daily activities. Traditional physiotherapy is important for recovery; however, limited access and low engagement are major barriers. Digital neurorehabilitation provides patient-centred solutions. These technologies are improving neuroplasticity and functional recovery.

**Aim:** The purpose of this study is to review and synthesise existing literature on digital and technology-driven rehabilitation interventions in stroke and their effectiveness in improving motor function, gait, balance, and overall functional recovery.

**Materials and Methods:** All papers included in this review discussed interventions using digital or technology-assisted rehabilitation approaches such as virtual or augmented reality, robotic-assisted therapy, functional electrical stimulation, brain-computer interfaces, AI-based systems, wearable technologies, or tele-rehabilitation for stroke rehabilitation. The articles had to be written in the English language. A narrative review of literature was conducted using

electronic databases such as PubMed, Google Scholar, and PEDro. Peer-reviewed articles published in English focusing on digital technology approaches in stroke were included. The results of the relevant clinical outcome studies were synthesised and then analysed.

**Results:** The reviewed literature demonstrated that technology-driven stroke rehabilitation improves motor recovery, gait, balance, and functional independence. It improves high-intensity, repetitive, task-specific training with real-time feedback and higher motivation, delivering better outcomes than traditional therapy alone.

**Conclusion:** Digital neurorehabilitation increases stroke recovery by overcoming traditional physiotherapy limits. VR, robotics, digital rehab apps, and tele-rehab enhance motor recovery, neuroplasticity with engaging, intensive and personalised training.

**Keywords:** Digital neurorehabilitation, Gait and balance improvement, Motor recovery, Neuroplasticity, Stroke rehabilitation, Technology-driven physiotherapy.

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