DESIGN of an Electronic Cane and Advanced Clinical Procedure for Continuous Gait Rehabilitation Monitoring

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Aims
Design an electronic cane integrated with advanced rehabilitation monitoring features to improve the gait rehabilitation process. The goal is to collect crucial data on the force applied to the cane, the angle of inclination, and time stamps, providing valuable insights for physicians and therapists to make better clinical decisions

Materials & Methods
The electronic cane incorporates a Freescale MK20DX256VLH7 microcontroller, MEMS acceleration sensor (ADXL345), FlexiForce pressure sensor, and Bluetooth communication. These sensors record data during walking, which is transmitted to a mobile platform via Bluetooth. A real-time clock (DS3231) ensures accurate time recording, with data stored on a microSD card for further analysis.

Results
Tests on volunteer participants showed reliable data recording and real-time transmission of pressure and inclination angles. The device accurately measures pressure with a 15% weight-bearing capacity and angle measurements between -30° and 110°.

Conclusions
This electronic cane significantly contributes to gait rehabilitation by offering a non-invasive, technology-driven solution for continuous monitoring, improving treatment effectiveness.

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