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Designing A Multifunctional Electric Wheelchair for People with Limited Mobility for The Bethlehem Arab Society for Rehabilitation in Palestine

Mohammad Alkhader, Fathi Anayah, Ahmad Kharouf, Omar Aburrob, Sadeq Awwad, Waleed Sharqawi

College of Engineering and Technology, Palestine Technical University - Kadoorie, Tulkarm, Palestine

Abstract

In this project, an electric wheelchair was designed and modified so that it can be set in three different positions, which are the standing position, the sitting position, and the sleeping position. The patient controls the wheelchair through the control buttons on its arm in addition to a manual arm to move the entire chair which is operated electrically and controlled electronically via Adriano. Three electric motors are used to control the back of the chair, the leg rest, and the position of the chair seat on the frame. A 6 kN electric jack was used to lift the base of the chair using two 12-volt lithium batteries connected in series. The wheelchair was tested and adjusted to the three positions in manual and automatic settings. A practical test showed good success to the project, and the speed of movement and transition of the wheelchair from one position to another was appropriate and safe for the patient. Adding a running ramp to the wheelchair will allow patients to practice leg exercises to maintain muscle health and prevent its atrophy.