ABSTRAK

Arrayyan Raihan Ferdiansyah
Rancang Bangun Alat Shoulder Wheel Menggunakan Torsi Motor Dengan Tampilan Nextion
xiii + 12 Halaman + 10 Tabel + 9 Lampiran

Telah dirancang dan direalisasikan sebuah sistem terapi motorik berbasis mikrokontroler yaitu Alat shoulder whell di gunakan untuk terapi bahu atau frozen shoulder secara continyu dan berkelanjutan pengaturan kecepatan dan waktu terapi. Pada penelitian kali ini penelitian ini mengembangkan alat shoulder wheel menggunakan torsi motor dengan tampilan nextion diharapkan alat ini memudahkan pasien dengan keluhan frozen shoulder dapat melakukan latihan secara mandiri.

Untuk kestabilan pada putaran motor ini ditambahkan torsi yang kuat pada motor nema yang di gunakan yaitu menggunakan motor Nema 34 yang memiliki torsi awal pada motor yaitu 12Nm dan menambah gearbox 1:5 yang menghasilkan torsi menjadi 60Nm. Pada pengukuran penelitian alat ini pengukuran kecepatan motor yaitu 5 RPM – 25 RPM di dapatkan Nilai eror 0,1% sampai 3,2% dengan menggunakan torsi motor sebesar 60Nm. Alat ini dapat digunakan pada pasien yang mengalami Frozen Shoulder dengan pasien yang dapat berlatih secara mandiri.

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Kata kunci: Mikrokontroler, Motor Torsi, Terapi Motorik, TFT Nextion, Rehabilitasi, Sistem Otomatis.

Daftar bacaan : 23 buku (2008-2017)

ABSTRACT

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Design Development of a Shoulder Wheel Device Using Motor Torque with Nextion Display
xiii + 12 *Pages* + 10 *Tables* + 9 *Appendices*

A microcontroller-based motor therapy system called the Shoulder Wheel has been developed to assist patients with frozen shoulder in performing continuous and independent therapy. This tool is designed with adjustable speed and time settings to meet individual therapeutic needs. In this study, the Shoulder Wheel was enhanced using a torque motor and a Nextion display for better user interaction and control. The display helps users easily monitor and set parameters such as rotation speed, duration, and exercise mode, making the tool user-friendly and effective. To ensure smooth and stable rotation, a high-torque Nema 34 motor was used, which initially provides 12 Nm of torque. This torque was further increased by integrating a 1:5 gearbox, resulting in a total output torque of 60 Nm. The motor's speed can

be adjusted between 5 RPM and 25 RPM, making it suitable for gradual therapeutic. exercises depending on the patient's recovery stage. Speed accuracy tests showed a small error margin ranging from 0.1% to 3.2%, indicating reliable and consistent performance for clinical or personal use. With these features, the tool allows patients to carry out therapy sessions independently without constant supervision from medical personnel. It is especially beneficial for individuals recovering from shoulder stiffness or adhesive capsulitis, offering a practical and effective solution for home or clinical rehabilitation. The combination of strong torque, stability, adjustable parameters, and user-friendly interface makes this device a valuable innovation in the treatment of Frozen Shoulder.

Keywords: Microcontroller, Torque Motor, Motor Therapy, Nextion TFT, Rehabilitation, Automated System.

Reading list: 23 books (2008-2017)