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Design and Development of Finger Rehablination Mechanism for Person with Paralyzed Hand

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Abstract: *This study presents the design, development, and experimental evaluation of a finger rehabilitation mechanism tailored for individuals with hand paralysis due to stroke or neurological disorders. The mechanism aims to restore finger mobility through a lightweight, wearable device integrating mechanical actuation and customizable parameters. Prototypes were fabricated using various materials (e.g., PLA, aluminum, and silicone) and tested across multiple parameters, including force application, range of motion (ROM), and actuation speed. Trials conducted on a simulated paralyzed hand model demonstrated that a hybrid PLA-silicone design with adjustable force settings (2–5 N) achieved optimal performance, improving ROM by up to 45% over baseline measurements. These findings suggest potential for scalable, cost-effective rehabilitation solutions, though further clinical trials are recommended.*

Keywords: PLA, aluminum, and silicone, scalable, cost-effective

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