

## **Enhancing Stroke Rehabilitation: Assessing Hand Function Through Electromyography**

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Stroke remains a leading cause of long-term disability, as it significantly impairs hand function and impacts the daily lives of affected individuals. Traditional assessment methods for hand strength and recovery, such as manual muscle testing, often lack the objectivity and precision necessary for effective rehabilitation. This study investigates the application of electromyography (EMG) as an objective measurement tool for evaluating muscle activation during hand-squeezing tasks in stroke patients. The primary objective is to assess the effectiveness of EMG in enhancing the evaluation of hand function and informing rehabilitation strategies. Healthy individuals will perform controlled hand-squeezing tasks. EMG sensors will be utilized to record muscle activation patterns, focusing on contraction timing and intensity. Those results will serve as a control and will be compared to results from simulated stroke survivors. A specialized software program will be developed to analyze EMG data, with validation involving a comparative analysis between groups. The anticipated findings aim to demonstrate the advantages of EMG in providing accurate assessments of muscle function, ultimately supporting the development of personalized rehabilitation protocols. By integrating EMG into stroke rehabilitation practices, this research seeks to improve recovery outcomes, enhance quality of life for stroke survivors, and advance data-driven rehabilitation methodologies.