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Kinematic and Electromyographic Analysis of Reaching Pattern in Stroke Patients

By

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Thesis

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

"وَمَا أُوتِيتُمْ مِّنَ الْعِلْمِ
إِلَّا قَلِيلًا"

صدق الله العظيم

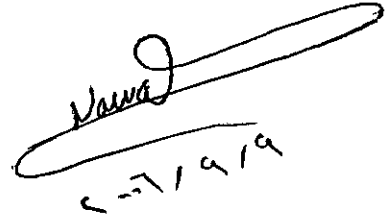
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DEDICATION

To my parents, who gave me everything. To the soul of my mother who sacrificed her life to help and support me. To my brother and sister who encouraged and supported me.

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ABSTRACT

Background: A major prerequisite for successful rehabilitation therapy after stroke is the understanding of the mechanisms underlying motor deficits common to these patients. **Objectives:** Objectives of this study were to determine the influence of altered muscle activity amplitudes on active ROM and the level of motor impairment of reaching pattern. **Methods:** thirty stroke patients participated in the study. Their mean age was 48.5 ± 5.27 . Analysis was conducted from sitting on a chair. The patients were instructed to reach for a target placed within their arm's length in forward horizontal plane by the affected then the non affected arm. Shoulder flexion, elbow extension and wrist extension ROM were analyzed by using three-dimensional motion analysis system. Muscular EMG amplitudes were recorded from the clavicular head of pectoralis major, anterior deltoid, lateral head of triceps and radial wrist extensors. The level of motor impairment was measured by the reaching performance scale. **Results:** There was a significant decrease in EMG amplitudes of the selected muscles and in ROM of shoulder flexion, elbow and wrist extension in the affected arm than the non-affected which intern affect the motor performance of reaching pattern in the affected arm of stroke patients. **Conclusion:** Reduction of EMG activity amplitudes of the selected muscles was considered as an important cause of limited ROM and increased level of motor impairment of reaching pattern in stroke population.

Key words: Stroke, EMG, 3-D Motion Analysis, Reaching Pattern.

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LIST OF ABBREVIATIONS

3D	: Three Dimensional
ABS	: Absolute
ADL	: Activities of daily Living
AMAT	: Arm Motor Ability Test
Ant	: Anterior
Cm	: Centimeter
CNS	: Central Nervous System
CVA	: Cerebrovascular Accident
Deg	: Degrees
DF	: Degrees of Freedom
EMG	: Electromyography
E.g	: Example
Fig.	: Figure
FMA	: Fugel-Meyer Assessment
GHJ	: Glenohumeral Joint
GS	: Global Synkinesis
KEMG	: Kinesiological Electromyography
Lt.	: Left
Max	: Maximum
MCU	: Motion Capture Unit
Min	: Minimum
msec	: Milli second
mv	: Milli volts
No.	: Number
PC	: Personal Computer
RMS	: Root Mean Square
ROM	: Range of Motion