Therapeutic Application of Functional Electrical Stimulation and Transcranial Magnetic Stimulation in Rehabilitation of Hand Function in Incomplete Cervical Spinal Cord Injury

Thesis

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By

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بسم الله الرحمن الرحيم

وَأَنْزَلَ اللَّهُ عَلَيْكَ الْكِتَابَ وَالْحِكْمَةَ
وَعَلَّمَكَ مَا لَمْ تَكُنْ تَعْلَمُ وَكَانَ فَضْلُ اللَّهِ
عَلَيْكَ عَظِيمًا

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Contents

List of Abbreviations

Abbrev.	Full term
ADL	: Activities of Daily Living
AMT	: Active motor threshold
ARAT	: Action research arm test
ASIA	: American Spinal Injury Association Impairment Scale
BDNF	: Brain derived neurotrophic factor
CT	: Computed Tomography scan
CM	: Corticomotoneuronal
CNS	: Central nervous system
CST	: Corticospinal tract
EPT	: Electric Perceptual Threshold
FCR	: Flexor carpi radialis
FDI	: First Dorsal Interosseous
FES	: Functional electric stimulation
FIM	: Functional independence measure
fMRI	: Functional Magnetic Resonance Imaging
FTT	: Finger Tapping Test
GABA	: Gamma-aminobutyric acid
IQR	: Inter-quartile Range
iSCI	: Incomplete spinal cord injury
M1	: Primary Motor area
MAS	: Modified Ashworth Scale
MEP	: Motor Evoked Potential
MRI	: Magnetic resonance imaging

List of Abbreviations *(Cont.)*

Abbrev.	Full term
MRC	: Medical Research Center
MT	: Motor Threshold
NMDA	: N-methyl-D-aspartate
NRT	: Neuromuscular restorative therapy
NS	: Not Significant
PMC	: Pre-Motor Cortex
RCT	: Randomized Controlled Trial
RMT	: Resting Motor Threshold
rTMS	: Repetitive Transcranial Magnetic Stimulation
S	: Significant
S1	: Primary Somato-Sensory Area
SCI	: Spinal cord injury
SHFT	: Sollerman Hand function Test
SMA	: Supplementary Motor Area
TFES	: Therapeutic Functional Electric Stimulation
TMS	: Transcranial magnetic stimulation
TrKB	**:** Tyrosine kinase B

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