

## TABLE OF CONTENTS

	<b>PAGE</b>
<b>ACKNOWLEDGEMENT</b>	iii
<b>ENGLISH ABSTRACT</b>	iv
<b>THAI ABSTRACT</b>	vi
<b>TABLE OF CONTENTS</b>	viii
<b>LIST OF TABLES</b>	x
<b>LIST OF FIGURES</b>	xi
<b>ABBREVIATIONS</b>	xiii
<b>CHAPTER I: INTRODUCTION</b>	1
Purposes of the study	5
Hypothesis of the study	6
Advantages of the study	6
<b>CHAPTER II: LITERATURE REVIEWS</b>	
Definition of stroke	7
Impairments and disability in the UE of stroke survivors	8
Recovery of the brain lesion	16
Neurorehabilitation program	20
Circuit training	23
<b>CHAPTER III: METHODS</b>	
Participants	30
Evaluation	31

Administrative test	31
Strength and spasticity assessment	32
Active range of motion assessment	33
Modified Wolf Motor Function Test (mWMFT)	33
The Motor Activity Log (MAL)	34
Training procedures	34
Data analysis	39
<b>CHAPTER IV: RESULTS</b>	40
<b>CHAPTER V: DISCUSSION</b>	49
<b>CONCLUSION</b>	60
<b>CLINICAL APPLICATION</b>	61
<b>FUTURE STUDY</b>	63
<b>REFERENCES</b>	64
<b>APPENDIX</b>	
APPENDIX A Participant data	80
APPENDIX B Strength and spastic assessment	82
APPENDIX C Reliability of the AROM measurement	83
APPENDIX D The modified Wolf Motor Function Test	87
APPENDIX E The Motor Activity Log	91
APPENDIX F The circuit training program	104
APPENDIX G Certificate of ethical clearance	115
<b>CURRICULUM VITAE</b>	118

## LIST OF TABLES

TABLE		PAGE
1	The characteristics of subject population	42
2	Comparison of strength and spasticity at the pretest session	43
3	Comparison of active range of motion at the pretest session	44
4	Comparison of functional outcome measures at the pretest session	45
5	Comparison of strength and spasticity at the pretest and posttest session	46
6	Comparison of active range of motion at the pretest and posttest session	47
7	Comparison of functional outcome measures at the pretest and posttest session	48
A1	The characteristics of the subject population in the reliability study	84
A2	The intra-class correlation of active range of motion	85

**LIST OF FIGURES**

<b>FIGURE</b>		<b>PAGE</b>
1	Pectoral stretch	104
2	Posterior deltoid stretch	104
3	Scapular stretch	105
4	Weight bearing	105
5	Forearm stretch	106
6	Anterior deltoid stretch	106
7	Biceps stretch	107
8	Triceps stretch	107
9	Scapular elevation	108
10	Shoulder rotation	108
11	Scapular protraction/retraction	109
12	Shoulder flexion with elbow straight	109
13	Forearm pronation/supination	110
14	Wrist flexion/extension	110
15	Elbow exercise	111
16	Wrist rotation	111
17	Bilateral arm training	112
18	Repetitive sensory motor training	112

## LIST OF FIGURES

FIGURE		PAGE
19	Repetitive task-specific training	113
20	Bilateral isokinetic training	113
21	Strength training exercise	114
	(a) using a wrist weight	
	(b) using a wall pulley	

## ABBREVIATION

ADL	activity of daily living
AOU	amount of used score of the MAL
ARAT	action research arm test
AROM	active range of motion
CVA	cerebrovascular accident
CPM	continuous passive movement
MAL	Motor Activity Log
mWMFT	modified Wolf Motor Function Test
N	Newton
NDT	neurodevelopmental treatment
PNF	proprioceptive neuromuscular facilitation
PROM	passive range of motion
QOM	quality of movement scores of the MAL
ROM	range of motion

s second

UE upper extremity