

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENT	iii
ENGLISH ABSTRACT	iv
THAI ABSTRACT	vi
TABLE OF CONTENTS	viii
LIST OF TABLES	xi
LIST OF FIGURES	xii
ABBREVIATIONS	xiii
CHAPTER 1 INTRODUCTION	1
1.1 Purpose of the study	4
1.2 Hypotheses of the study	4
1.3 Advantages of the study	4
CHAPTER 2 LITERATURE REVIEW	6
2.1 Biomechanics of the sit-to-stand movement	6
2.1.1 Sit to stand movement determinants	8
2.1.2 EMG pattern of lower extremity muscles during a sit to stand movement	12

2.2	Anatomy of lower extremity	13
2.2.1	Muscle of the gluteal region	13
2.2.2	Muscles of the thigh region	15
2.2.3	Muscle of the leg region	17
2.3	Measurement of muscle strength and endurance	19
2.3.1	Muscle strength measurement	19
2.3.2	Muscle endurance measurement	22
2.4	Functional sit-to-stand test	23
	CHAPTER 3 METHODS	26
3.1	Participants	26
3.2	Equipment	27
3.3	Outcome measures	27
3.4	Data collection procedures	28
3.5	Leg length and thigh circumference measurement	28
3.6	Sit-to-stand test measurement	28
3.7	Calculation of the power of the STS movement	30
3.8	Knee extensor muscle strength test	30
3.9	Knee extensor muscle endurance test	31
3.10	Statistical analysis	32
3.11	Reliability of one leg sit-to-stand test, leg strength and endurance measurement	32
3.12	Diagram of data collection procedure	33
3.13	Location	34

CHAPTER 4 RESULTS	35
4.1 Reliability study	35
4.2 Main study	36
4.2.1 Demographic characteristics of the participants	36
4.2.2 Time and power of one leg sit-to-stand tests	36
4.2.3 Knee extensor muscles strength and endurance	37
4.2.4 Correlation between variables obtained from the 5 and 10 repeated one-leg STS tests and variables representing strength and endurance of the knee extensor muscles	37
CHAPTER 5 DISCUSSION	44
5.1 Conclusion	48
REFERENCES	49
APPENDICES	53
APPENDIX A Consent form	54
APPENDIX B Information sheet	56
APPENDIX C Certificate of ethical clearance	59
APPENDIX D Data collection form	60
CURRICULUM VITAE	61

LIST OF TABLES

Table		Page
1	The intraclass correlation coefficients of the tested variables	35
2	The demographic data of the participants	36
3	Mean values of time to complete and power of one leg sit-to-stand tests	37
4	The correlation between sit-to-stand tests variables and knee extensor muscles MVC	38
5	The correlation between sit-to-stand tests variables and knee extensor muscles time to fatigue	39

LIST OF FIGURES

Figure		Page
1	Four phases of sit to stand movement	8
2	The pattern of muscle function associated with STS movement	13
3	Muscles of the gluteal region	14
4	Muscles of the thigh	17
5	Muscles of the leg	18
6	Measurement of knee extensor muscle strength by hand-held dynamometer	20
7	Measurement of quadriceps muscle strength by isokinetic dynamometer	21
8	A sequence of one repetition of the one-leg STS movement	29
9	Knee extensor muscle isokinetic strength and endurance measurement	31
10	Relationship between knee extensor muscle MVC and time to complete the 5 and 10 repeated one-leg STS tests	40
11	Relationship between knee extensor muscle MVC and power of the 5 and 10 repeated one-leg STS tests	41
12	Relationship knee extensor muscle time to fatigue and time to complete the 5 and 10 repeated one-leg STS tests	42
13	Relationship knee extensor muscle time to fatigue and power of the 5 and 10 repeated one-leg STS tests	43

ABBREVIATIONS

T5-STS	Time to complete the 5 one-leg STS tests
T10-STS	Time to complete the 10 one-leg STS tests
P5-STS	Power of the 5 repeated one-leg STS tests
P10-STS	Power of the 10 repeated one-leg STS tests
MVC	Maximum voluntary contraction
CoM	Center of mass
kg	Kilogram
cm	Centimeter
m	Meter
sec	Second
W	Watt
N	Newton
EMG	Electromyography