TABLE OF CONTENTS

	PAGE
ACKNOWLEDGEMENT	iii
ENGLISH ABSTRACT	iv
THAI ABSTRACT	vi
TABLE OF CONTENTS	viii
LIST OF TABLES	x
LIST OF FIGURES	xi
LIST OF ABBERVIATIONS	xii
CHAPTER I: INTRODUCTION	1
Research questions and hypotheses	4
Purpose of the study	4
Application advantages	5
CHAPTER ll: LITERATURE REVIEW	
Body mass index classification	6
Health conditions associated with overweight and obesity	8
Normal gait cycle	12
Gait characteristics of obese persons	16
Kinematic comparison of treadmill and overground walking	18
Effects of slope on gait characteristics	19

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright © by Chiang Mai University
All rights reserved

Gait symmetry and limb dominance 20

Physical activity questionnaire 21

CHAPTER III: METHOD

Participants 25

Equipment 27

Independent and dependent variables 28

Experimental setup 28

Participant preparation 28

Protocols 29

Data reduction 29

Statistical analysis 32

CHAPTER IV: RESULTS

Comparing for three modes between normal and obese groups 33

Comparing within group between three walking modes 39

CHAPTER V: DISCUSSION 50

CONCLUSION 59

FUTURE STUDY 60

REFERENCES 61

APPENDIX

Appendix A Health and physical activity questionnaire 67

Appendix B Consent form 70

Appendix C Reliability of the study 71

CURRICULUM VITAE 73

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright © by Chiang Mai University
All rights reserved

LIST OF TABLES

TABLE		PAGE
1	Body mass index classification for Asian and Europids	7
2	The characteristics of participants	26
3	Types of occupational physical activity for obese and normal weight participants	27
4	Comparison of the temporospatial and kinematic variables between normal and obese groups during overground walking	33
5	Comparison of the temporospatial and kinematic variables between normal and obese groups during treadmill walking	35
6	Comparison of the temporospatial and kinematic variables between normal and obese groups during treadmill 10% walking	37
7	Summary of temporospatial and joint kinematic variables for the normal group at three modes of walking	39
8	Summary of temporospatial and joint kinematics variables for obese groups at three mode of walking	42

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright © by Chiang Mai University
All rights reserved

LIST OF FIGURES

FIGURE		PAGE
1	Phase of gait cycle	12
2	Step and stride lengths	16
3	Diagram for calculation of trunk, hip, knee, and ankle joint angle	31
4	Step length	31
5	Trunk flexion-extension pattern	46
6	Hip flexion-extension pattern	47
7	Knee flexion-extension pattern	48
8	Ankle dorsiflexion-plantarflexion pattern	49

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright © by Chiang Mai University
All rights reserved

LIST OF ABBREVIATIONS

BMI	**Body mass index**
CHD	**Coronary heart disease**
cm	**Centimeter**
CVD	**Cerebral vascular disease**
EPIC	**European Prospective Investigation into Cancer and Nutrition Study**
mmHg	**Millimeter of mercury**
m/s	**Meter per second**
Kg	**Kilogram**
Km/h	**Kilometer per hour**
Kg/m^2	**Kilogram per square meter**
PAI- 1	**Plasminogen activator inhibitor-1**
s	**Second**
SD	**Standard deviation**
°	**Degrees**
2-D	**Two-dimensional video analysis**

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright © by Chiang Mai University
All rights reserved