CHAPTER 4

RESULTS

4.1 Reliability study

Ten healthy individuals (4 men and 6 women) with a mean age of 21.8 ± 1.9 years participated in the reliability study. The mean height and weight of the participants were 165.6 ± 8.1 cm, and 56.6 ± 6.9 kg, respectively.

Test retest reliability of the variables related to a one-leg STS and knee extensor muscle strength and endurance was determined. Participants were tested using the same testing protocol on two separate days. The values of the ICC $_{(3,1)}$ for the following variables: T5-STS, T10-STS, knee extensor muscle isometric MVC and knee extensor muscle time to fatigue were 0.793, 0.846, 0.923, and 0.948 respectively as shown in Table 1.

Table 1 The intraclass correlation coefficients (ICC $_{(3,1)}$) of the tested variables

Outcome variables	ICC $_{(3,1)}$
time to complete 5 repeated one leg STS test	0.793
time to complete 10 repeated one leg STS test	0.846
knee extensor muscle isometric maximum voluntary contraction	0.923
knee extensor muscle time to fatigue	0.948

4.2 Main study

4.2.1 Demographic characteristics of the participants

Fifty participants (25 male and 25 female) voluntarily participated in the main study. All participants read and signed an informed consent. They were aged between 18 and 25 years. None of them were diagnosed with neurological or musculoskeletal disorders. All of participants were right leg dominant. Table 2 shows demographic characteristics of the participants.

Table 2 The demographic data of the participants (N=50)

Characteristics	Male (n=25)	Female (n=25)	Total (N=50)
Age (years)	21.1 ± 1.4	21.2 ± 1.8	21.2 ± 1.6
Height (cm)	171.1 ± 6.2	159.6 ± 4.6	165.3 ± 8.0
Weight (kg)	63.7 ± 10.8	52.5 ± 8.7	58.1 ± 11.2
Leg length (cm)	85.0 ± 4.4	80.2 ± 4.5	82.6 ± 5.0
Thigh circumference (cm)	52.7 ± 6.3	51.2 ± 5.8	51.9 ± 6.1

Note: Data are mean ±SD.

4.2.2 Time and power of one leg sit-to-stand tests

All participants completed the 5 repeated and 10 repeated one-leg STS tests without reports of any complications. The mean time to complete 5 repeated one-leg STS test (T5-STS) was 6.81 ± 0.85 sec and 13.32 ± 1.79 sec for 10 repeated one-leg STS test (T10-STS). The mean power of 5 repeated one-leg STS test (P5-STS) was

162.32 ± 40.98 W and 166.19 ± 40.76 W for 10 repeated one-leg STS test (P10-STS) as shown in Table 3.

Table 3 Mean values of time to complete and power of one-leg sit-to-stand tests

Type of one leg sit-to-stand test	Time to complete (sec)	Power (W)
5 repeated one-leg STS	6.81 ± 0.85	162.32 ± 40.98
10 repeated one-leg STS	13.32 ± 1.79	166.19 ± 40.76

Note: Data are mean ±SD.

4.2.3 Knee extensor muscle strength and endurance

All participants completed the knee extensor muscle strength and endurance without reports of major complications. Seven participants reported mild muscle soreness on the day after the test. The mean values of knee extensor muscle isometric MVC and knee extensor muscle time to fatigue were 209.95 ± 81.00 N and 86.09 ± 51.08 sec, respectively.

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.

As shown in Table 4, there were no correlation between knee extensor MVC and time to complete the 5 repeated and 10 repeated one-leg STS tests (T5-STS and T10-STS). A scatter plot representing the relationship between the knee extensor MVC values and the time to complete one-leg STS tests for all participants is shown

in Figure 10. Knee extensor MVC was positively correlated with P5-STS and P10-STS (r = 0.828, *p* < 0.001 and r = 0.759, *p* < 0.001, respectively). A scatter plot representing the relationship between the knee extensor MVC values and the power of one-leg STS tests for all participants is shown in Figure 11. As shown in Table 5, there were no correlations between knee extensor muscle time to fatigue and power one-leg STS tests (P5-STS and P10-STS). A scatter plot representing the relationship between the knee extensor time to fatigue values and the power of one-leg STS tests for all participants is shown in Figure 12. The knee extensor muscle time to fatigue was negatively correlated with time to complete the 5 repeated and 10 repeated one-leg STS tests (r = -0.317, *p* = 0.025 and r = -0.394, *p* = 0.005, respectively). A scatter plot representing the relationship between the knee extensor time to fatigue values and the time to complete one-leg STS tests for all participants is shown in Figure 13.

Table 4 The correlation between sit-to-stand tests variables and knee extensor muscle MVC.

	MVC	*p* value
T5-STS	- 0.277	0.051
P5-STS	0.828	0.000
T10-STS	- 0.124	0.390
P10-STS	0.759	0.000

Table 5 The correlation between sit-to-stand tests variables and knee extensor muscle time to fatigue**.**

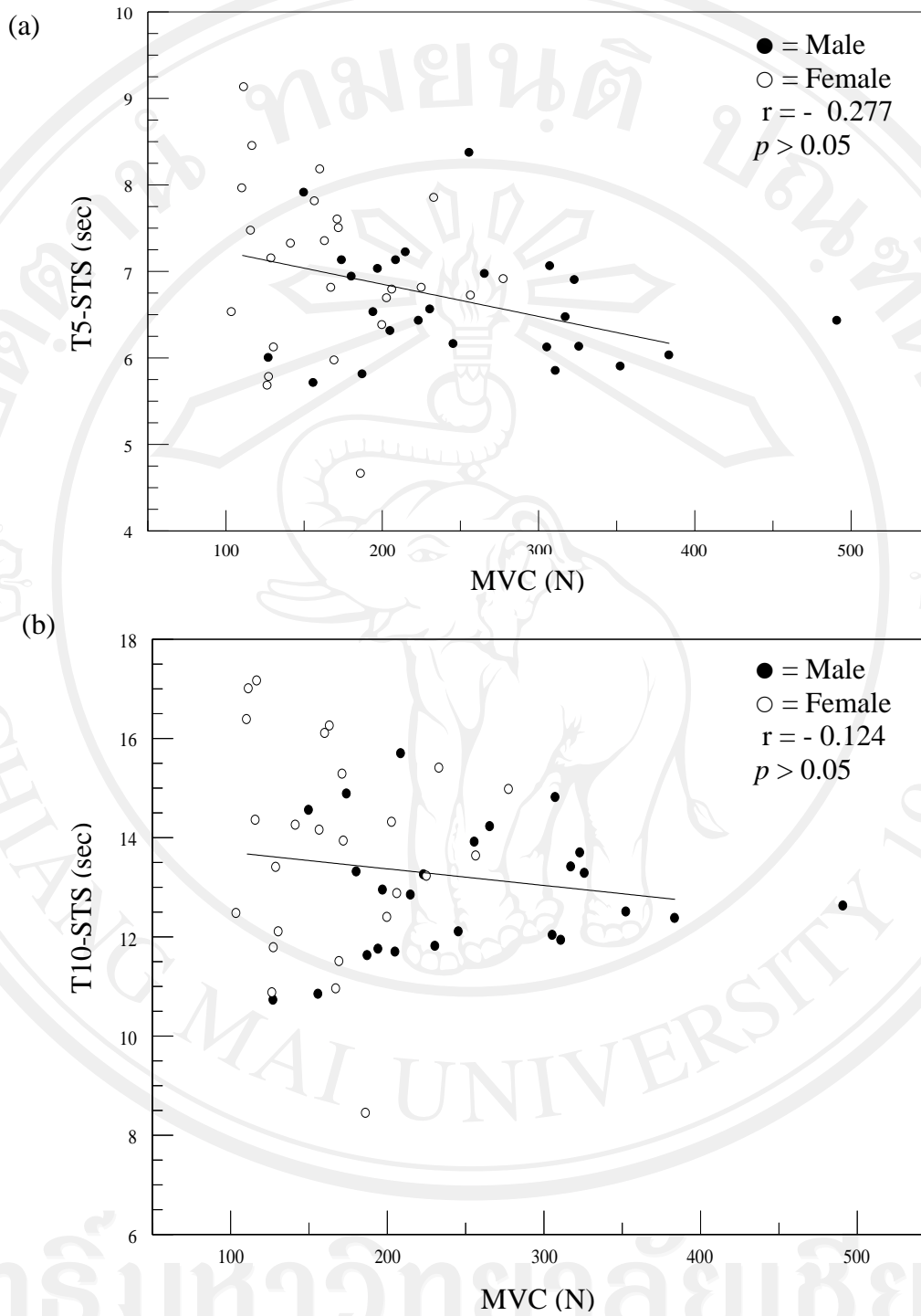|	Time to fatigue	p value
T5-STS	- 0.317	0.025
P5-STS	0.141	0.327
T10-STS	- 0.394	0.005
P10-STS	0.202	0.158

Figure 10. Relationship between knee extensor muscle MVC and time to complete the

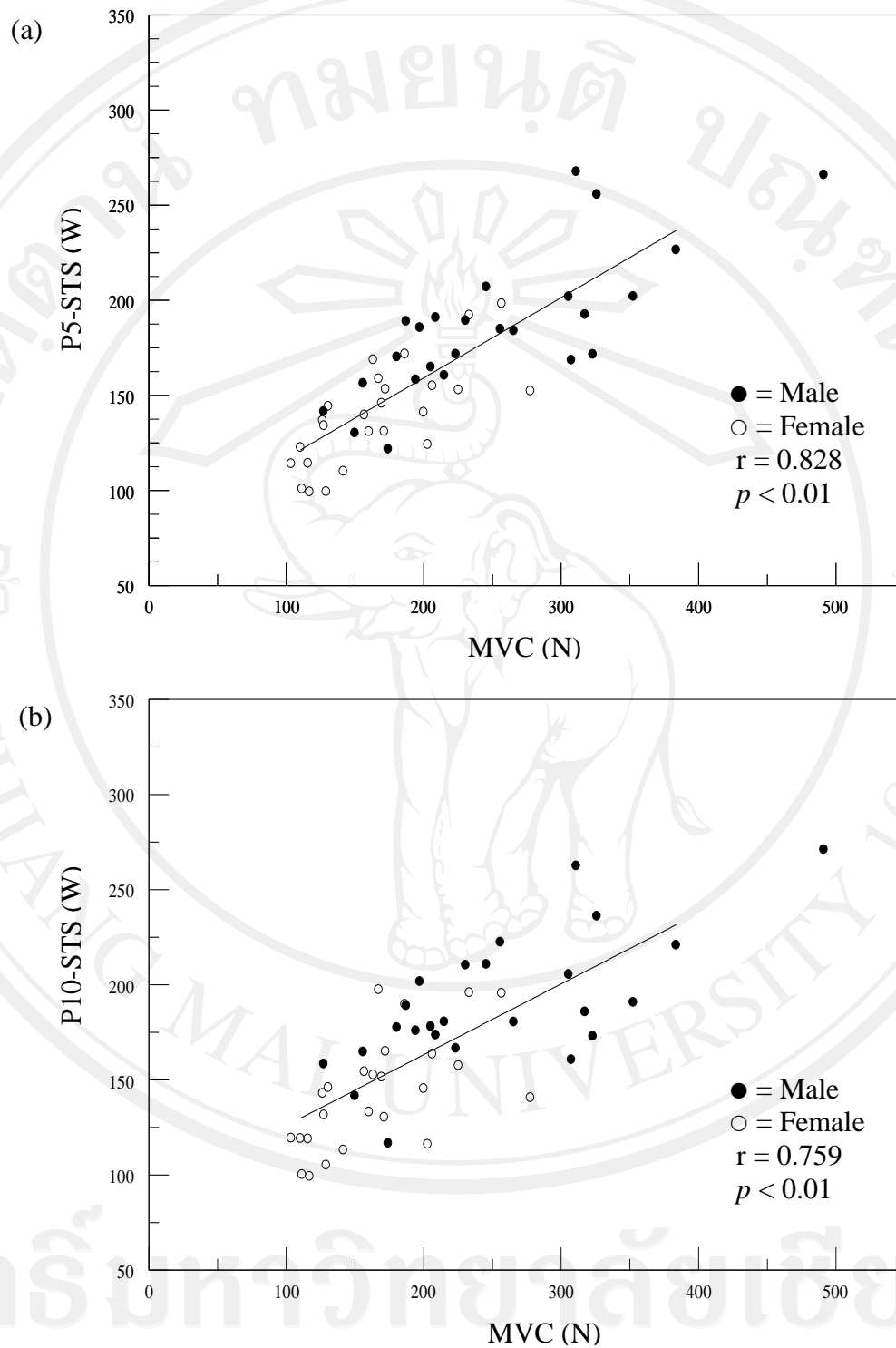5 repeated (a) and 10 repeated (b) one-leg STS tests

Figure 11 Relationship knee extensor muscle MVC and power of the 5 repeated (a)

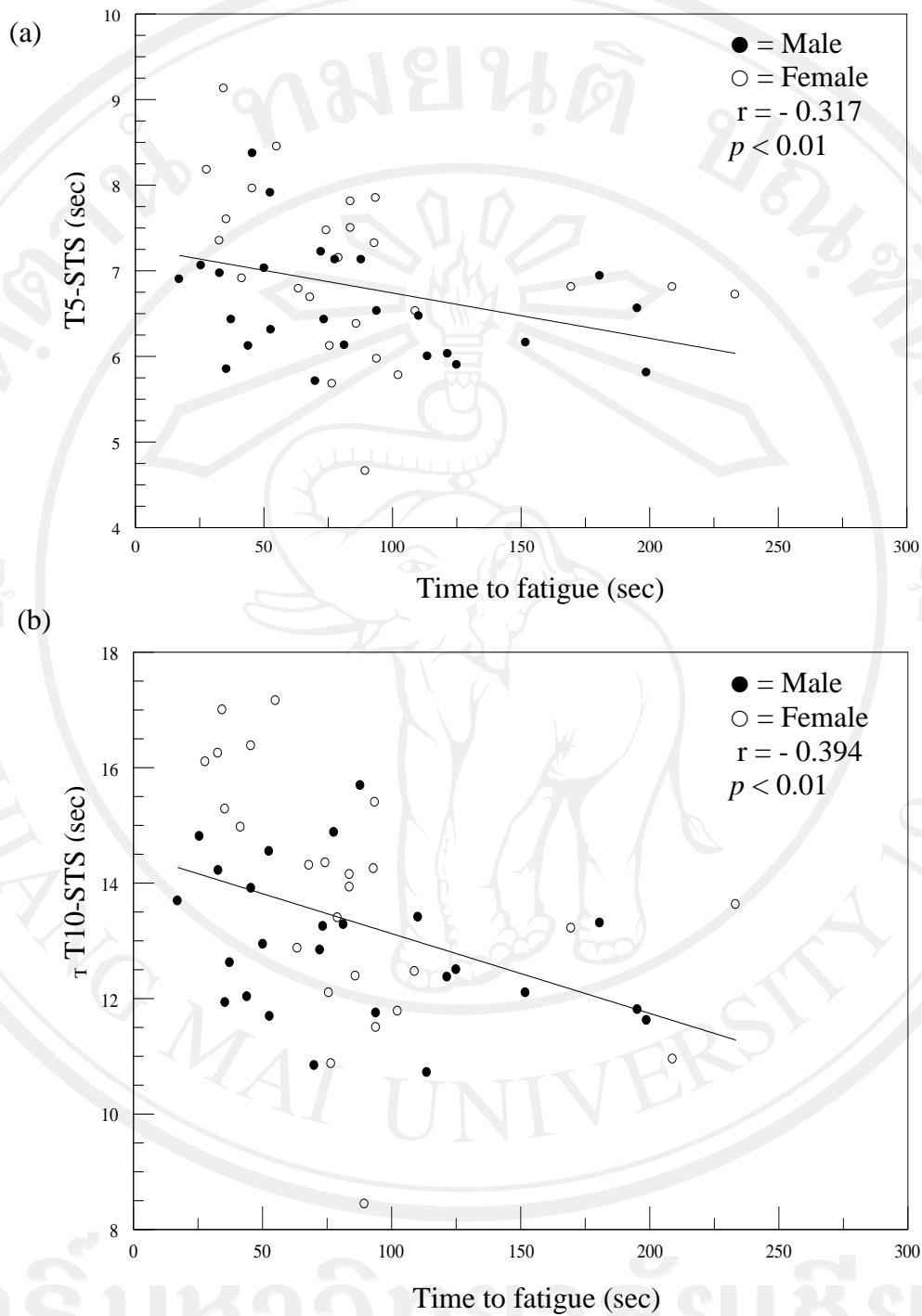and 10 repeated (b) one-leg STS tests

Figure 12 Relationship knee extensor muscle time to fatigue and time to complete the

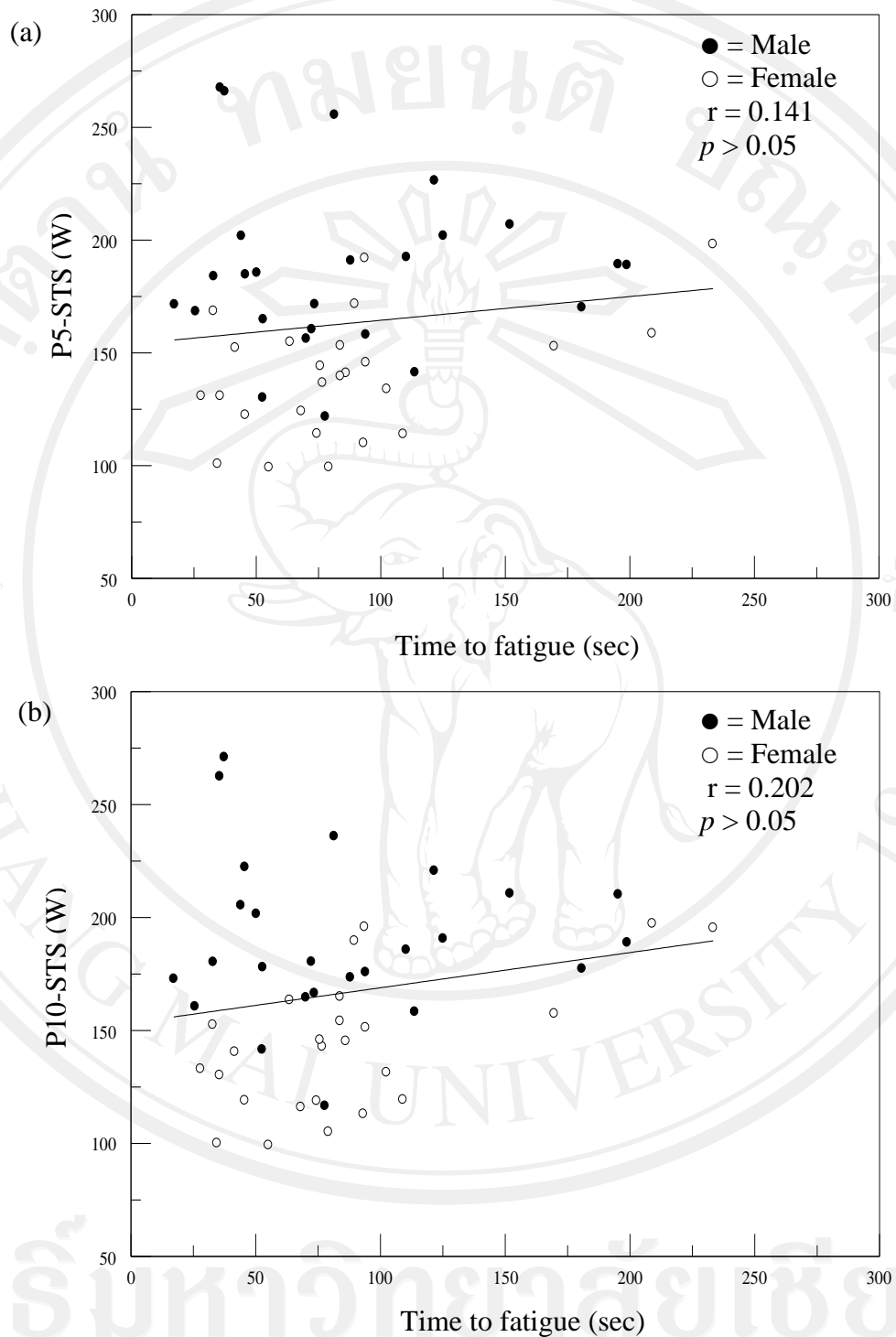5 repeated (a) and 10 repeated (b) one-leg STS tests

Figure 13 Relationship knee extensor muscle time to fatigue and power of the 5

repeated (a) and 10 repeated (b) one-leg STS tests