CHAPTER IV

RESULTS

Thirty-eight hemiplegic patients with and without shoulder pain participated in this study. Demographic characteristics of the subjects in each group are given in table 1. Both groups consisted of eight women and eleven men with hemiplegia. Independent pair t-test was performed to compare the outcome between NSP and SP groups. The average hemiplegic onset of NSP and SP groups were 3.58 ± 3.75 month (1 – 12 month) and 3.79 ± 3.61 month (1 – 12 month), respectively. The average age of NSP and SP groups were 58.26 ± 12.34 years (34 – 79 years) and 58.53 ± 11.92 years (33 - 80 years), respectively. The average weight and height of NSP group was 62.47 ± 12.38 kg (36 – 85 kg) and 158.58 ± 9.85 cm (144 – 150 cm), and SP group was 58.58 ± 12.48 kg (37 – 84 kg) and 161.47 ± 8.87 cm (150 – 177 cm). T-kypho and Hu-inf of NSP group was 8.95 ± 2.79 (3.13 - 15.04), 50 ± 41 mm (10 - 150 mm), as well as, SP group was 8.19 ± 2.47 (3.43 - 12.66), 65 ± 49 mm (0 - 160 mm), respectively. Onset, age, weight, height, T-kypho and Hu-inf were not significantly different between groups.

Table 1 Demographic data of subjects with hemiplegia

Parameter	NSP group (n=19)		SP group (n=19)	
	Mean±SD	Range	Mean±SD	Range
Onset (month)	3.58 ± 3.75	1 - 12	3.79 ± 3.61	1 - 12
Age (year)	58.26 ± 12.34	34 - 79	58.53 ± 11.92	33 - 80
Weight (kg.)	62.47 ± 12.38	36 - 85	58.58 ± 12.48	37 - 84
Height (cm)	158.58 ± 9.85	144 - 150	161.47 ± 8.87	150 - 177
T-kypho	8.95 ± 2.79	3.13 - 15.04	8.19 ± 2.47	3.43 - 12.66
Hu-inf (mm)	50 ± 41	0 - 150	65 ± 49	0 - 160

Figure 1 illustrates the distribution of muscle tone of shoulder adductors of each group. The muscle tone was evaluated using Modified Ashworth Scale. Most of the subjects in the NSP group demonstrated flaccidity (mode = 0, median = 0). In contrast, the SP group presented mild spasticity (mode = 0, median = 1).

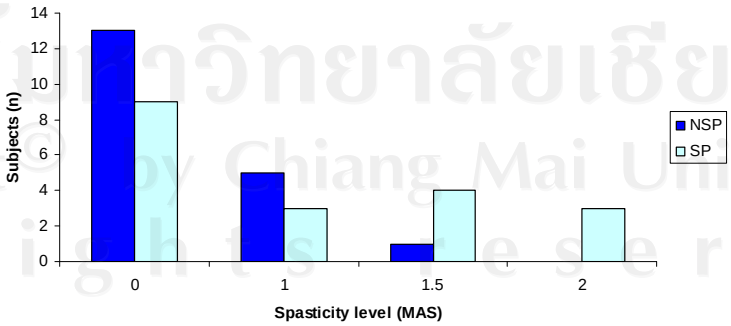

Figure 1 Distribution of Modified Ashworth Scale (MAS) for shoulder adductor muscles during sitting position in NSP and SP.

Figure 2 illustrates the distribution of Motor Assessment Scale of upper extremity in each group. Poor motor recovery was observed in both groups (mode = 0, median = 0).

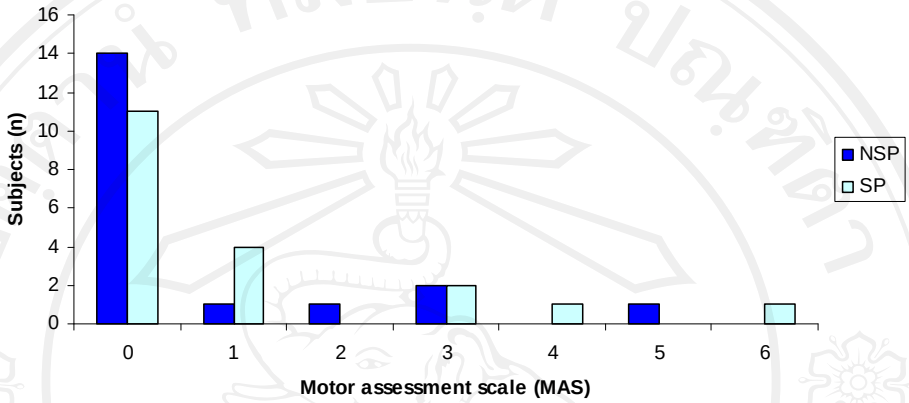

Figure 2 Distribution of Motor Assessment Scale (MAS_{UL}) of upper extremity in NSP and SP.

All subjects in the SP group reported pain at the affected shoulder during movement. Only two subjects reported pain at rest (Figure 3). The VAS during shoulder movement was varied from 2-10 (mode = 3 and median = 4).

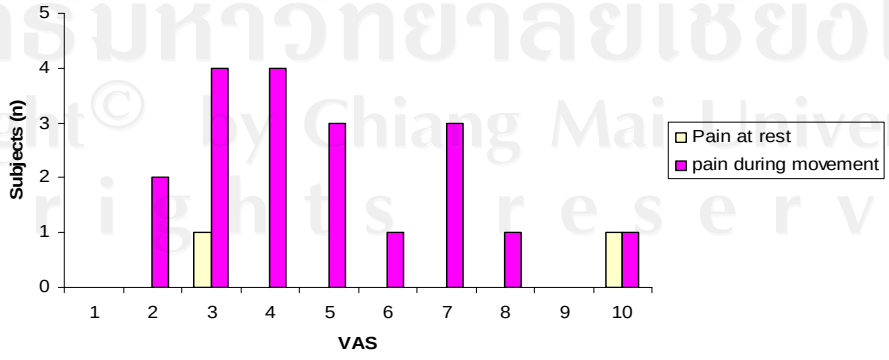

Figure 3 Pain level (visual analogue scale: VAS) in SP group.

The intra-class correlation coefficients (ICC) for each movement are displayed in Table 2. The reliability was high for all assessments, except for scapular rotation at 90 degrees which had moderate reliability at 0.76 and statistics ranging from -0.21 to 0.97.

Table 2 Intra-class correlation coefficients for all measured parameters in 8 healthy subjects

Parameter	ICC (2,1)	Lower – upper bound
horizontal	0.91	0.55 - 0.98
vertical	0.96	0.81 - 0.99
Sc-rot-rest	0.87	0.34 - 0.97
Sc-rot-90	0.76	-0.21 - 0.97
Sc-rot-140	0.91	0.55 - 0.98
Pectoralis minor	0.95	0.73 - 0.9
Pectoralis major	0.99	0.95 - 0.99
External rotator	0.94	0.72 - 0.99
Internal rotator	0.94	0.68 - 0.99

The horizontal and vertical scapular positions of both groups are presented in figure 4. The horizontal and vertical positions in NSP group were 67.32 ± 14.14 mm. and 66.36 ±12.99 mm. respectively, and SP group were 65.61 ± 11.62 mm. and 61.75 ± 9.51 mm. respectively. These scapular positions were not significantly difference between groups.

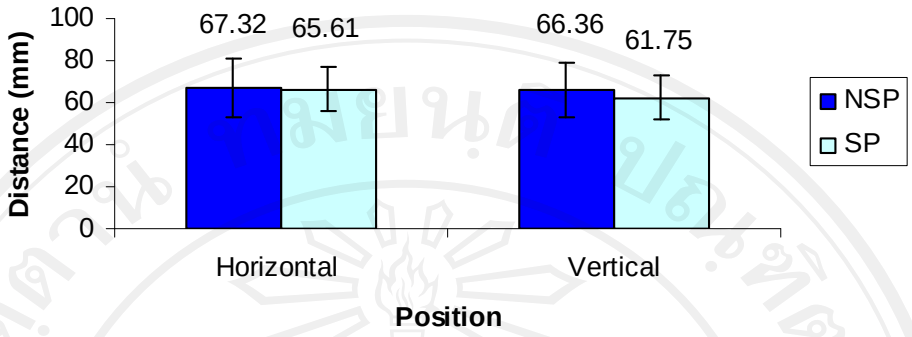

Figure 4 Scapular horizontal and vertical position of hemiplegic subjects in each group.

The scapular rotation at rest (0°), 90°, and 140° of passive GH abduction in the scapular plane, in the NSP group and the SP group are presented in figure 5. Both groups presented scapular downward rotation at rest (NSP = -1.4 ± 5.31° and SP = -2.49 ± 5.6°). Scapular rotated position at 90° and 140° of GH abduction showed a decrease in upward rotation (at 90° of GH; NSP = 20.24 ± 7.03°, SP = 18.75 ± 5.13° and at 140° of GH; NSP = 44.93 ± 5.51°, SP = 41.71 ± 8.39°, respectively). The GH:ST data are represented in table 3. These scapular rotated positions were not significantly different between the NSP and SP groups.

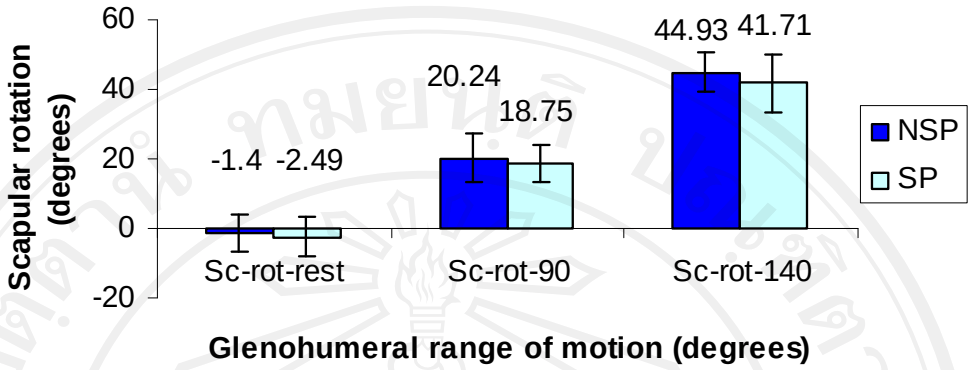

Figure 5 Scapular rotation at resting and during 90° and 140° of passive arm elevation in each group.

Table 3 GH:ST during passive arm elevation at 90 and 140 degrees in hemiplegic subjects (NSP and SP)

Passive GH elevation (degrees)	GH:ST (hemiplegic subjects)	
	NSP	SP
90	3.45:1	3.8:1
140	2.12:1	2.86:1

The results of the shoulder muscle length in both groups are presented in Figure 6 and 7. Muscle length of shoulder internal rotator muscles were significantly different between groups (NSP = 79.84 ± 12.43°, SP = 69.16 ± 16.42°), with large effect size (0.75). The pectoralis major (NSP = 130.37 ± 34.94°, SP = 112.37 ± 28.15°), shoulder external rotator (NSP = 48.63 ± 14.50°, SP = 56.05 ± 11.22°), pectoralis minor (NSP = 7.61 ± 1.27 cm, SP = 7.27 ± 1.40 cm) muscles length were not significant difference between groups.

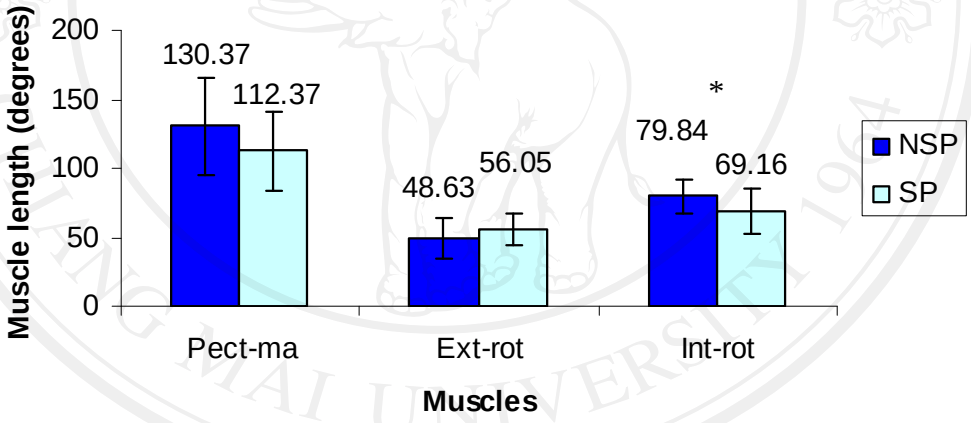

Figure 6 Pect-ma, Ext-rot and Int-rot muscle length of hemiplegia subjects in each group.

* Significant difference at p = 0.03

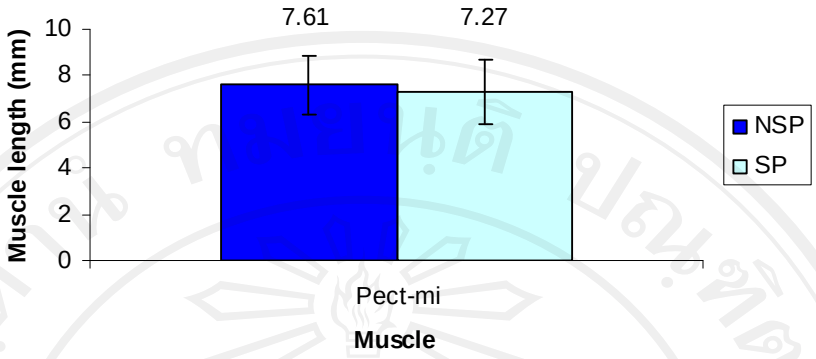

Figure 7 Pect-mi muscle length of hemiplegic subjects in each group.