

## CHAPTER IV

### MATERIALS AND METHOD

This study was a randomized, double blind, controlled trial to compare Electro-acupuncture and rest. The study was approved by the Animal welfare Committee of Faculty of Veterinary Medicine, Chiang Mai University

#### 4.1 Subjects

Subjects were included in the study if the managers of the horse stable agreed to allow their horses to participate in the study. Sample size was calculated from the effect size of 0.75 lb/cm<sup>2</sup> of the differenced pain scores (before and after) between the EA and the rest group with power of 80% at the statistical significant level of .05. To reach this statistical power, at least 6 horses in each group were needed.

There were sports horses and school riding horses. All horses had passed the inclusion criteria which were as follows:

1. The horses' owners accepted acupuncture as a form of treatment for their horses.
2. The horses had back pain for more than 3 months.
3. The horses showed one of the following signs on examination:
  - Sensitivity when a rider mounted, when a saddle was placed on the horse's back, or when the girth was tightened.
  - Exhibited a painful response when an investigator pressed their backs.

- Reluctant to move backwards, reluctant to canter or trot, refusal to jump, had vigorous tail movements, and dragging one or both hind feet.
4. The horses had not been medicated with NSAIDs, steroids, or other pain killers for at least 2 weeks.

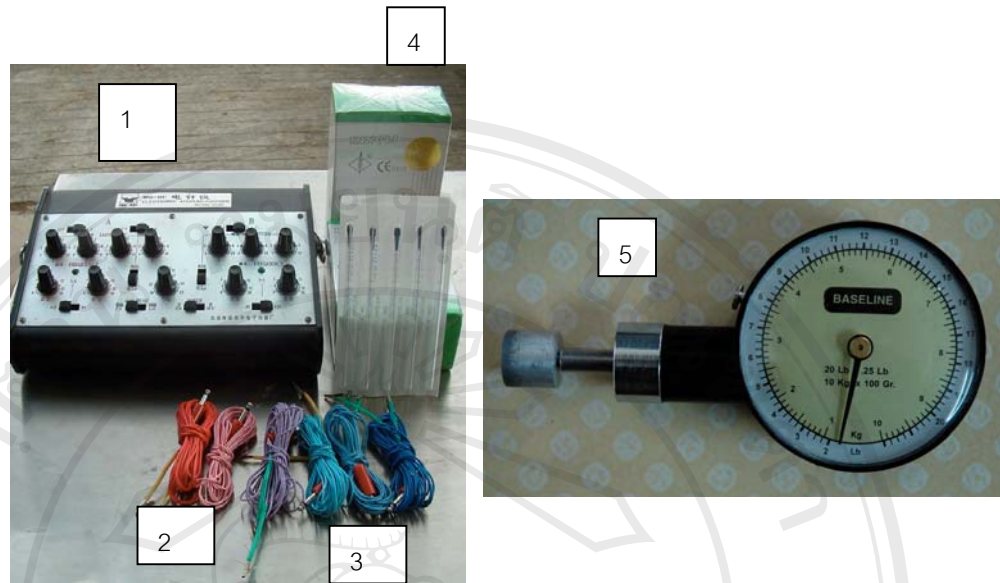
The horses were excluded from the project, if:

1. They had disorders of the hind limbs including fractures, diseases of the tendons, ligaments, joints, or nervous system determined by physical and lameness examinations.
2. They received other treatments such as NSAIDs or antibiotics.
3. They were out of control such as refusing to stay in the stall or kicking.
4. They had any accident during the study.

#### **4.2. Materials:**

The equipment required for this study is listed below (Fig. 4.1):

1. Electro-Acupuncture Unit
2. Electro-Lead (long set)
3. Electro-Lead (short set)
4. Needles gauge 0.40×70mm
5. Pressure Algometer unit
6. Alarm clock



**Figure. 4.1 Equipment for this study**

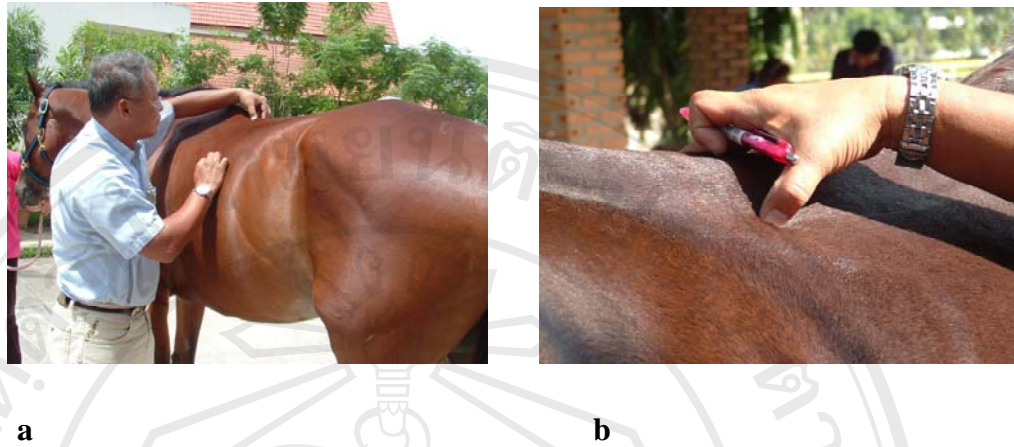
#### 4.3. Method:

##### 1. Two weeks before the screening visit:

The owner or trainer of horses which suffered from back pain stopped all treatment such as injections, oral, and topical medication for back pain for 14 days. The level of pain of the horses was measured by a visual analog scale and used as data.

##### 2. In the screening visit (Day0):

2.1. An experienced veterinarian determined the (Fig 4.2) physical examination and lameness. The horses that shown disorders of the hind limbs were excluded from this study. The horses that were subjects were checked by an experienced veterinarian. Physical examination (Fig4.2) included pressure on the spinous process along the back (withers to sacroiliac joint) and along the back muscles, flexion of back muscles, and flexibility of the back. .



**Figure 4.2** The experienced veterinarian checked the back by palpation: a. pressure on the spinous process along the back (withers to sacroiliac joint) b. pressure with thumb along the back muscles.

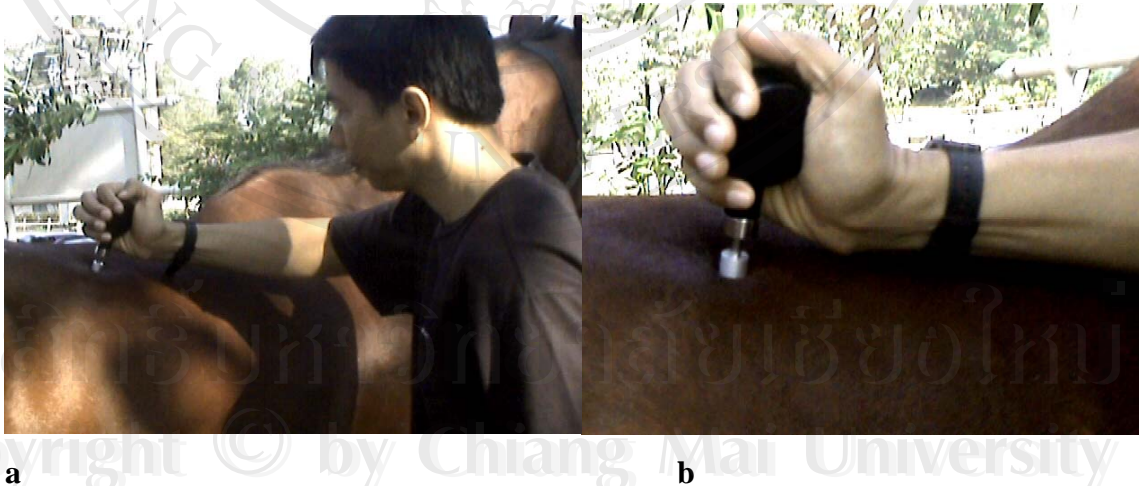
2.2 Blood sampling had been taken from each horse (approximately 20 ml of blood) and the serum was separated and sent to a laboratory for CK and SGOT analysis within 24 hours.

2.3 The horses' backs were examined for trigger points by a Traditional Chinese Veterinary Medical (TCVM) examiner. A trigger point is defined as the most painful point around the affected back. An acupuncturist palpated along the back which corresponds to the bladder meridian (Fig 4.3) and trigger points were marked by clipping away some of the hair.



**Fig4.3 Acupuncturist TCVM checking along the back on the bladder meridian.**

2.4 An experienced physiotherapist evaluated the level of pain at the trigger points using a pressure algometer pressed perpendicular (Fig. 4.3) to the trigger point and the scale were read at the eye level when the horse showed signs of pain or muscle contraction.



**Figure. 4.4 a and b: An experienced physiotherapist evaluated the level of pain by using a pressure algrometer**

3. During the study (day 1-13):

1. The subjects were randomly assigned into 2 groups as previously described. No other treatments were given except the treatment assigned from the study during the period of data collection. The restraints used were a halter or twitch used in the stall but no tranquilizers were used.
2. Horses assigned to the rest group received a placebo treatment. Needles were attached to the acupuncture points without penetrating the skin (Fig 4.4). Electro-acupuncture was attached to the needle without electrical stimulation. Placebo electro-acupuncture was used once every three days for five times. No other treatment, work, or exercise was allowed for 16 days except routine walking.



**Figure 4.5 Horse in the rest group receiving placebo treatment. The needles were attached with glue and did not penetrate the skin.**

3. Horses in the experimental group received Electro-Acupuncture (EA) once every three days for five times. The procedure is described below:

- Step 1. Cleaning of skin on the area horse's back.
- Step 2. Electro-Acupuncture device WQ-6F was used with a current of 4.5 volts.
- Ten acupuncture points were selected following the approved Xie technique(62). Name of acupuncture points, site, location, and manipulating method are listed in table 4.1. The disposable acupuncture needles (0.40×70 mm) were used (Fig 4.5).



a

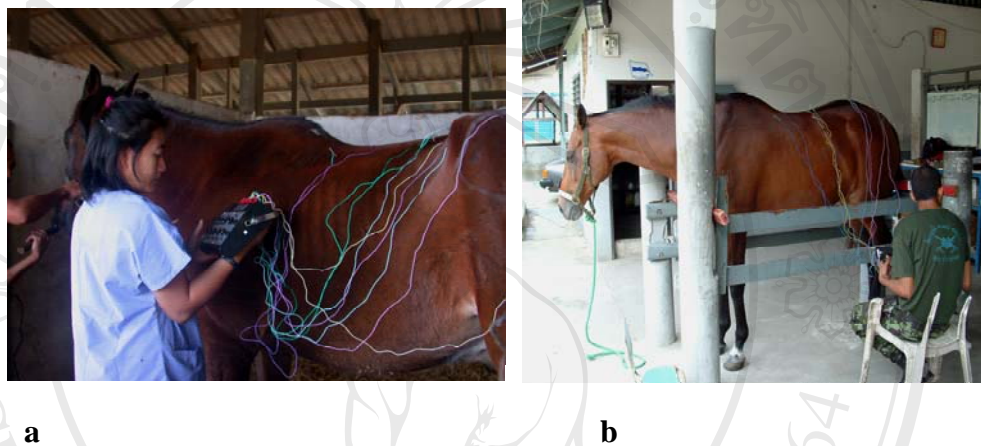
b

**Figure 4.6 a.**A horse with a penetrating acupuncture needle at the acupuncture point BL 17. **b.** The needles were hooked together through an electrode and were called a set.

- Two needles of two different acupuncture points (1 needle per point) were hooked together through an electrode and were called a set. GV-20 and GV-6 was the first set; the left and right side of BL-26 was the second set; the left and right side of BL-

54 was third set; the left and right side of BL 21 was fourth set; and the left and right side of BL 17 was fifth set (Figure 4.6).

- Each treatment was administered for 30 minutes (20 Hz for 15 minutes and 80-120 Hz for another 15 minutes). Each horse received five acupuncture treatments, once every three days.

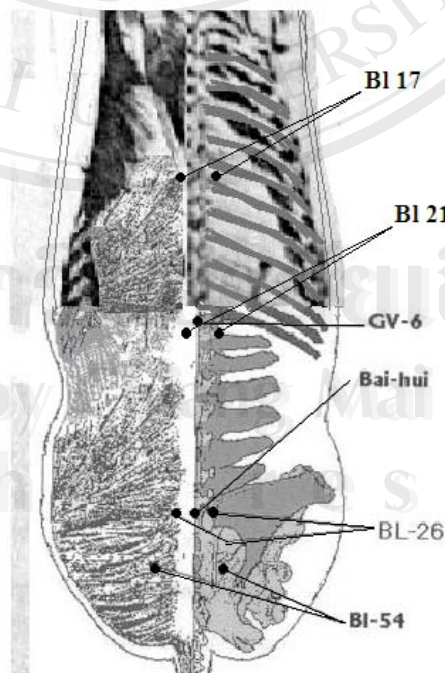


**Figure.4.6 a. and b. The horse was administered electrical stimulation for 30 minutes**



**Table 4.1. Name of acupuncture points, the location of the points, and the needling depth used in this study.**

Name of acupuncture point	Site	Location	Manipulating method
Bai-Hui (GV-20)	One point	Between the spinous processes at the lumbosacral junction	Perpendicular insertion, 7 cm deep.
Duan-Xue (GV-6)	One point	Between the spinous processes of T18 and L1	Perpendicular insertion, 4 cm deep.
Shen-Shu(BL-26)	Bilaterally	2 cun (about 6 cm) lateral to Bai-hui	Perpendicular insertion, 7 cm deep.
Ba-shan(BL-54)	Bilaterally	Midpoint between the greater trochanter of femur and Bai-Hui	Perpendicular insertion, 7 cm deep.
Wei-Shu BL 21	Bilaterally	Thoracolumbar junction (T18-L1), 3 cun lateral to dorsal midline	Perpendicular insertion, 7 cm deep.
Ge-Shu Bl 17	Bilaterally	12 <sup>th</sup> intercostals space.	Perpendicular insertion, 7 cm deep.



**Figure 4.7. Ten acupuncture points used in this study**

4. After treatment (day 14): The pain level was re-evaluated by the same physiotherapist who used a pressure aglometer at the trigger point.

#### 4.4. Statistical analysis:

Comparison of baseline mean pain scores (d0) between rest and EA group was tested using *unpaired t-test*

Comparisons of pain scores between pre (d0) and post treatment (d14) within each group were tested using *paired t-test*

Comparison of pain change between rest and EA group was tested using *unpaired t-test*