CHAPTER 3

METHODS

1. Participants

Sample size was estimated from the pilot data of the primary outcome measure (VAS). At least fifteen subjects were required to obtain the effect size of 1.039, alpha level at 0.05 with the power of 0.80. All members of 16 Thai women national weightlifters were considered to be recruited into the study.

1.1 Inclusion criteria: Subjects were included into the study if:

1. They aged between 18-40 years.

2. They gave informed consent prior to entry into the study

3. They were not in the state of menstruation.

1.2 Exclusion criteria: Subjects were excluded from the study if:

1. They had sensory deficits (e.g. numbness, paresthesia) over trunk or lower limb.

2. They had an inflammation or skin diseases over trunk area.

3. They had history of spinal surgery.

4. They had been diagnosed as having spinal disorders or nerve compression in the past 3 months.

2. Study design

The within-subject, repeated measures design was used in the study. Participants received interventions in two conditions (First: sport massage condition, second: sport massage in combination with lumbopelvic stability training condition). Each experimental condition attended the laboratory for 3 sessions to confirm the therapeutic effect of treatment condition with potential wash out period of 24-48 hours interval between sessions. The ethical clearance was obtained from the Faculty Research Ethics Committee.
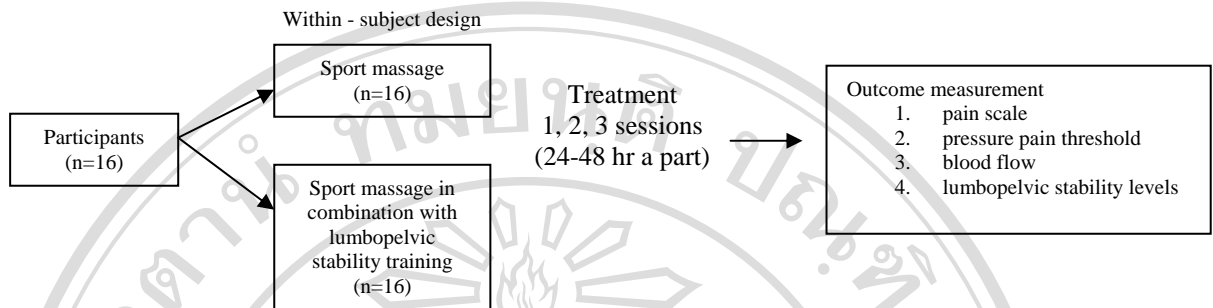
3. Equipments

1. Pressure algometer; strain-gauge, SOMEDIC, Sweden

2. Laser Doppler blood flow meter, Moor , UK

3. Air Pressure biofeedback unit (PBU), Chattanooga, USA

4. Timer

5. Massage table, bed sheet, and pillows

6. Magic pen

7. Powder

8. Towels

9. Inform consent, evaluation form, and Questionnaire

4. Procedures

1. Participants were screened for the suitable inclusion and exclusion criteria.

2. Information regarding the purposes and procedures of the study were

informed to the participants.

3. Participants signed an inform consent before entry into the study and were requested not to take alcohol, stimulant (e.g. caffeine) or medications of at least 6 hours prior entering to the experiment.

4. Participants received intervention in two conditions (First: sport massage condition, second: sport massage in combination with lumbopelvic stability training condition) with at least 4 weeks rest interval between condition.

5. An average pain at rest using visual analog scales, an average pressure pain threshold (over both sides of upper trapezius and L4-5), and lumbopelvic stability levels were the primary outcome measures. An average blood flow was the secondary outcome measures. These outcome measures were evaluated at pre- and post-intervention of each experimental session.

6. The sport massage condition received 20 minutes of sport massage cover the area of occiput, acromion processes and axillary lines to posterior iliac crest. The technique consisted of compression (static contact) 3 minutes, effleurage 6 minutes, petrissage (wringing and picking up) 4 minutes, kneading 5 minutes, friction 1 minutes and repeat effleurage 1 minute.

7. The sport massage in combination with lumbopelvic stability training condition received 10 minutes of the lumbopelvic stability training and 20 minutes of the sport massage.

Within - subject design

Sport massage
(n=16)

Participants
(n=16)

Sport massage in
combination with
lumbopelvic
stability training
(n=16)

Treatment
1, 2, 3 sessions
(24-48 hr a part)

Outcome measurement
1. pain scale
2. pressure pain threshold
3. blood flow
4. lumbopelvic stability levels

4.1 Condition I: Investigation of the effects of the sport massage

1. Participants were in prone position with head and neck in neutral position.

2. The laser Doppler blood flow meter (Moor, UK) was used to detect the tissue blood flow over the standard fix point at right facet joint (T12–L1) and maintained for recording the analogue data for 2 minutes (42). Then, the other outcome measures (i.e., pain visual analog scale, pressure pain threshold, lumbopelvic stability test) were assessed. The pressure algometer (SOMEDIC, Sweden) was used to evaluate pressure pain threshold. The pressure algometer was placed on the most sensitive spot at both sides of the upper trapezius and over the facet joint (L4 - L5) (43, 44).

3. After participants received 20 minutes of sport massage, participants were reassessed for blood flow, pain visual analog scale, pressure pain threshold and lumbopelvic stability test.

4. Participants were appointed for the 2nd and the 3rd session experimental sessions at about 24-48 hours interval between sessions.

4.2 Condition II: Investigation of the effects of the sport massage with lumbopelvic stability control.

1. Participants were in prone position with head and neck in neutral position.

2. The laser Doppler blood flow meter (Moor UK), pain visual analog scale, the pressure pain threshold, and lumbopelvic stability test were measured as the similar protocol of condition I.

3. Participants received 10 minutes of lumbopelvic stability training as following: the participants were in supine position with knee flexion of 70 degrees. The pressure biofeedback unit (PBU) was placed under the lumbar spine (L2-L4) to monitor the position and pump the pressure transducer to 40 mmHg. The participants were maintaining the stability of trunk in each level. There were 7 levels of the lumbopelvic stability training, the participants were performed the lumbopelvic stability training at level of their performance and 1 more advance level (appendix F). Each task consisted of 8 times x 2 sets with 15 seconds rest interval between repetitions. After intervention, participants were reassessed for blood flow, pain visual analog scale, pressure pain threshold, and lumbopelvic stability test.

4. Participants received 20 minutes of sport massage as the similar protocol of condition I. After intervention, participants were reassessed for blood flow, pain visual analog scale, pressure pain threshold, and lumbopelvic stability test.

5. Participants were appointed for the 2nd and the 3rd session experimental
sessions at about 24-48 hours interval between sessions.

5. Location

The study was conducted at the weightlifting camp and the Neuro-
Musculoskeletal & Pain Research Unit (NMPRU) at the Department of Physical
Therapy, Faculty of Associated Medical Sciences, Chiang Mai University.

6. Statistical analysis

Repeated measured ANOVA was used for data analysis for pain visual analog
scale, pressure pain threshold, and blood flow. If the data was not normal distribution
and heterogeneity of variance, the non-parametric statistics were used for data
analysis.

Lumbopelvic stability test would be assessed using non-parametric statistics,
Wilcoxon signed ranks tests, as this outcome measure was an ordinal scale**.**

The alpha level for all results was set at 0.05 to determine the significance of
differences.

7. Reliability study

7.1 Reliability of the masseuses for sport massage

This thesis study involved with 2 masseuses for performing sport massage
techniques. Therefore, reliability between masseuses were evaluated using weight
scales. The reliability between masseuses in performing the massage techniques was

evaluated in 1 single subject. To replicate the study protocol for massage techniques, an application was performed for a total time of 30 minutes. Each of sport massage techniques (i.e. static contact, efflurage, pastisage, kneading and fiction) was repeated for 6 times and evaluated for the pressure levels in kilogram unit. The intratester reliability of masseuses while performing each massage technique was acceptable with the ICCs ranged from 0.98-0.99. In addition, the intertester reliability between the masseuses were also acceptable with the ICCs value over than 0.98.

7.2 Reliability of the pressure pain threshold (appendix F)

The pressure pain threshold was evaluated using a digital pressure algometer (SOMEDIC, Sweden). The reliability of the pressure pain threshold was tested in 5 subjects. Measurement was repeatedly tested for 5 times with 30 seconds rest-interval between each measurement. To replicate the study protocol for pressure pain threshold, an evaluation of reliability was performed at 30 minutes and 1 days a part between sessions. The intratester reliability of pressure-pain threshold in this study was acceptable with the ICCs ranged from 0.89-0.99.

7.3 Reliability of the blood flow test (appendix F)

Blood flow was evaluated using Laser Doppler flow meters (Moor, UK). The reliability of the blood flow was tested in 5 healthy subjects. Measurement was tested and re-tested in prone position as similar to the study protocol. To replicate the study protocol, the evaluation for reliability was taken at 30 minutes and 1 day a part

between sessions. The intratester reliability of blood flow in this study was acceptable with the ICCs ranged from 0.96-0.99.

7.4 Reliability of lumbopelvic stability test (appendix F)

The lumbopelvic stability test was evaluated by using the lumbopelvic stability testing protocol. The reliability of the lumbopelvic stability test was evaluated in 5 healthy subjects. Measurement was tested and re-tested in supine position with knee flexion of 70 degrees as similar to the study protocol. The pressure biofeedback unit (PBU) was placed under the lumbar spine (L2-L4) to monitor the position and pumped the pressure transducer to 40 mmHg. To replicate the study protocol, an evaluation for reliability was performed at 30 minutes and 1 day a part between sessions. The intratester reliability (ICCs) of lumbopelvic stability test in this study was also acceptable with the ICCs at 0.88.