An examination of subject variables that influence pressure pain threshold

A thesis submitted for the degree of Doctor of Philosophy

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2015

CERTIFICATE OF ORIGINAL AUTHORSHIP

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

Signature of Student:

Date: 15/10/2015

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Abstract

Background: Pain is a primary clinical concern for most people. Pain is the most common reason for seeking any form of health assistance be it medical, dental, physiotherapeutic or alternative disciplines. Pain threshold is defined as the lowest application of a stimulus that is perceived as pain. Experimental pain studies use a range of pain challenges including electrical, heat or cold, ischaemic and pressure. Some carry a higher potential risk of tissue injury or the sensations experienced are less acceptable to subjects. Pressure pain threshold (PPT), measured by a simple mechanical algometer is an attractive alternative well-suited for non-invasive repeated measurements on multiple sites not limited to limbs over short time intervals in a relaxed setting. Since 2000, the University of Technology Sydney had conducted eight PPT studies and collected over 47,500 baseline PPT measurements on 262 healthy subjects at 24 regional sites with three or four PPT readings for each site at each session of four to eight occasions of at least one week apart. Research Study One included seven studies with over 32,000 pre-intervention PPT measures on 235 healthy subjects at 17 sites with three PPT measures at each occasion for four consecutive occasions. These data were being analysed to develop comprehensive epidemiological profiles that assess relationships between PPT with subject variables (gender, age, BMI) and duration of temporal sessions. Research Study Two assessed the PPT at two affected and two non-affected sites of 20 patients with lateral epicondylitis. Research Study Three examined the inter-device reliability between mechanical and electronic algometers at six sites of 17 subjects.

Aims: Research Study One explored the temporal stability of possible relationships between subject variables of gender, age and BMI, the duration of temporal sessions with the regional PPT at each measurement site. Research Study Two assessed the regional PPT measures at LI10 and LI11 of the affected and non-affected elbows for subjects with lateral epicondylitis. Research Study Three examined the inter-device reliability of a mechanical and an electronic algometers of same measurement parameters: circular rubber plunger of 1cm^2 and force application rate of 1kg/s.

Methods: Research Study One: All studies used the same protocol including the same model algometer, tip dimensions, application rates, rest interval between measurement cycles and at least seven days between each of four data collection visits. Regional PPT measurement sites included sites on head, neck and limbs. Data analyses used GLM and the alternative non-parametric tests wherever applicable. Research Study Two: A double blind randomised controlled trial that involved PPT measurements at two affected and two non-affected acupoints LI10 and LI11. Research Study Three: PPT measurements were taken by trained examiners using electronic and mechanical algometers

alternatively at six sites on hands. Subjects were blinded with a curtain drawn across the neck to the type of algometer being applied at each site.

Results: Research Study One: For all 17 sites, the regional PPT for males was significantly higher than for females for each visit and each measurement cycle in general and in Intervention and Control groups. No significant differences between mean PPT and median PPT, and between the means of PPT_{mean} and PPT_{median} for each gender at all 17 measurement sites. The mean and median PPT among reading cycles within gender were generally stable for both genders independent of temporal visits. Irrespective of gender, most sites showed significant increase in means of PPT_{mean} and PPT_{median} over temporal sessions in general and in Intervention but not the case in Control. The Pearson correlation coefficients of PPT with age and BMI for both genders at all measurement sites were generally weak (<0.35 in magnitude). Stepwise multiple regressions models had PPT_{mean} or PPT_{median} in Visit 1 related to solely gender in all sites except bilateral LI20 with age and gender and PC6L with BMI only. Research Study Two: Generally significant increase of mean PPT at non-affected and affected sites in Acupuncture than Sham Laser and in males than females. Research Study Three: The mean PPT of mechanical algometer did not differ with that of electronic algometer at all six measurement sites.

Conclusions: Research Study One: Data analysis on PPT to be completed separately by gender. Experimental design for PPT between subjects should ensure a matched gender ratio across groups. Washout period to be extended. Research Study Two: The males received higher PPT than females whilst both genders showed higher PPT from acupuncture treatment than the sham laser in lateral epicondylitis. Research Study Three: Both mechanical and electronic algometers provided valid and reliable PPT scores under similar protocols.

Contents

Tables

Figures

Seminars

a. **Cheah SL** (poster and short oral presentation), Cobbin D. Temporal stability of regional pressure pain threshold between genders in healthy adults. New Horizons 2014: 17&19 November. (Appendix 16)

b. Christine Berle, Christopher Zaslawski, Deirdre Cobbin, Peter Meier, Sean Walsh and **Seong Leang Cheah.** The effect of acupuncture treatment compared to sham laser for lateral elbow pain: a randomised controlled pilot study. World Federation of Acupuncture/Moxibustion Societies, Sydney 2-4th November 2013.

c. Christine Berle, Christopher Zaslawski, Deirdre Cobbin, Peter Meier, Sean Walsh and **Seong Leang Cheah**. (5-7th October, 2012). The effect of acupuncture treatment compared to sham laser for lateral elbow pain: A randomised controlled pilot study. International Scientific Acupuncture and Meridian Symposium, iSAMS 2012.

d. Zaslawski C, Berle C, Cobbin D, Meier P, Walsh S and **Cheah SL**. The effect of acupuncture on lateral elbow pain. Inaugural Chinese Medicine Academic Conference 2011 at University of Technology Sydney: August 20-21.

e. Zaslawski C, Berle C, Cobbin D, Meier P, Walsh S and **Cheah SL**. The effect of acupuncture treatment compared to sham laser for lateral epicondylalgia: A randomised controlled pilot study. Australian Acupuncture and Chinese Medicine Conference 2011 in Perth May 20-22.

Conference abstracts

a. **Cheah SL,** Cobbin D. 2014 New Horizons, 17&19 November, Final program and abstract book: Temporal stability of regional pressure pain threshold between genders in healthy adults. 49. (Appendix 17)
b. Christine Berle, Christopher Zaslawski, Deirdre Cobbin, Peter Meier, Sean Walsh and **Seong Leang Cheah.** 2013 Australian Journal of Acupuncture and Chinese Medicine, Selected Conference Abstracts: The effect of acupuncture treatment compared to sham laser for lateral elbow pain - A randomised controlled pilot study. 8(2):28-29. (Appendix 18)
c. Christine Berle, Christopher Zaslawski, Deirdre Cobbin, Peter Meier, Sean Walsh and **Seong Leang Cheah.** 2012 Australian Journal of Acupuncture and Chinese Medicine**,** Selected Conference Abstracts: The effect of acupuncture treatment compared to sham laser for lateral epicondylalgia: results from a randomised controlled pilot study. 7(1):39. (Appendix 19)

Publication

d. Chenoweth L, Jeon YH, Stein-Parbury J, Forbes I, Fleming R, Cook J, **Cheah SL**, Fletcher S, Tinsley L. PerCEN trial participant perspectives on the implementation and outcomes of person-centered dementia care and environments. International Psychogeriatrics 2015 Aug 26: 1-13.

Note: Papers related to abstracts in a, b, and c will be prepared for publication. Paper (d) has no relation to this thesis but rather part of skill earned as data manager for the project.

Chapter 1: Introduction

1.1 Background

Pain is a primary clinical concern for most people. Pain is the most common reason for seeking any form of health assistance be it medical, dental, physiotherapeutic or alternative disciplines. While pain is a phenomenon (Bäcker et al 2010) experienced by virtually everybody, a comprehensive definition remains elusive. This reflects the complex nature of the pain experience. Some descriptions focus upon the frequent association between pain and actual or potential damage to human tissues (Ogimoto et al 2002; Christidis et al 2005; Fernandez-de-las-Penas et al 2006b; Rolke 2006) where it provides an 'alarm or early warning function'. By contrast, others are concerned with emotional hurt where the experience, while cognitively intense (Isselée et al 1997; Ishitani et al 2005), occurs in the absence of tissue injury (Williams et al 2004; Vedolin et al 2009).

However, all manifestation share the common underlying characteristic that pain is a brain event and is perceived (Williams et al 2004; Zhang et al 2009) or experienced (Katz et al 1999) solely by the conscious brain. This means that all pain is subjective and its interpretation in terms of quality and intensity is influenced by the individual sufferer's past experiences and expectations (Katz et al 1999) as well as the current physiological state (Vedolin et al 2009). The study of pain has become a primary concern for understanding both human physiology and clinical disease states (Isselée et al 1997) as evidenced by the longstanding publication of prestigious journals such as Pain and The Clinical Journal of Pain.

1.2 Pain models

The origin of pain was drafted by the French philosopher and mathematician Réne Descartes (1596-1650) in a linear causality model which claimed the mechanical transmission of pain stimulus in a passive and unidirectional manner to the brain just like the pulling at other end of the robe connected to the doorbell and caused the instant stroke of a doorbell (Melzack and Wall, 1965; Bäcker et al 2010). This concept of pain perception evolved into the specificity theory and pattern theory which were basis to the gate control theory emerged in 1965 (Melzack and Wall, 1965; Melzack 1996; Wall 1996; Wolff 1996). This theory proposed that pain phenomena were determined by interactions among three spinal cord systems. The nociceptive stimulus information was transmitted and modulated many times in its path from the receptor to the brain based on the mechanism of inhibitory and excitatory influences in the central nervous system

instead of unidirectional. This model has great impact to pain research and was further incorporated with the systems theory that evolved in the 1980s in which a stimulus did not directly provoke an event but modified an existing active system. It was the physical and biochemical conditions and activities within the individual, and not the direct external stimulus alone that was responsible for the pain sensation. The level of pain sensation was determined by the interplay between the pain-inhibiting and pain-promoting mechanisms (Bäcker et al 2010). This has potentially explained at a neuronal level the working of acupuncture by aiding the individual's own pain inhibiting mechanisms to alleviate pain via local analgesic and anti-inflammatory action (Wu et al 2002; Zijlstra et al 2003; Rong et al 2005; Zhao 2008; Kim et al 2011; Leung 2012; Hadianfard et al 2014).

Whilst the above theories have difficulties in explaining some of the biopsychosocial factors that related to pain (e.g. phantom limb), Melzack and Wall revised and associated the gate theory with additional components involving psychological factors (e.g. stress, anxiety, memory) into the recently evolved neuromatrix theory (Melzack 1993, 1996; Wolff 1996; Melzack 1999; Leskowitz 2000) that focus on the well-being of an individual as a balance of mind, body, spirit and environment (Melzack 2001; Wheat et al 2007; Kim et al 2011; Lee et al 2013; Cheng et al 2014) and has drawn growing interest into the field of complementary and alternative medicines as seen in Australia (Leach et al 2014; Steel et al 2014). However, of interest is the application of the model in the study of PPT (Bittar et al 2005; Oosterwijck et al 2011; Jay et al 2014). The UTS PPT studies had at certain extent explored PPT in relations to the biopsychosocial elements (Li et al 2005; Zaslawski 2006; Yuan 2002; Szabo 2007).

1.3 Measuring pain

Pain remains difficult to define and to measure because its experience is multidimensional as well as variable in intensity. A major advance came from the work of Melzack and colleagues at McGill University (Melzack 1975) that led to the development of the widely accepted McGill Pain Questionnaire (MPQ), that has been shown to measure the experience of pain both reliably and validly (Melzack and Wall 1988; Katz and Melzack 1999). The MPQ continues to be used widely to monitor quality and intensity of pain over time and to determine the effectiveness of analgesic interventions. This versatile instrument takes into account three dimensions of the pain experience dubbed sensory, affective and evaluative. Its extensive use in many studies internationally has clearly shown that it is possible to reliably assess pain both in the clinical setting and in laboratory studies.

The MPQ has been used to measure pain tolerance (Edwards et al 2001) defined as: *the lowest stimulus level at which the subject withdraws or asks to have the stimulus stopped* (Melzack and Wall 1988) as well as the less confronting pain threshold: *the lowest stimulus value at which the person reports that the stimulus feels painful* (Gazerani et al 2006). For obvious reasons, experimental pain studies that make use of measures of pain tolerance present ethical concerns. Therefore, most experimental pain studies focus on the measurement of experimental pain thresholds, in view of the potential for tissue damage.

However there are two separate aspects to pain measurement and the MPQ only addresses one, which is quantifying the actual pain experience. The other aspect is the reliable quantification of the intensity of the pain inducer or challenger that is being delivered and is the province of dolorimetry. A dolorimeter is an instrument designed to deliver a stimulus capable of inducing pain in a controlled manner so that the stimulus can be gradually increased and reliably measured. Different dolorimeters have been developed to deliver different qualities of stimuli for example heat, electrical and pressure. Measuring pain threshold and tolerance are two of the main endpoints studied in dolorimetry.

In 1884, Goldscheider described experimental procedures for eliciting pain thermally by placing hot objects on the skin or immersing a limb in hot water (Hardy et al 1940). In 1940, a more refined method that also used thermally induced pain was developed by Hardy and colleagues. Regarded as the first dolorimeter, their device was designed to deliver a quantified and variable thermal stimulus to elicit pain (Hardy et al 1940, 1947). The stimulus was the intensity of heat projected from a 1000 watt light bulb that was focused through a lens onto a blackened area on the subject's skin and applied for a constant interval (three seconds). The intensity of the radiation was controlled and varied using a rheostat. If no pain was experienced, the intensity of the light was increased and after 30 to 60 seconds the test was repeated. This procedure was repeated until the subject reported feeling pain at the end of the exposure and was equated to the pain threshold. Using the same three subjects (the experimenters themselves) this was found to be relatively constant over many months both within and between the three subjects. By increasing the thermal intensities, the group developed a pain scale, called the *Hardy-Wolff-Goodell Scale*, with ten gradations or *dols*. However, the thermal method was inappropriate for determining pain tolerance due to potential and actual tissue injury, such as blistering associated with higher intensity stimuli.

A different approach to temperature induced pain that does not have the risk of tissue damage is the pain induced by immersion in very cold water, commonly known as the cold pressor test. For example, Krishnan et al (2012) used two specifically designed cylindrical temperature-controlled water baths with a thermo-regulator in which the subject's forearm and hand were immersed for cold pain threshold and cold pain tolerance measurements.

Ischaemic pain has also been employed as the challenge. For example, Krishnan et al (2012), using a blood pressure cuff on the subject's arm, increased the cuff pressure to 20mmHg above the subject's systolic pressure. Subjects then performed a handgrip exercise on an elastic ball in time with the rate of the beat of a metronome while the pressure at the cuff was maintained. During the exercise period each subject immediately signalled when they first detected (experienced) pain and then, when they could no longer tolerate the pain. Both endpoints were recorded in seconds by the researcher.

Electrical stimulation has been widely used in pain measurement studies although it brings with it a suite of application and quantification hurdles often related to the variable conductivity of the skin, the need for two electrodes and variable electrode dimensions (Maresca et al 1983, Krishnan et al 2012). The development of TENS devices facilitated ready availability of a highly adaptable, compact and portable stimulation source and a delivery mode that could be controlled by the subject, thereby eliminating measurement error stemming from the response time of the individual applying the stimulus.

Pressure represents yet another pain challenge and mechanical devices to produce pain experimentally, had been developed by von Frey (1897) and Eddy (1932), as reported by Hardy et al (1940). The first dolorimeter that measured pain threshold produced by application of pressure was developed by Gluzek in 1944. The patient's leg was stabilised on a leg rest and gradually increasing pressure was applied to the tibia until it was reported to produce pain. The pressure pain thresholds were reported to range 500 to 2700 grams of applied pressure.

This method has evolved into what is more widely known as algometry. An algometer (Figure 1.1a) is an instrument for measuring the intensity of pain-inducing stimuli. In the clinical and/or experimental setting, algometers are widely used to quantify the pressure and/or force required to elicit either a pressure induced pain threshold or tolerance in subcutaneous and underlying tissues. In the experimental setting, both threshold (Chung 1992; Cathcart et al 2006, 2008) and tolerance (Fischer 1987; Edwards et al 2001) are typically measured. Pressure pain threshold

(PPT) is defined as *the minimum force per unit area that induces discomfort or pain* whereas pressure pain tolerance is *the maximum force per unit area a person can tolerate without excessive effort* (Fischer 1986).

The algometer is a spring loaded pressure gauge, attached to a rubber-tipped stylus and a force dial which reads in pounds or kilograms. When in use, the flat, circular rubber tip (areas ranging from 0.5 to 1.5 cm^2; UTS PPT studies used $1cm^2$) of the plunger is placed perpendicular to the subject's skin and pressure steadily applied until the subject reports that the pain threshold (or pain tolerance) is perceived. Pressure is applied at a uniform rate of 1kg/s in all UTS PPT studies.

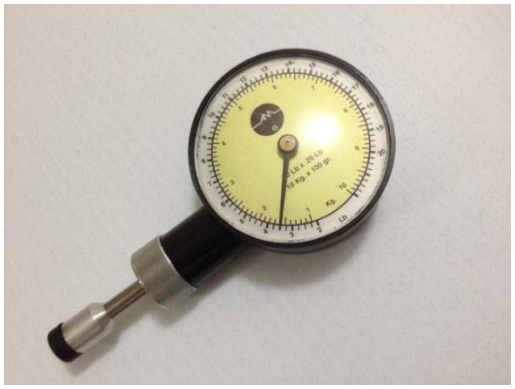


Figure 1.1a: A mechanical algometer.

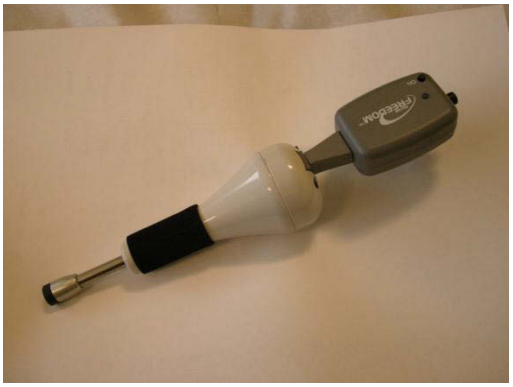


Figure 1.1b: An electronic algometer.

Nowadays, there are both mechanical (Figure 1.1a) and electronic (Figure1.1b) algometers used for clinical practices and experiments. The electronic algometer has been described by some as an improved version of the mechanical algometer, because it removes measurement error stemming from the response time of the individual applying the pressure. However, it loses the flexibility of the manual method in situations where multiple body sites are to be measured and remeasured in a short period of time.

In brief, dolorimetry research has led to development of dolorimeters designed to deliver and measure a range of pain challenges. Many experimental studies on pain thresholds involve measurements of electrical pain thresholds (Maresca et al 1983; Krishnan et al 2012; Li et al 2013), thermal pain thresholds (Hwang et al 2012; Li et al 2013) and ischaemic pain thresholds (Frölich et al 2012). PPT was chosen for the present research because of a series of characteristics that made it most appropriate. However no matter which pain challenger is selected, there are both advantages and limitations. Importantly it must be emphasised that the quality of the pain experience also differs with the quality of the challenger.

Pain challengers	Limitations
Electrical pain	Requires sophisticated and isolated power source. Needs meticulous preparation to ensure reliable electrical contact (Lund et al 2005). Time consuming and irritating for the participant (Lund et al 2005). Difficult to prepare multiple measurement sites. Many subjects dislike electrical sensations.
Ischaemic pain	Measurements are restricted to limbs (Roche et al 1984). Onset and termination are gradual and appears to be a practice effect with repetition (Barlas, 2000). Repeated measurements are time consuming (Panza et al 1995).
Thermal pain	Comparisons between heat and cold stimuli are difficult to interpret due to large inter-individual variations in baseline thermal, heat or cold, pain threshold (Johnson et al, 1989). Measurements of heat and cold pain threshold tend to be limited at the superficial nervous tissue while clinical pain cases concern the underlying deeper tissues. Cold induced pain threshold only applied on localised body region (Ashton et al 1984).
Pressure pain	Measuring tip may skid off when pressure applied was increased, at a bony or uneven site. Difficulty in maintaining the direction of the applied pressure at the rubber tip of the plunger perpendicular to the surface of the measuring site throughout each measurement.

For the present program a single form of pain challenge was used in order to develop an epidemiological profile for healthy subjects for this quality of painful experience. Among the challengers listed, pressure pain measured with an algometer, emerges as the most appropriate in situations where:

- multiple measurement sites are involved;
- repeated measurements over a short time interval are required;
- sites are not limited to the limbs;
- risk of pain or injury are virtually absent for pain threshold measurement;
- preparation of sites is minimally intrusive or time consuming;
- portable and not restricted to a laboratory or clinic setting;
- compliance by subject and return for follow up sessions is necessary;
- possible stress associated with sophisticated settings of other challengers can be avoided.

These were the conditions that described the long running program of research into pain threshold commenced at the University of Technology, Sydney (UTS). In the Department of Medical and Molecular Biosciences (DMMB) of the Faculty of Science at UTS, since 2001 (Zaslawski 2001), a series of seven studies has made extensive use of PPT in healthy subjects. Since their inception the studies have generated over 32,000 PPT measurements on 235 healthy

subjects (127 females, 108 males), at a total of 24 body sites, with three or four recordings for each site on each of four to eight occasions at interval of at least one week apart.

Of particular interest in this thesis was the temporal session of one week apart in which there was a considerable concern on the stability of the pre-intervention PPT after baseline session. Any significant variability of subsequent PPT should be handled carefully while interpreting post-intervention PPT.

1.4 PPT database from previous UTS studies

Obviously these extensive records comprise a comprehensive database concerning PPT in healthy subjects. In addition, among the studies, many of the measurement sites were the same. The six previous PPT studies have generated an extensive database of baseline PPT measures at a range of 24 sites on 150 healthy subjects represented by mostly younger adults (78 females, 72 males) with mean age 30 years, age range 17 to 70 years (Zaslawski et al 2001, 2003, 2006; Yuan 2002; Li et al 2005, 2008; Szabo 2007). In each study, the key demographics of the subjects such as gender, age, weight and height were reported. For each subject, baseline PPT of three to four measures at each study site were collected on at least four separate occasions spaced a minimum of one week apart. In addition identical protocols and algometry instruments and procedures were used for all studies facilitating the pooling of data into arguably the most comprehensive database of PPT measures available.

Since each study using a within subjects repeated measures experimental design, the numbers of subjects were too small to consider significant patterns or relationships between PPT and subject variables such as gender, age, and the body mass index (BMI). However, since all the data have been made available for the present research, they are now able to be combined.

The data were still limited since subjects aged above 35 were rarely included in these studies. If useful epidemiological data were to be developed, the age range needed to be extended by recruitment of additional subjects. An expansion of the database of subjects to include ages distributed between 35 and 65 will permit subdivisions for each measurement sites into smaller but representative groups by gender, age and BMI, so meaningful results may be drawn from data analysis.

A large database of healthy subjects will comprehensively contribute a great deal of the PPT norms for related research, not only on subjects in a normal health state but also for those with

disease states. This is because, as pain is quantifiable, subjects with disease states might have some representations of discomfort at their physiological sites with respect to PPT measures. For example, an injured site may have a lower or higher baseline PPT reading as compared to the normal site, and this might vary after an intervention and over a period of time.

1.5 Study aims

Research Study One: An extended study on the regional PPT of subjects aged between 35 and 65 years replicating the same protocols of type of algometer, size of measuring tip, rate of applied force, three measurement cycles and four occasions with at least one week apart on some existing sites as the previous PPT studies at UTS.

General aim: To examine the temporal stability of possible relationships between subject variables of gender, age and BMI with the regional PPT.

This general aim comprised of 18 specific aims.

Research Study Two: A pilot study on selected sites on subjects with lateral elbow pain.

General aim: To examine the regional PPT measures at LI10 and LI11 between the affected and non-affected elbow for subjects with lateral epicondylitis.

This general aim comprised of nine specific aims.

Research Study Three: Examination of the reliability of PPT readings obtained between mechanical and electronic algometers of a specific measuring size and rate.

General aim: To examine the consistency of PPT measures at each study site obtained by mechanical and electronic algometers.

This general aim comprised of two specific aims.

1.6 Format of thesis

Chapter 1: Introduction

Introduced the background of pain study, the evolution of pain models and various types of pain challengers used in quantifying pain. Detailed the choice of using algometers in measuring pressure pain threshold in UTS PPT studies and the need of Research Study One in extending the age range. Research Study Two as a pilot study in extending PPT measurement on disease state study and Research Study Three explored the possibility of combining PPT data obtained by two different models of algometers.

Chapter 2: Literature review

The elements in the common protocol of UTS PPT studies were reviewed. These included the type of algometers, the various size of measuring plunger, the rate of application of pressure, the operator's experience and training, test-retest interval, health states and the age and body mass index of subjects.

Chapter 3: Methods

The experimental research designs and procedures and the statistical models for each study were described.

Chapter 4: Results

This chapter reported the results from three research studies. The results were systematically presented in Sections 4.1 to 4.19 for Research Study One, followed by Sections 4.20 to 4.28 for Research Study Two, then in Sections 4.29 and 4.30 for Research Study Three.

Chapter 5: Discussion and conclusion

Each research study was discussed and concluded separately. Research Study One was discussed in Sections 5.1 to 5.6, followed by Research Study Two in Section 5.7 and Research Study Three in Section 5.8. Implications for future research were covered in Sections 5.9 to 5.11.

References

Appendices

Chapter 2: Literature review

Of interest in the literature review is the scope of the PPT research involving the type of algometer used, the various size of measuring tip on the plunger, the rate of application of pressure, the operator's experience and training, test-retest interval, diseases or conditions measured using PPT measures, and the subject variables in age and body mass index.

2.1 Systematic search of PPT articles

A systematic search of the UTS e-database on category of Health was undertaken to identify studies using the key phrase "pressure pain threshold" or "pain pressure threshold". The search was then refined by including secondary keywords such as "algometer or algometry" and other search phrases as coded in Table 2.1. Figure 2.1 provides the flow chart for number of articles stored in the two main databases, namely ProQuest and MEDLINE, according to period of publication and availability as reviewed articles for search phrases as described in Table 2.1.

Code	Search phrases
A1	"pressure pain threshold" or "pain pressure threshold"
A2	A1 and ("algometer" or "algometry")
A3	A2 and ("mechanical algometer" or "hand-held algometer" or "handheld algometer")
A4	A2 and "electronic algometer"
B1	A2 and tip
B2	A2 and rate
B3	A2 and ("reliability" or "validity")
B4	A2 and (training or trained or operator)
C1	A2 and "age group"
C2	A2 and "body mass index"
C3	A2 and (intervals or occasion)
C4	A2 and ("retest" or "test-retest" or "re-test" or "re-measured")
C5	A2 and (disease or injury)

Table 2.1: Coding of search phrases.

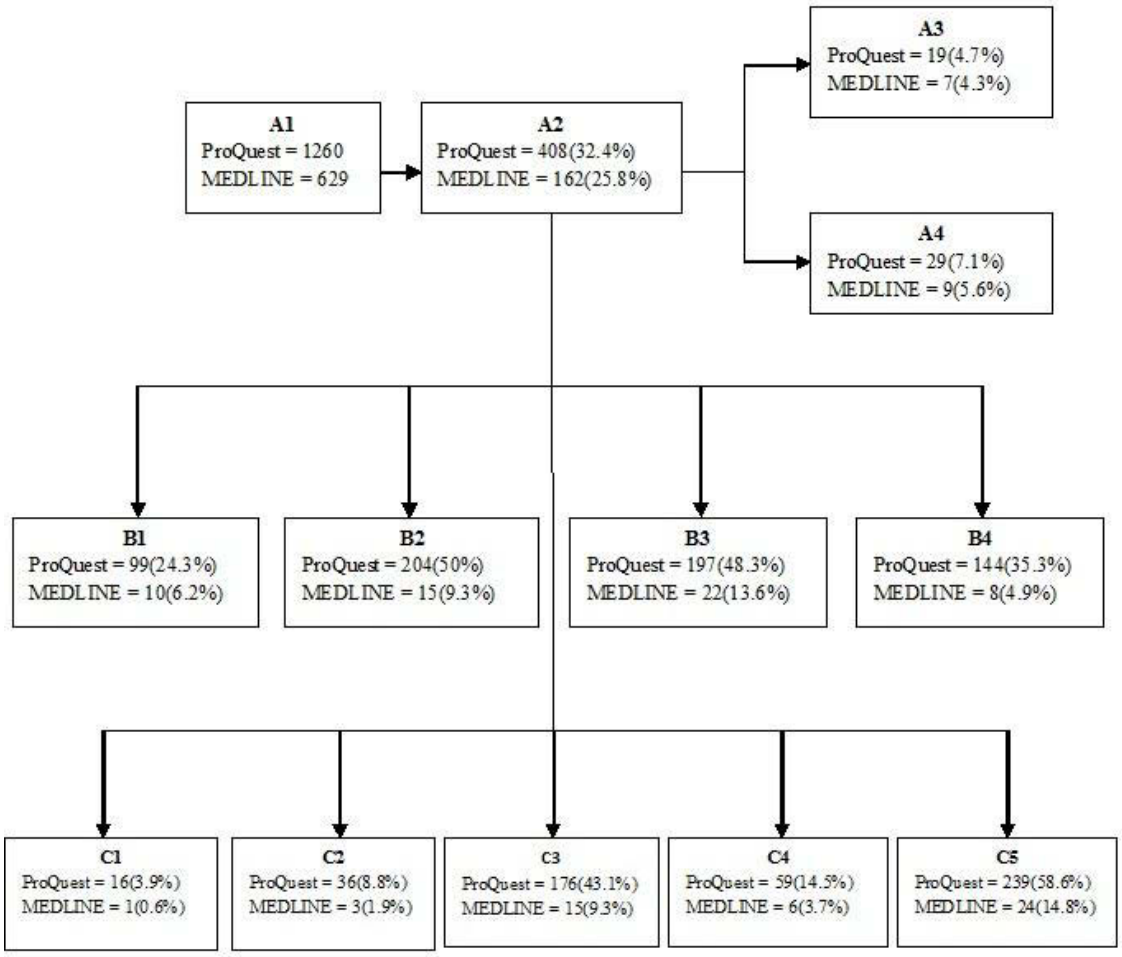


Figure 2.1: Flow chart for the number of articles in ProQuest and MEDLINE by period of publication and availability as reviewed articles for search phrases A1, A2, A3, A4, B1, B2, B3, B4, C1, C2, C3, C4 and C5.

As of 31.12.2014, based on the key search phrase of "pressure pain threshold" or "pain pressure threshold", ProQuest had collected 1260 reviewed articles, whilst MEDLINE reported a total of 629 since 1984. Search phrases on types of algometers based on phrases such as "electronic algometer" or "mechanical algometer" or "hand-held algometer" or "handheld algometer" revealed a limited number of studies as the specific models of the algometer were commonly used in the reports instead of the above general terms. ProQuest has larger collections that deal with features regarding algometers as shown in second level that reported outcome from search phrases B1, B2, B3 and B4. Of 408 articles in ProQuest, 99 (24.3%) reported size of plunger tip, 204 (50%) the rate of the application of pressure, 197 (48.3%) concerned the training of operators and 144 (35.3%) involved the reliability or validity of algometry. Since 1984, of the

162 reports returned in MEDLINE, ten studies (6.2%) reported size of plunger tip, 15 (9.3%) the rate of the application of pressure, 22 (13.6%) the training of operators and eight (4.9%) involved the reliability or validity of algometry. With search phrases of C1, C2, C3 and C4, the third level shows that there were very limited publications about the age group (16 in ProQuest and one in MEDLINE) and body mass index (36 in ProQuest and three in MEDLINE). However, there were 176 (43.1%) and 59 (14.5%) articles for "intervals or occasion" and ("retest" or "test-retest" or "re-test" or "re-measured") respectively in ProQuest but a relatively smaller number of 15 (9.3%) and six (3.7%) in MEDLINE. The publications related to disease states or injuries included 239 (58.6%) reported in ProQuest and 24 (14.8%) in MEDLINE. The above comparisons reveal that ProQuest has collected more reviewed articles than MEDLINE in the field of PPT study in all search phrases. Hence, ProQuest is considered for tracking the trend of publications involving PPT research.

Before 1984, there were few reports involving PPT even though pain threshold studies involving applied pressure could be traced back to 1897. Hardy et al (1940) for example had mentioned that studies by von Frey (1897) and Eddy (1932) did involve production of pain by pressure. Since 1984, pain studies reporting PPT as a measure have been increasing. These studies often reported methodological features such as test retest interval, size of tip of algometer, rate of application of pressure, type of algometer, relevant diseases, operator training, as well as reliability and validity as listed in Table 2.1. However, only 16 studies involved age group (C1) and 36 mentioned body mass index (C2). In the present research using the PPT studies at UTS, analysis of regional PPT by age group or body mass index on healthy adults will be possible owing to the large set of database collected based on eight studies.

The search revealed various publication titles which shows that reports of PPT and algometry studies are dominating in the fields of musculoskeletal (175 titles) and neurology (112 titles), followed by orthodontics (39 titles) and other medical sciences. The musculoskeletal titles comprise collections from the disciplines of chiropractic, physiotherapy and osteopathy.

2.2 Mechanical and electronic algometry

Although mechanical algometry (MA) was used for the majority of studies (61%) for measurement of PPT (Fischer et al 1986, 1987, 1990; Antonaci et al 1992, 1998; Nussbaum et al 1998; Smidt et al 2002; Zaslawski et al 2003; Li et al 2008), the recent trend (39%) has shown an increase in the use of electronic algometry (EA) (Kosek et al 1993 and 1999; Isselée et al 1997; Sayed-Noor et al 2008). Electronic algometry involves measuring PPT with a guided

rate graph on the screen as reference for the examiner during measurement phase (Kosek et al 1993 and 1999; Isselée et al 1997; Ogimoto et al 2002; Tanaka et al 2004). However the EA was cumbersome as compared to MA when a series of different sites in the one session was to be measured as it involved physically connecting the algometer with a control pedal linked to a computer monitor at all times.

While more preparation time is required for the EA compared to MA, EA facilitates the incremental guidance of the applied rate (a 1kg/cm^2/s guide line usually displayed on a computer screen) thus attempting to ensure a controlled pressure application required for experimental purposes (Isselée et al 1997). The EA PPT scores were also in many cases "subject controlled" in that the data acquisition system recorded the PPT score following the subject's pressing a hold switch rather than relying on verbal response of the subject, on sensing the PPT and subsequent withdrawal of the algometer by the researcher (Ogimoto et al 2002; Tanaka et al 2004). No studies were located that compared the reliability of PPT values obtained using electronic and mechanical instruments. However, Bernhardt et al (2007) conducted a reliability and validity comparison between a commercial Somedic digital algometer with a self-designed fingertip-shaped pressure algometer for palpation (PAP) for assessing PPT at 16 sites located in the temporomandibular joint, masticatory muscles and the frontalis muscle of 30 subjects. The concurrent validity was demonstrated by statistically significant correlations between the two devices at all 16 sites (14 highly significant and two significant) with values ranging between 0.38 and 0.66. The intraexaminer reliability analysis of repeated PPT measurements were excellent with ICC>0.75 for 12 sites and ICC≥0.73 for remaining four sites.

Appendix 1 gives a summary of mechanical and electronic algometers used in studies in ascending order of the tip size. There were 43% of the EA studies reported the display of applied rates and the availability of a control switch for subjects to operate once PPT was sensed.

2.3 Size of algometer tip

The tip sizes reported were either in terms of area or in diameter. Appendix 1 shows that the most frequently employed tip size was a 1cm^2 (47%) rubber circular surface (Fischer et al 1987; Nordahl et al 2003; Rolke et al 2006; Ge et al 2008; Kinser et al 2009), followed by a 1cm (23%) in diameter (Kosek et al 1993; Cairns et al 2006; Frank et al 2013), then 0.5cm^2 (Ohrbach et al 1989 and 1998, Isselée et al 2001, Defrin et al 2003).

The tip sizes varied from 1mm (Möller et al, 1998; Takahashi et al 2005) in diameter to 2cm^2 (Tunks et al 1988; Defrin et al 2003; Walsh et al 2009) or even 4cm^2 in a specific study in comparing tip sizes and rates of force application conducted by Xiong et al (2011). All PPT studies at UTS (Yuan 2002, Zaslawski et al 2003, Szabo 2007, Li et al 2008) also used a 1 cm^2 circular tip on the plunger. Möller et al (1998) applied a handheld EA with a tip size of only 1mm diameter for an animal study (rat) while Kosek et al (1999) reported using an EA (Somedic Sales AB, Farsta, Sweden) with diameter of 10mm for measurements on the lateral epicondyle of the humerus bone. Examples of the variation reported in studies include Chesterton et al (2003) who applied a pressure algometer from Salter Abbey Weighing Machine Ltd England with circular tip of 11mm in diameter at the first dorsal interosseous muscle and Vatine et al (1998) who used an algometer (modified from Model FT 10, Grass Medical Instruments, Quincy, MA) with tip size of 0.25cm^2 on the sternum. Cathcart et al (2006, 2008) used an in-house mechanical algometer of 0.40cm^2. While the measuring tips used by the above studies were primarily circular in shape, Williams et al (2004) applied a different tip shape with measuring tip of 1.5cm straight edge by 1mm in diameter for measuring the PPT at the lunula of the nail-bed of 61 healthy subjects at a constant rate of 100g/s. A few studies (Jensen et al 1986; Defrin et al 2003; Takahashi et al 2005; Xiong et al 2011) made comparisons on the algometer tip-size.

2.4 Rate of application of pressure

In order to measure PPT, the force is applied via the tip of the algometer at a specific rate. Kinser et al (2009) demonstrated the need for the investigator to be well practised in the use of the algometer to ensure a consistent rate of force was applied thus enhancing the reliability of measurements. Kinser and his associates compared the manually applied pressure on a force plate with that applied with a 1cm^2 round rubber application surface of a handheld algometer. The force-time curves were developed and analysed for the rate of force application. Hence, a consistent and appropriate rate of application is critical for the algometry reliability. Inconsistency of pressure application may hinder the subject's recognition of the PPT. As summarised in Appendix 1, different studies have used different rates of application of force. These rates are expressed in various units such as N/s, kPa/s, kg/s or kg/cm^2/s according to the calibration of algometer for the specific experiment and the availability of the circular plunger tip size. Depending on the aim of the PPT study on the measurement regions (muscles, nerves, bone), the anatomical location of the sites, and the sensitivity of the pressure threshold, various tip sizes were employed. Hence, standardization of these rates across references were made by referring to the conversion formulae such as 0.1 kg/cm^2 equals 9.81kPa and 5N/cm^2 is

equivalent to 50kPa. These transformed rates ranged from 0.1kg/cm^2/s (Fischer et al 1987) to 4kg/cm^2/s (Vatine et al 1998). The more commonly reported rates were 1kg/cm^2/s (Fischer et al 1987, Nussbaum et al 1998, Zaslawski et al 2003, Cathcart et al 2006, Li et al 2008) and 0.5kg/cm^2/s (Rolke et al 2006, Barlas et al 2006, Vedolin et al 2009). It is to be noted that Fisher et al used 1kg/cm^2/s in 1986. Antonaci et al (1992) inadvertently reported a rate of 100g/s but was amended to 2kg/cm^2/s in Antonaci et al (1998). The main reason of having a constant rate of application is to enhance reliability (Jensen et al 1986, Kinser et al 2009) and validity of algometry (Vaughan et al 2007) since PPT can be quantified but impacted by subjective responses of both subject and examiner. For example, too rapid a rate may lead to the examiner overshooting the PPT due to reaction times (Jensen et al 1986, Defrin et al 2003) or too slow may cause fatigue to examiner for maintaining constant rate (Jensen et al 1986, Defrin et al 2003) over extended periods of time, especially for repeated measures at multiple sites.

Tunks et al (1988) used 1kg/s of rate application to measure the PPT of ten fibromyalgia and ten healthy subjects for the reliability study at ten paired and typical tender points. There was significantly lower tenderness thresholds of tender points in fibromyalgia compared to normal subjects. Correlation coefficients were calculated and showed high inter-rater (0.85) and test-retest (0.85) reliability.

2.5 Operator experience and training

Nussbaum et al (1998) in their PPT study on 35 healthy subjects at biceps brachii muscle (three trials, using a protocol of ten seconds between trials, and 20 minutes between examiners, over three consecutive days for a total of 18 trials) noted that reliability was enhanced when all measurements were taken by one examiner instead of two. The researchers also stressed the important of training in operating the algometer. One week prior to the study, the two examiners practiced using the Fisher algometer of circular tip size of 1cm^2 while being timed so that a standard application rate was achieved by increasing the pressure linearly to 5kg/cm^2 over five seconds indicating an estimated rate of 1kg/cm^2/s. Ten practice trials were performed by each examiner. Various combinations of paired measurements with respect to trial-to-trial and day-to-day between examiners A and B were analysed. It was reported that examiner A recorded higher scores of PPT than those recorded by examiner B in about 70% of the paired measurements. However, when mean PPT increased, examiner A tended to score increasingly lower than examiner B and as a result the mean difference between examiners (0.14 kg/cm^2 in Trial 1) was small. Though the order of examiners measured PPT were reversed for 15 subjects, the ANOVA did not provide any significant support to the order of examiners with the PPT

scored (p-value = 0.33). With the exception of day one where trial-to-trial reliability was significantly higher between Trials 2 and 3 than between Trials 1 and 2 ($p<0.05$). Furthermore, day-to-day reliability for a single measurement of PPT was highest in Trial 3, and day-to-day reliability for a measurement derived from the mean of multiple trials was highest for the mean of Trials 2 and 3. These results have led to the suggestion that Trial 1 could be excluded in deriving the mean PPT.

Training of examiners was undertaken prior to testing (Farasyn et al 2007; Vedolin et al 2009; Aldayel et al 2010). Barlas et al (2006) involved a week training to familiarise the examiners with algometer and other experimental procedures whist Rolke et al (2006) involved only one day of training.

Sayed-Noor et al (2008) suggested the important of examiner's experience on measuring of PPT as it was amenable to bias. In the assessment of 18 subjects reporting pain in the greater trochanteric region with matched controls, it was the intra individual body-side PPT differences that yielded the most sensitive measurement. Furthermore while large inter individual differences across patients might be considerable and could mask pathologic diagnosis findings they found good validity for the algometer and suggested the cut-off ratio of 0.8 for PPT of affected and non-affected side could be used for diagnostic purposes.

Some reported satisfactory levels of both inter and intra examiner reliability of algometers in clinical and/or laboratory practices (Takala et al 1990; Chung et al 1992; Delaney et al 1993; Jacobs 1995; Nussbaum et al 1998; Brown et al 2000; Ogimoto et al 2002; Cathcart et al 2006; Chesterton et al 2007; Farasyn et al 2008; Kinser et al 2009). For example, Chesterton et al (2007) reported inter-rater reliability on PPT measures at first dorsal interosseous muscle of 13 healthy adults (21 men, 1 women, mean age = 22) assessed by five trained observers. The subjects were blinded from three PPT measures randomly taken by each observer with 15s between measurements for a single observer and 10min interval between each observer per subject. This study suggested no bias with no significant difference ($p=0.094$, ICC = 0.91, 95% CI) between observers' mean PPT were found. The maximum difference among readings were 1.77kg/cm^2. Smidt et al (2002) revealed strong intra-rater reliability ($0.91<ICC<0.96$) on PPT at involved and uninvolved arms of 50 patients with lateral epicondylitis randomly taken by two physiotherapists, but received unsatisfactory inter-rater reproducibility ($ICC<0.75$) at uninvolved arms. Delaney et al (1993) measured inter and intra-observer reliability of (MA) algometry using a 1kg/s application by two independent examiners on 50 healthy adult

volunteers (25 men, 25 women, aged 20 to 51 years). The results showed that the pressure algometer was highly reliable in measuring myofascial trigger point sensitivity, between and within experimenters. The researchers further proposed that PPT measurement could be useful in the diagnosis and monitoring of treatment of myofascial pain syndrome. Takala et al (1990) reported moderately acceptable intra-rater (ICC from 0.71 to 0.91) and inter-raters (0.68 to 0.79) reliabilities for PPT measurements at upper trapezius and levator scapulae muscles of 93 men and 70 women.

2.6 Test retest interval

In Appendix 2, out of 79 groups of researchers, 35 collected three PPT measurements per site with a few stated the first reading was discarded (Nussbaum et al 1998; Farasyn et al 2007; Meeus et al 2010) whilst many were aware of the possible influence on reliability for rest time between repeated trials within an occasion or between occasions (Reeves et al 1986; Fischer et al 1987; Ohrbach et al 1989; Takala et al 1990; Wessel et al 1995; Nussbaum et al 1998; Ogimoto et al 2002; Persson et al 2004; Potter et al 2006; Jones et al 2007; Vaughan et al 2007; Ylinen et al 2007; Gomes et al 2008; Kinser et al 2009; Walsh et al 2009; Xiong et al 2011; Lacourt et al 2012; Frank et al 2013). Depending on the objectives of the studies, intervals between occasions varied from a few session per day (Kosek et al 1999; Chesterton et al 2003; Ayesh et al 2007a, 2007b), several consecutive days (Chung et al 1992; Nussbaum et al 1998; Jones et al 2007; Hübscher et al 2008), a week apart (Brennum et al 1989; Reid et al 1994; Plesh et al 1998; Ogimoto et al 2002; Sterling et al 2002; Zaslawski et al 2003; Potter et al 2006) to a year (Taimela et al 2000). For examples, Persson et al (2004) took four consecutive measurements at ten minutes intervals on days 1, 3, 28 and 30, Delaney et al (1993) completed repeat measurements at five minute intervals, and Zaslawski et al (2003) performed four cycles of measurements at ten sites over a ten minute period, resulting in each site being remeasured at 2-2.5 minute intervals. However, possible comparisons among studies are only applicable if same sites on muscles/tissues were examined with similar rest time or interval between occasions.

Jones et al (2007) studied the intra and inter day reliability of PPT in the upper extremity and torso in 19 healthy women aged between 20 to 39 years. The test-retest reliability of PPT values at eight sites with three PPT trials at each session was consistent within the same day across four consecutive days.

Farella et al (2000) examined the PPT of 40 female patients with temporomandibular disorders and 40 age-matched female subjects as controls using an EA (tip of circular surface of 1 cm^2 at a rate of 20kPa/s) at two sites at masseter muscle and two sites at temporalis muscle with approximately a five second interval between sites. Four measurements were made at each site with a two minute rest interval between trials. The first PPT of a session was discarded and each PPT was defined by the mean of the successive three trials.

Ogimoto et al (2002) measured PPT at the buccal and palatal sites of ten subjects (eight males; two females) of average age 26.5 years who had suffered pain in the oral mucosa using an algometer (tip 2mm in diameter). Three trials were recorded at each measurement site with one minute rest time between trials for three occasions with one week apart.

2.7 PPT in disease states

PPT has frequently been used for temporomandibular disorders (Murphy et al 1992; McMillan et al 1994; Reid et al 1994; Brown 2000; Ogimoto et al 2002; Nordahl et al 2003; Visscher et al 2004; Fernández-de-las-Peñas et al 2006a; Bernhardt et al 2007; Gomes et al 2008). In general, algometry was shown to be useful in obtaining PPT measurements for this condition. Other disease states that have utilised PPT include chronic neck pain (Taimela et al 2000; Irnich et al 2001; Sterling et al 2002; Ylinen et al 2007), lateral epicondylitis (Smidt et al 2002; Slater et al 2005), lateral elbow tendinopathy (Bjordal et al 2008) and myofascial pain (Ohrbach et al 1989; Ohrbach et al 1989; McMillan et al 1994; Reid et al 1994; Shen et al 2007; Ge et al 2008; Vedolin et al 2009). Appendix 3 provides a more comprehensive overview of disease states in various studies. Some studies examined the stability of PPT between the patients and the controls in various disease states (McMillan et al 1994; Vatine et al 1998; Farella et al 2000; Sterling et al 2002; Shiau et al 2003; Slater et al 2005; Fernández-de-las-Peñas et al 2006a, b, 2009; Bernhardt et al 2007; Cathcart et al 2008; Vedolin et al 2009). Sand et al (1997) measured PPT at 13 cranial sites bilaterally in 30 headache patients and ten healthy controls on three different days. Thresholds were reported to be lower significantly at all 13 measurement sites when the subjects came directly to algometry without any preceding medical examination. However, replication of the study with a larger study group is necessary if general inferences are to be made. Chronic neck pain has been studied by two research groups, Sterling et al (2002) and Taimela et al (2000). Sterling et al (2002) included 19 healthy subjects and 19 patients whilst Taimela et al (2000) used 76 patients (22 men, 54 women) with chronic, nonspecific neck pain. Wessel (1995) studied the reliability of PPT in osteoarthritis (OA) of the knee in women with and without the condition. At all six measurement sites at the knee, the PPT measured on

three occasions were statistically significantly lower in the OA group. Zhang et al (2011) designed a randomised controlled model for the study of acupuncture treatment for plantar fasciitis. Subjects were randomly assigned to the treatment group (N = 28) or the control group (N = 25). The secondary outcome measures included PPT measurement using an electronic algometer (Somedic, Sweden) applied by a trained researcher, prior to each treatment session. The algometer tip-size was $1cm^2$. Three successive measurements were made at the medial tubercle of the calcaneum of the non-painful foot, and at the most painful site on the painful foot (usually the medial tubercle of the calcaneum).

2.8 Characteristics of subjects: gender, age, height and weight

Takala (1990) studied PPT with a mechanical algometer on the upper trapezius and levator scapulae muscles in a working population of 93 men and 70 women. The finding showed that women had lower pain threshold values than men, a finding that was consistent with those of the UTS studies (Yuan 2002; Zaslawski et al 2003, 2006; Li et al 2005, 2008; Szabo 2007). Appendix 4 gives a general view for studies that had concluded that PPT measurements of males were statistically significantly higher than that of females in various age groups (Buchanan et al 1987; Ohrbach et al 1989; Vanderweeën et al 1996; Plesh et al 1998; Vatine et al 1998; Chesterton et al 2003; Christidis et al 2005; Rolke et al 2006). However, Christidis et al (2005) further clarified that there was no significant difference in between genders if the change in PPT with respect to baseline PPT were considered. Ayesh et al (2007a) found no significant difference between genders in their study on younger adults (males of mean age 23.4±0.6, female 25.9±0.6), Fischer et al (1987) found 24 males having significantly higher mean PPT than 26 females at nine sites except gluteus medius and Isselée et al (1997) concluded that there were no significant difference between genders of younger adults (11 males average age 27, 11 females average age 24) at any study sites except one at the right temporal muscle for their PPT study on masseter and temporalis muscles. Whilst some carefully designed matched gender groups (Fischer et al 1986, 1987; Buchanan et al 1987; Tunks et al 1988; Brennum et al 1989; Delaney et al 1993; Vanderweeën et al 1996; Isselée et al 1997; Plesh et al 1998; Tanaka et al 2004; Barlas et al 2006; Ayesh et al 2007b ; Anderson et al 2008; Li et al 2008; Walsh et al 2009) or matched intervention groups (McMillan et al 1994; Wessel et al 1995; Farella et al 2000; Shiau et al 2003; Slater et al 2005; Bernhardt et al 2007; Cathcart et al 2008; Wasner et al 2008; Fernández-de-las-Peñas et al 2009; Meeus et al 2010; Xiong et al 2011), a handful of others (Murphy et al 1992; Kosek et al 1993, 1999; Farella et al 2000; Waling et al 2001; Shiau et al 2003; Persson et al 2004; Jones et al 2007; Ylinen et al 2007; Ge et al 2006, 2008; Fernández-de-las-Peñas et al 2009) were aware of recruiting females only whereas Cairns et al

(2006) and Aldayel et al (2010) recruited males only in their studies. Most studies recruited unmatched gender groups, for example Zhang et al (2011) recruited 14 males and 29 females for study on plantar fascilitis and Taimela et al (2000) involved 22 males and 54 females with chronic and non-specific neck pain whereby females were twice more than males.

Appendix 5 gives a summary of the characteristics of subjects involving weights and heights when reported. Overall reported mean age for both genders spanned from 20 (Vedolin et al 2009) to 76 (Zhang et al 2011) years old, mean weight from 53kg (Shiau et al 2003) to 89kg (Nussbaum et al 1998), mean height in between 159cm (Zhang et al 2011) and 180cm (Nussbaum et al 1998) and mean BMI in between 20.4 (Xiong et al 2011) to 26 (Ylinen et al 2007). Anderson et al (2008) recruited younger adults of age in between 22 to 33 with males having a BMI range between 20.5–29.3 (mean 24.1) and female 20.4–29 (mean 24.2). Defrin et al (2003) included healthy adults (BMI of 24.6±4 for males and 22.2±3 for females) by using a hand-held pressure algometer (Somedic Sales AB, Algometer type II, Sweden) with probe sizes 0.5, 1 and 2 cm^2 for measuring PPT at various sites on hand, painfree back and myofascial trigger points (MTPs) in the back of the subjects.

Though reports included age, height, weight and even BMI, no specific comparisons were made regarding the PPT by age groups and categories of BMI. To achieve these comparisons, a huge database from subjects of various age groups would be required. With its data collection over the past 15 years, PPT database recordings from previous studies at UTS together with the present extended regional PPT database over a more senior age group of 85 subjects would make these comparisons possible.

2.9 Acupuncture sites

In UTS, Zaslawski et al (2003, 2006) and his associates (Yuan 2002, Li et al 2005, 2008, Szabo 2007) have conducted extensive PPT measurements on acupuncture sites for clinical trials. Barlas et al (2006) applied needling at LI10, TH5, GB34 and ST38 and considered PPT measured at bilateral muscle bellies as covariates while interpreting the treatment results. Zhang et al (2011) measured PPT at PC7 and LI4 in study of heel pain and found that PC7 showed relatively higher PPT than LI4.

Chapter 3: Methods

I. Research Study One

3.1 Aim

To examine the temporal stability of possible relationships between subject variables of gender, age and BMI with the regional PPT.

3.2 Design

Pre-intervention PPT measures from six previous regional PPT studies (Study 1 to Study 6) were extracted and combined with the PPT measures obtained from the present extended study (Study 7) to expand the comprehensive UTS PPT database.

Unlike Study 1 to Study 6, there was no acupuncture intervention involved in Study 7. All studies applied the same pre-intervention protocol with respect to type of algometer, size of measuring tip, rate of applied force, number of pre-intervention PPT measurement cycles completed and four consecutive data collection occasions scheduled at least one week apart.

Note that two of the previous studies (Study 1 and Study 6) involved more than four data collection occasions. However, for the purpose of the present comparisons, only the pre-intervention PPT measures in the first four occasions (at least one week apart) of three PPT readings per occasion have been included.

The previous six studies recruited healthy adults of age between 17 and 70 but with mean (±SD) age of 29.9±11.1 years and mean BMI of 22.5±3.5 kg/m^2 for 78 females and mean age of 29.9±9.1 years and mean BMI of 22.9±2.5 kg/m^2 for 72 males.

Ethics approval with approval number UTS HREC 2010-367A was obtained on 21 October 2010 from the Human Research Ethics Committee (HREC) of UTS to recruit staff volunteers. Owing to the slow recruitment despite ten advertisements being posted in the online Staff Notices and flyers being distributed at various general notice boards, a request was submitted to HREC to extend the collection of PPT data to premises outside the UTS Acupuncture Clinic. This amendment was granted on 4 July 2012 provided the consents were obtained from the

person-in-charge of the premises and the similar environment for measurement and collection of data were carried out. At premises outside the UTS Acupuncture Clinic, a portable massage table was provided so that subjects would experience a similar measurement environment to the UTS Acupuncture Clinic.

3.3 Subjects

Recruitment advertisements or notices for the extended PPT study (Study 7) were posted electronically via the online Staff Notices in the UTS intranet and also in the form of A4 Information Posters (Appendix 6) at the general notice boards across different buildings within the City Campus of UTS. A total of 139 inquiries were received and an Information Pack that consisted of an Information Poster, an Information Sheet (Appendix 7) and a Consent Form (Appendix 8) was sent electronically or hand delivered to each potential participant. A total of 36 male and 49 female volunteers were recruited (Study 7 in Table 3.2). The subjects included 62 staff volunteers (53 attended at the clinic and nine at Research and Innovative Office in Building 1, Main Campus), seven church members and 19 friends and their relatives from two private houses. Apart from three discontinuations (attended one or two occasions) by two males and one female volunteers due to work commitments, the remaining 85 subjects completed the PPT measurements at 17 sites in four occasions. Prior to obtaining consent, all subjects were briefed about the study and experienced the PPT measurement procedure at several non-measurement sites.

For all subjects, age, height and weight were recorded for analyses that involved examination of relationship between PPT with age and BMI. The Department of Health, New South Wales has classified the BMI (in kg/m^2) into four categories: Underweight (BMI<18.50), Healthy Weight Range (18.50<BMI<24.99), Overweight (25.00<BMI<29.99) and Obese (BMI≥30) in which BMI is calculated as weight (kg) divided by the square of height (m^2) (NSW 2014)

Study 7 recruited healthy adults aged between 35 and 65 years with mean age of 50.0±9.3 years and mean BMI of 24.5±5.1 kg/m^2 for 49 females and mean age of 49.7±9.0 years and mean BMI of 25.6±4.1 kg/m^2 for 36 males.

The selection criteria for Study 7 were as follows:

- Aged between 35 and 65;
- Do not suffer from a chronic musculoskeletal disorder;
- And not pregnant at the time of recruitment.

3.4 Regional PPT measurement sites

All PPT measurement sites were marked with a felt pen to ensure accurate point location throughout all sessions. The overall regional PPT measurement sites included 18 acupoints and six nonacupoints located variously at the neural segments or dermatomes as shown in Figure 3.1.

Table 3.1 lists the anatomical location of each site by side and by its relation to acupuncture channel and/or Western Medical Science (WMS) neuro-segmental region. L and R after the site identification number denote the side of the body involved. The acupoints comprised of CV12, GB12R, GB20R, KD3L, KD3R, LI10L, LI10R, LI20L, LI20R, LI5L, LI5R, LV5R, PC6L, PC6R, SI3R, SP6R, ST36L and ST36R. The nonacupoints were 1L, 1R, 2L, 2R, 3R and 4L. The acupoints were separately located in nine channels with one point each from the Conception Vessel, Liver, Small Intestine and Spleen channels, two points each in Gall Bladder, Kidney, Pericardium, and Stomach channels and six points in Large Intestine channel. A total of 24 measurement sites were used in Study 1 to Study 6, in which 17 sites (GB12R, KD3R, LI10L, LI20L, LI20R, LI5L, LI5R, PC6L, PC6R, SP6R, ST36L, ST36R, 1L, 1R, 2L, 2R and 3R) were selected for Study 7.

Each of the six previous studies (Tables 3.2a to 3.2f) used a series of ten measurement sites. The 17 sites used in Study 7 comprised of sites used in the previous studies (Table 3.2g). Table 3.3 shows the location of the 17 regional PPT measurement sites (face to legs) used in Research Study One.

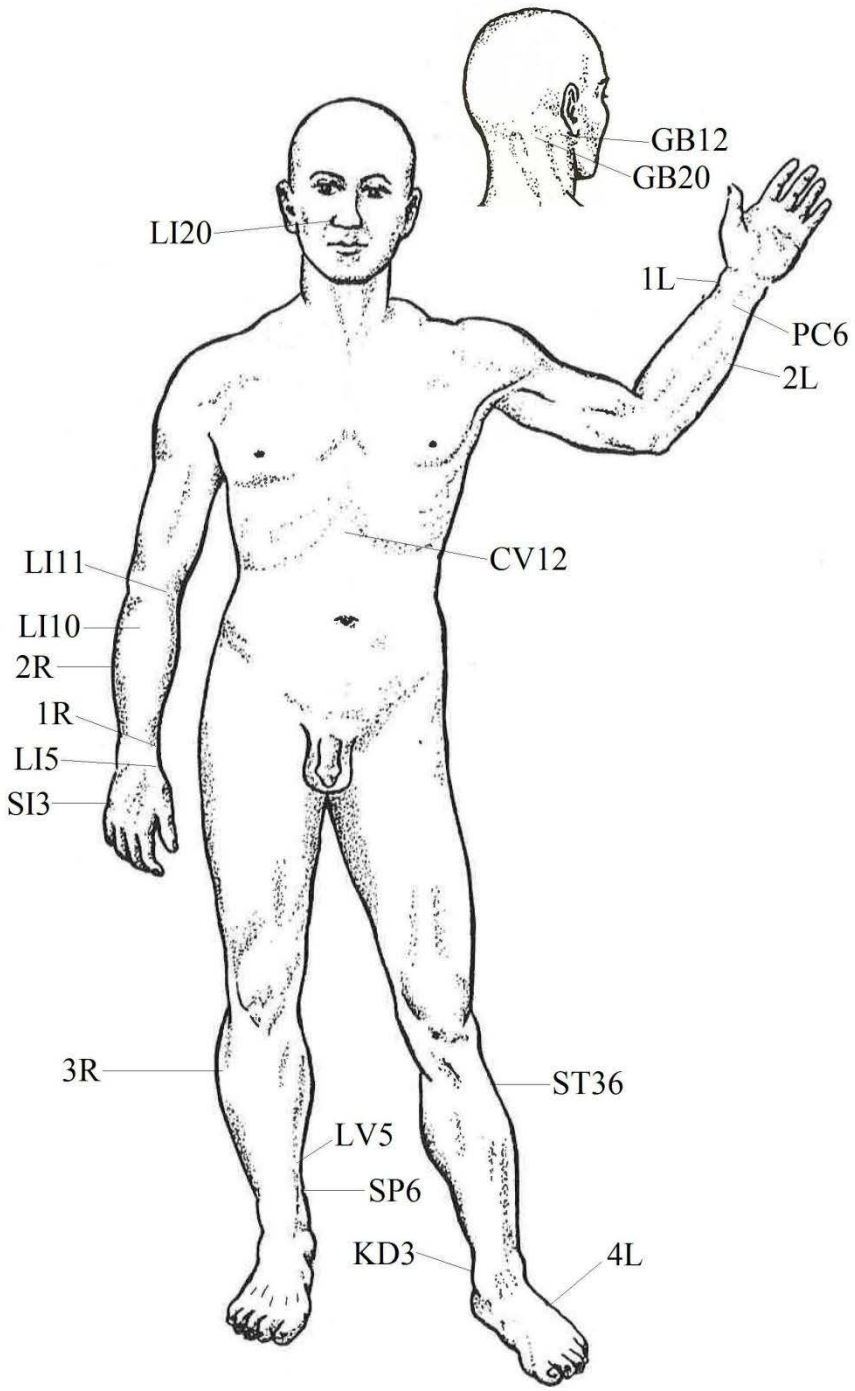


Figure 3.1: Regional PPT measurement sites used in UTS PPT studies on healthy adults. Figure adapted from Rogers and Rogers 1999. Some sites involved left and right sides as listed in Table 3.1.

Site	Side	Anatomical Location	Channel / segmental region
CV12 (Zhongwan)	Midline	On the midline of the abdomen, 4 *cun* above the umbilicus	Channel: Conception Vessel Dermatome: T8
GB12 (Wangu)	Right	On the head, in the depression posterior and inferior to the mastoid process behind the ear	Channel: Gall Bladder Dermatome: C3
GB20 (Fengchi)	Right	On the neck, below the occipital bone, 1 *cun* above the posterior hairline, in the depression between the upper ends of the stercleidomastoid and trapezius muscles	Channel: Gall Bladder Dermatome: C3
KD3 (Taixi)	Both	Posterior to the medial malleolus, on the midpoint of the line connecting the medial malleolus and the Achilles tendon	Channel: Kidney Dermatome: L4
LI10 (Shousanli)	Both	On the radial side of the dorsal surface of the forearm, on the line connecting LI5 and LI11, 2 *cun* below LI 11 (Quchi) located at the midpoint of the line between the radial end of the cubital crease and the external humeral epicondyle	Channel: Large intestine Dermatome: C5
LI20 (Yingxiang)	Both	At the upper segment of the nasolabial groove of the face, at the level of the middle part of the nasal ala, 1 *cun* superior and lateral to LI19 (Kouheliao) located on the lateral side of the upper lip, directly below the lateral border of the nostril, at the junction of the upper 1/3 and middle 1/3 of the upper lip	Channel: Large intestine Dermatome: V2 (maxillary of trigeminal)
LI5 (Yangxi)	Both	At the radial end of the crease of the wrist, in the depression between the tendons of the short extensor and long extensor muscles of the thumb	Channel: Large intestine Dermatome: C5
LV5 (Ligou)	Right	On the medial aspect of the leg, 5 *cun* above the tip of the medial malleolus, in the centre of the medial border of the tibia	Channel: Liver Dermatome: L4
PC6 (Neiguan)	Both	On the palmar aspect of the forearm, 2 *cun* above the transverse crease of the wrist, between the tendons of the long palmar muscle and the radial flexor muscle of the wrist	Channel: Pericardium Dermatome: border of the C5 and T1
SI3 (Houxi)	Right	On the ulnar side of the hand, posterior to the 5th metacarpophalangeal joint, at the end of the distal palmer crease	Channel: Small Intestine Dermatome: C8
SP6 (Sanyinjiao)	Right	On the lower part of the medial side of the leg, 3 *cun* above the tip of the medial malleolus, in the depression posterior to the medial border of the tibia	Channel: Spleen Dermatome: L4
ST36 (Zusanli)	Both	3 *cun* directly below ST35 (Dubi), in the depression one finger-breadth lateral to the anterior crest of the tibia. ST35 is located at the lower border of the patella, in the depression lateral to the patellar ligament, when the knee is flexed	Channel: Stomach Dermatome: L4
1R and 1L	Both	On the arm, 2 *cun* proximal to the wrist crease on the dorsal surface, just on the medial border of the radius	Channel: Nil Nonacupoint Dermatome: C6
2R and 2L	Both	Midway between the wrist joint and the medial epicondyle of the elbow on the medial side of the forearm, anterior to the ulna shaft	Channel: Nil Nonacupoint Dermatome: C8
3R	Right	2 *cun* distal to the fibula head, posterior to the fibula shaft	Channel: Nil Nonacupoint Dermatone: L5
4L	Left	Half way down the lateral planter margin of the left foot, 1 *cun* from the lateral border	Channel: Nil Nonacupoint Dermatome: S1

Table 3.1: The 24 regional measurement sites at which PPT measures were taken on healthy adults. The sites are labelled according to the body side, anatomical location, relation to TCM channel (only applicable to acupoint) and WMS segmental region. Note the term *cun* relates to a TCM body measurement unit.

Study 1	
F = 22; M = 18	
Site 1	LI5R
Site 2	LI20R
Site 3	1R
Site 4	PC6R
Site 5	2R
Site 6	ST36R
Site 7	3R
Site 8	LI10R
Site 9	SI3R
Site 10	CV12

a

Study 2	
F = 11; M = 9	
Site 1	LI5R
Site 2	LI20R
Site 3	1R
Site 4	2R
Site 5	ST36R
Site 6	CV12
Site 7	3R
Site 8	LI5L
Site 9	2L
Site 10	ST36L

b

Study 3	
F = 11; M = 11	
Site 1	LI5R
Site 2	LI20R
Site 3	GB20R
Site 4	1R
Site 5	ST36L
Site 6	KD3L
Site 7	LI5L
Site 8	1L
Site 9	ST36R
Site 10	KD3R

c

Study 4	
F = 12; M = 12	
Site 1	LI10L
Site 2	2L
Site 3	4L
Site 4	KD3R
Site 5	SP6R
Site 6	LI5R
Site 7	1R
Site 8	PC6R
Site 9	LI20L
Site 10	GB12R

d

Study 5	
F = 10; M = 10	
Site 1	LI10L
Site 2	1L
Site 3	ST36L
Site 4	4L
Site 5	KD3R
Site 6	LV5R
Site 7	LI5R
Site 8	PC6R
Site 9	LI20L
Site 10	GB12R

e

Study 6	
F = 12; M = 12	
Site 1	KD3R
Site 2	3R
Site 3	ST36R
Site 4	LI5L
Site 5	1L
Site 6	PC6L
Site 7	2L
Site 8	LI10L
Site 9	LI20R
Site 10	GB12R

f

Study 7	
F = 49; M = 36	
Site 1	1R
Site 2	3R
Site 3	LI5R
Site 4	ST36R
Site 5	2R
Site 6	SP6R
Site 7	PC6R
Site 8	KD3R
Site 9	LI10L
Site 10	LI20R
Site 11	1L
Site 12	LI20L
Site 13	LI5L
Site 14	ST36L
Site 15	2L
Site 16	GB12R
Site 17	PC6L

g

Table 3.2: The regional PPT measurement sites in previous studies (a to f) and the present study (g).

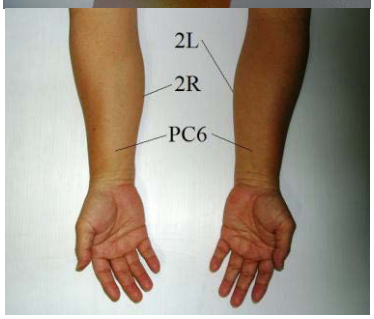
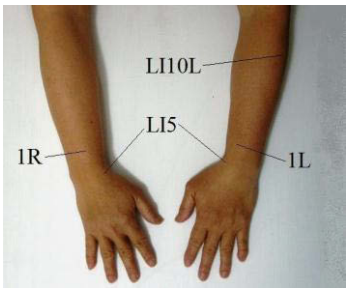
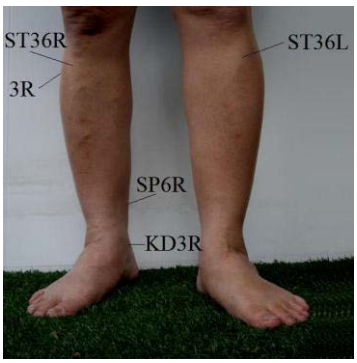
Location of sites	Definition of location
	LI20L or LI20R: At the upper segment of the nasolabial groove of the face, at the level of the middle part of the nasal ala
	GB12R: In the depression posterior and inferior to the mastoid process behind the ear
	2L or 2R: Midway between the wrist joint and the medial epicondyle of the elbow on the medial side of the forearm, anterior to the ulna shaft PC6R or PC6L: On the palmar aspect of the forearm, 2 *cun* above the transverse crease of the wrist, between the tendons of the long palmar muscle and the radial flexor muscle of the wrist
	LI10L: On the radial side of the dorsal surface of the forearm, on the line connecting LI5 and the edge of the transverse cubital flexure crease, 2 *cun* distal to the crease 1L or 1R: On the arm, 2 *cun* proximal to the wrist crease on the dorsal surface, just on the medial border of the radius LI5L or LI5R: At the radial end of the crease of the wrist, in the depression between the tendons of the short extensor and long extensor muscles of the thumb
	ST36L or ST36R: 3 *cun* directly below ST35, in the depression one finger-breadth lateral to the anterior crest of the tibia. ST35 is located at the lower border of the patella, in the depression lateral to the patellar ligament, when the knee is flexed 3R: 2 *cun* distal to the fibula head, posterior to the fibula shaft SP6R: On the lower part of the medial side of the leg, 3 *cun* above the tip of the medial malleolus, in the depression posterior to the medial border of the tibia KD3R: Posterior to the medial malleolus, on the midpoint of the line connecting the medial malleolus and the Achilles tendon

Table 3.3: The definition of 17 regional PPT measurement sites used in Research Study One. Note: All images showing all 17 PPT locations are of the author himself.

3.5 Measuring PPT

PPT data collection for the various occasions involved four researchers who were experienced in measuring PPT with an algometer and recording PPT measurements. PPT was measured by using a mechanical Wagner Pain^{TM} Model FPK10 algometer with capacity/graduation of 10kgfx100gf on a 2¼" dial and rubber tip of 1cm^2 attached to the stainless steel plunger as shown in Figure 3.2. All PPT readings were taken by applying the rubber tip at the plunger perpendicular to the measurement site on the skin with the operator taking the counts by heart counting to themselves (1 and 2 and 3 and …in a steady manner) while pressing the site so that to achieve a constant rate of approximately 1kg/s. This rate was further monitored by the researcher recording the measurements to ensure a consistent rate was applied. Throughout the PPT measurements, subjects lay supine on the treatment table. PPT measurement sites were marked with a felt pen to ensure consistency of measurement locations throughout each session. For all studies, in each of the four consecutive visits with at least one week apart in between visits, a practice cycle across a series of all measurement sites was conducted before actual PPT measures were taken for the subsequent three cycles. The readings from the practice cycle were omitted/discarded. Kosek et al (1993) and Nussbaum et al (1998) reported that this cycle of first readings appeared to be relatively unreliable compared with readings in subsequent cycles as subjects acclimatised to the procedure. Study 1 to Study 6 required approximately two to three minutes to complete a cycle of ten sites whilst Study 7 required approximately four minutes to complete a cycle of 17 sites.

Every subject was briefed to indicate by saying “Yes” or “Now” or “There” when the pressure was first perceived as uncomfortable or painful. As soon as the PPT was reached, the operator immediately withdrew the algometer. The algometer was then handed to the second researcher to read and record the PPT readings. A replacement reading was recorded if and only if the subject indicated an advanced or delayed “Yes” or “Now” or “There” in the perception of PPT.

Throughout the data collection phase of each study, no data were analysed to avoid effects stemming from researcher expectations. In addition, the researcher applying the algometer was not explicitly informed of the measurement values being recorded.

Figure 3.2: The Wagner Pain Test™ Model FPK Algometer.

3.6 Statistical analysis

The baseline PPT data of each subject in each previous study were abstracted from the existing databases which were securely kept in the DMMB in the form of original hardcopies and of electronic formats in MINITAB and/or EXCEL. For each study the electronic database entries were verified against the hardcopies to ensure that the PPT data of each subject were correctly and completely transferred and tabulated. The merged and restructured database was then saved in IBM SPSS Statistics 22 and MINITAB version 17.0 for data analysis (Tabachnick et al 2007; Hills 2011).

The above PPT database comprises the baseline PPT scores collected from six previous UTS PPT studies that involved intervention LI4m^{+}21 (A sterile stainless steel disposable needle of length 30mm and diameter 0.22mm was inserted into LI4R to a depth of 15 to 20mm, followed by a standardised manual rotating of the needle between the fingers through a large angle of 540 to 720 degree in a bi-directional manner for nine times, each manipulation procedure lasted approximately five seconds and was applied every three minutes over a period of 21 minutes) while Study 7 (Control group) involved no intervention.

The analysis of variance (ANOVA) by General Linear Model (GLM) with Sidak's adjustments and Post Hoc Tests was employed for this repeated measures experimental research design. A 95% confidence interval with Type I Error at $\alpha = 0.05$ was considered to determine the significant difference between the means. Examination of relationships between regional PPT and age or BMI included scatterplots, notched boxplots, and Pearson product moment correlation coefficient. One-sample t-test with Bonferroni adjustment was used to compare the PPT in between pre-intervention and post-intervention during unilateral LI4m^{+}21 session. To

protect the chances of obtaining false-positive results (Type I error) when m tests were performed, Bonferroni correction at p= 0.05/m were employed to maintain the familywise error rate (Hills, 2011).

II. Research Study Two

3.7 Aim

To examine the regional PPT measures at LI10 and LI11 between the affected and non-affected elbow for subjects with lateral elbow tendinopathy.

3.8 Design

The PPT data collections were carried out in conjunction with the study conducted by Berle et al (2011). This was a double blind (assessor and patient) randomised controlled trial that involved PPT measurements (for the present research), pain rating/descriptor questionnaire (Visual Analogue Scale and McGill Melzack rating) and a functional self-report disability scale (Disabilities of the Arm, Shoulder and Hand questionnaire).

Ethics approval was granted on 21 September 2009 by the HREC of UTS with clearance number UTS HREC REF NO. 2009-274A.

3.9 Subjects

An Information pack that comprised of an Information Letter (Appendix 9), a Trial Entry Assessment Form (Appendix 10) and a Consent Form (Appendix 11) was sent to each of the 73 people who had expressed an interest in entering the trial. While 23 participants met the selection criteria only 20 completed the PPT measurements at all four occasions. The subjects were randomised with five men and six women in the treatment group and four men and five women in the control group.

The inclusion criteria for the participating subjects included:

- Chronic lateral elbow pain of at least three months duration;
- And 35 – 55 years of age.

The exclusion criteria included:

- Diseases of the central or peripheral nervous system;

- Radial nerve entrapment;
- Inflammatory rheumatic diseases;
- Gout;
- Radioulnar or radiohumeral osteoarthritis;
- Earlier episodes of lateral elbow pain treated surgically or with acupuncture;
- And have a current Work Cover claim.

3.10 Regional PPT measurement sites

There were four measurement sites with two acupoints located at each arm. These sites were the affected LI10 and LI11, and the non-affected LI10 and LI11. The affected arm could be either right or left. The locations of the sites are as shown in Figure 3.1. The definition and anatomical location of the PPT measurements sites are given in Table 3.4. The sites are labelled according to the body side, anatomical location, the relation toacupuncture channel and/or neuro-segmental region.

Site	**Side**	**Anatomical Location**	**Channel and/or segmental region**
LI10 (Shousanli)	Both	On the radial side of the dorsal surface of the forearm, on the line connecting LI5 and LI11, 2 *cun* below LI 11 (Quchi) which is located at the midpoint of the line between the radial end of the cubital crease and the external humeral epicondyle	Channel: Large intestine Dermatome: C5
LI11 (Quchi)	Both	At the lateral end of the transverse cubital crease midway between LU5 (Chi Ze, located at the cubital crease on the radial side of the biceps brachii tendon) and the lateral epicondyle of the humerus.	Channel: Large intestine Dermatome: C5

Table 3.4: The four regional measurement sites at which PPT measures were taken on adults with lateral elbow pain. The sites are labelled according to the body side, anatomical location, the relation to TCM channel and/or WMS segmental region.

3.11 Measuring PPT

A computerised hand-held electronic algometer (Tracker Freedom® JTech Medical, Salt Lake City Utah USA) was used for measuring PPT in Study II. Techniques for conducting PPT

measurements at experimental sites, the applied rate and tip size of the algometer were as introduced in Section 3.5.

For all PPT measurements, participants were seated comfortably with their shoulder in relax manner and the elbow lying on the table with flexion. Pressure was applied perpendicularly to each site at a rate of 1kg/cm^2/s as shown in Figure 3.3. The examiner was trained to achieve the required rate of application via a computerised rate display as shown in Figure 3.4. This was further monitored throughout the actual PPT measurement process.

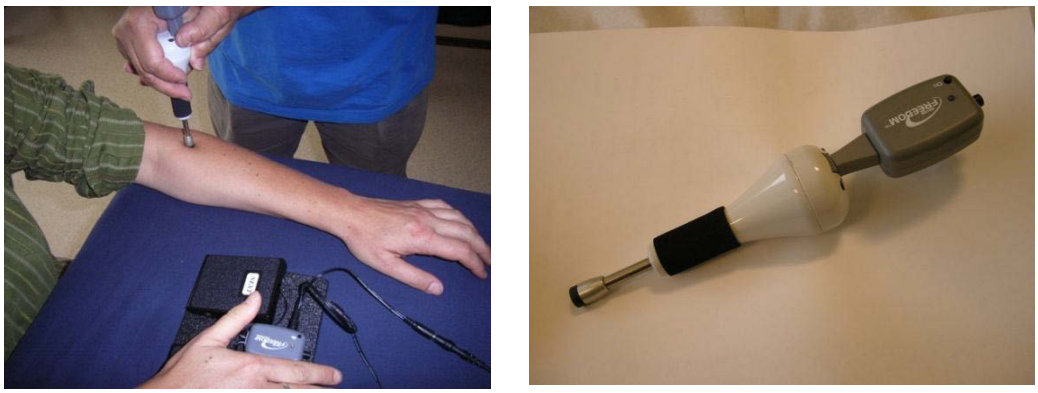


Figure 3.3: Left: Measuring PPT by an electronic algometer at LI10 of the left hand. The subject immediately pressed the pedal to record the data into the computerised system (Tracker Software Version 5) when the PPT was perceived. Right: The electronic algometer (Tracker Freedom®).

Figure 3.4: Display of the application rate as a guide to consistent applied rate and records of reading which were transmitted immediately when the paddle was activated.

PPT measurements were obtained in week 0 (one week before commencing the five weeks of either verum or sham laser intervention.); in week 1 (initial intervention week); week 5 (final intervention week) and week 9 (one month follow-up). On each occasion, two sets of PPT measurements were completed at 20 minute intervals. On week 1 and week 5, the 20 minutes were used as intervention sessions whereas for week 0 and week 9, no intervention was involved. There was a rest time of ten seconds between measures at the two different sites.

3.12 Statistical analysis

As in Research Study One, a GLM for repeated measures was employed in the data analysis on PPT with alpha = 0.05. When subgroups were formed by treatment, gender and occasion, non-parametric tests such as Friedmann test and Mann-Whitney U test were used to replace the parametric GLM for equal and unequal sample groups respectively.

III. Research Study Three

3.13 Aim

To examine the interdevice reliability of two PPT measurement devices: mechanical and electronic algometers of same measurement parameters: tip size and application rate.

3.14 Designs

In this study, subjects were blinded to the measurement procedure with a curtain drawn across their neck thereby making them blind to the type of algometer being applied at each site.

Ethics extension for using electronic algometer on 17 subjects from Research Study One at six PPT sites for this reliability study was granted on 25 February 2012 by HREC.

3.15 Subjects

The 17 subjects who volunteered to participate in this reliability testing study had previously consented to participate in the extended PPT study (Study 7).

3.16 Regional PPT measurement sites

The six regional PPT measurement sites used comprised of 1L, 1R, PC6L, PC6R, LI5L and LI5R.

3.17 Measuring PPT

The subject lay on the treatment table in a supine position with all the sites marked by a felt pen. A curtain was pulled across the subject's chest so that they could not see the algometers or the PPT measurement process. Sounds associated with the computerised system of electronic algometer were muted so that the subject could not differentiate between the two types of algometers.

The PPT measurements were carried out in alternate manners between mechanical and electronic algometers at different sites located on alternate sides of the body.

3.18 Statistical analysis

Paired samples t-tests were conducted to examine the consistency of readings between the mechanical and electronic algometers at all six sites separately by gender.

Chapter 4: Results

This chapter reports the results from three independent research studies.

I. Research Study One

Research Study One aimed to examine the temporal stability of possible relationships between subject variables of gender, age and BMI with the regional PPT. The temporal period refers to the session when three regional PPT measurements were being collected within the same occasion and over four consecutive occasions with intervals of at least one week in between occasions.

Research Study One included 235 healthy subjects, drawn from seven separate studies. A total of 17 PPT measurement sites were used in data analysis. Table 4.1 shows the number of subjects in each measurement site by gender by study with total possible number of subjects shown in the last row. The number of subjects in measurement site by gender by study which was less than the total possible number of subjects in the related gender and study implied that some subjects did not complete all four PPT occasions on that site and were excluded from the study for that particular site. It is to be noted that the comparisons of PPT among UTS PPT studies were beyond the scope of this thesis.

Number of subjects recruited in Research Study One																
Site	Study 1		Study 2		Study 3		Study 4		Study 5		Study 6		Study 7		Total	
	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
LI20L							12	12	10	10			49	36	71	58
LI20R	22	18	11	9	11	11					12	12	49	36	105	86
GB12R							12	12	10	10	12	12	49	36	83	70
2L			11	9			11	8			12	12	49	36	83	65
2R	20	15	11	9									49	36	80	60
PC6L											12	12	49	36	61	48
PC6R	22	18					12	12	10	10			49	36	93	76
LI10L							12	12	10	10	12	12	49	36	83	70
1L					11	11			10	10	12	12	49	36	82	69
1R	22	18	11	9	11	11	12	12					49	36	105	86
LI5L			11	9	11	11					12	12	49	36	83	68
LI5R	22	18	11	9	11	11	12	12	10	10			49	36	115	96
ST36L			10	8	11	11			10	10			49	36	80	65
ST36R	20	14	10	8	11	11					12	12	49	36	102	81
3R	19	16	11	7							12	12	49	36	91	71
SP6R							12	12					49	36	61	48
KD3R					11	11	12	12	10	10	12	12	49	36	94	81
Total	**22**	**18**	**11**	**9**	**11**	**11**	**12**	**12**	**10**	**10**	**12**	**12**	**49**	**36**	**127**	**108**

Table 4.1: The distribution of subjects by gender (F=Female, M=Male) in each measurement site in the order from head to toe.

An overall database of regional PPT was established from pre-intervention PPT measures collected in Studies 1 to 6 (involved various interventions inclusive of LI4m^{+}21) and the PPT measures in Study 7 (no intervention). A total of three PPT measures being collected per visit for four consecutive visits.

The syntax for data analyses performed in the following aims are shown in Appendix 13 by sequence of its application.

4.1 Aim One: To display the boxplots of PPT at 17 measurement sites by gender

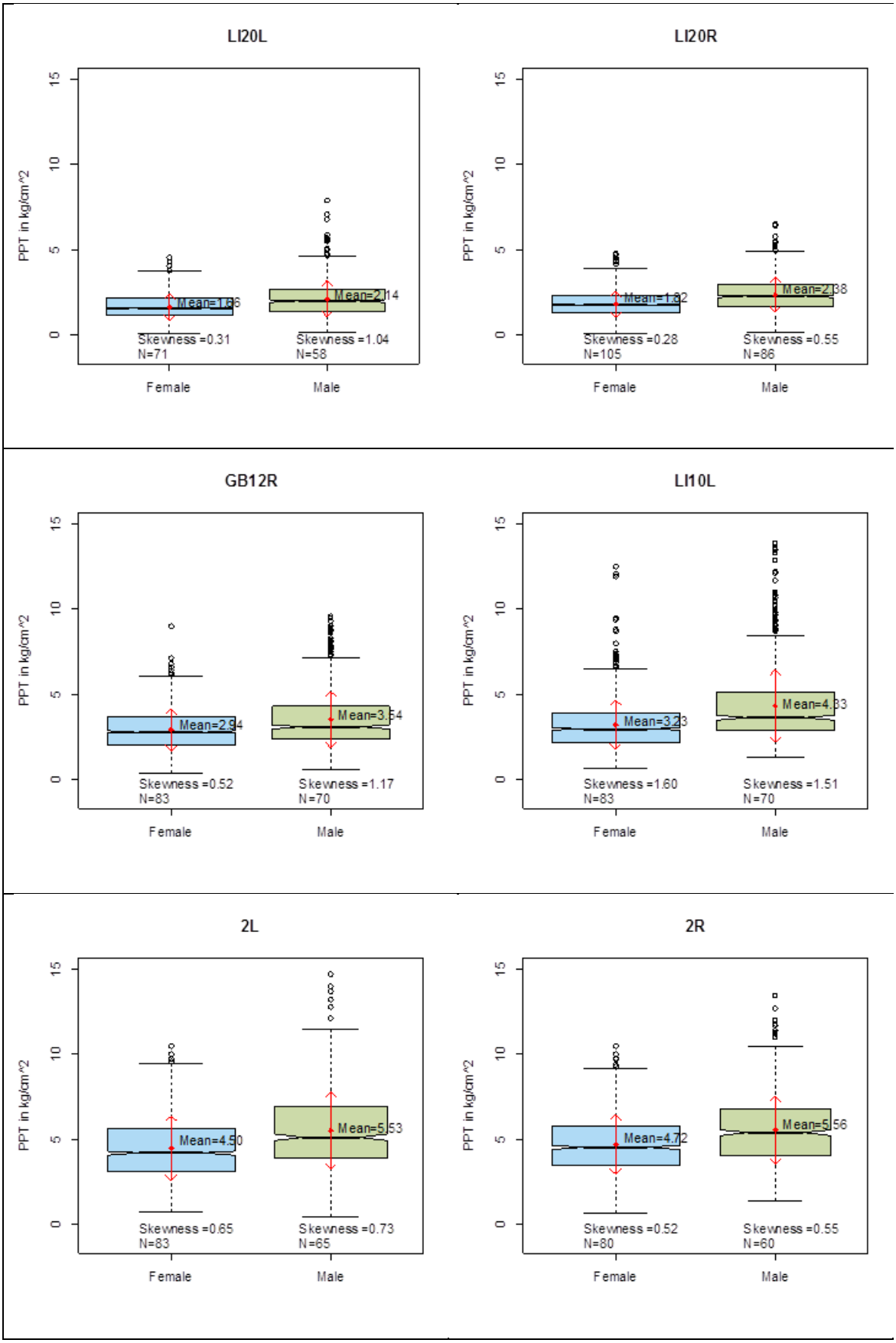
A series of boxplots of PPT measures for 17 measurement sites by gender was generated by using R version 3.1.2 to depict the descriptive statistics of PPT at each corresponding site. Figure 4.1 displays a series of boxplots for 17 measurement sites by gender, showing the interquartiles (Q1 at 25%, Q2 or median at 50%, Q3 at 75%), lower fence (Q1-1.5IQR), upper fence (Q3+1.5IQR), mean PPT (red dot) with standard deviation (red double arrows), width of box proportional to the square root of the sample size, potential outliers, skewness and the notched boxplots which offers evidence of a statistically significant difference between the medians of both genders if the notches of two boxes did not overlap (in this case, all 17 sites, evidenced by non-parametric Median Test on overall PPT at 95% confidence interval (Q1, Q2, Q3 refer to quartiles 1, 2 and 3. IQR=Q3-Q1).

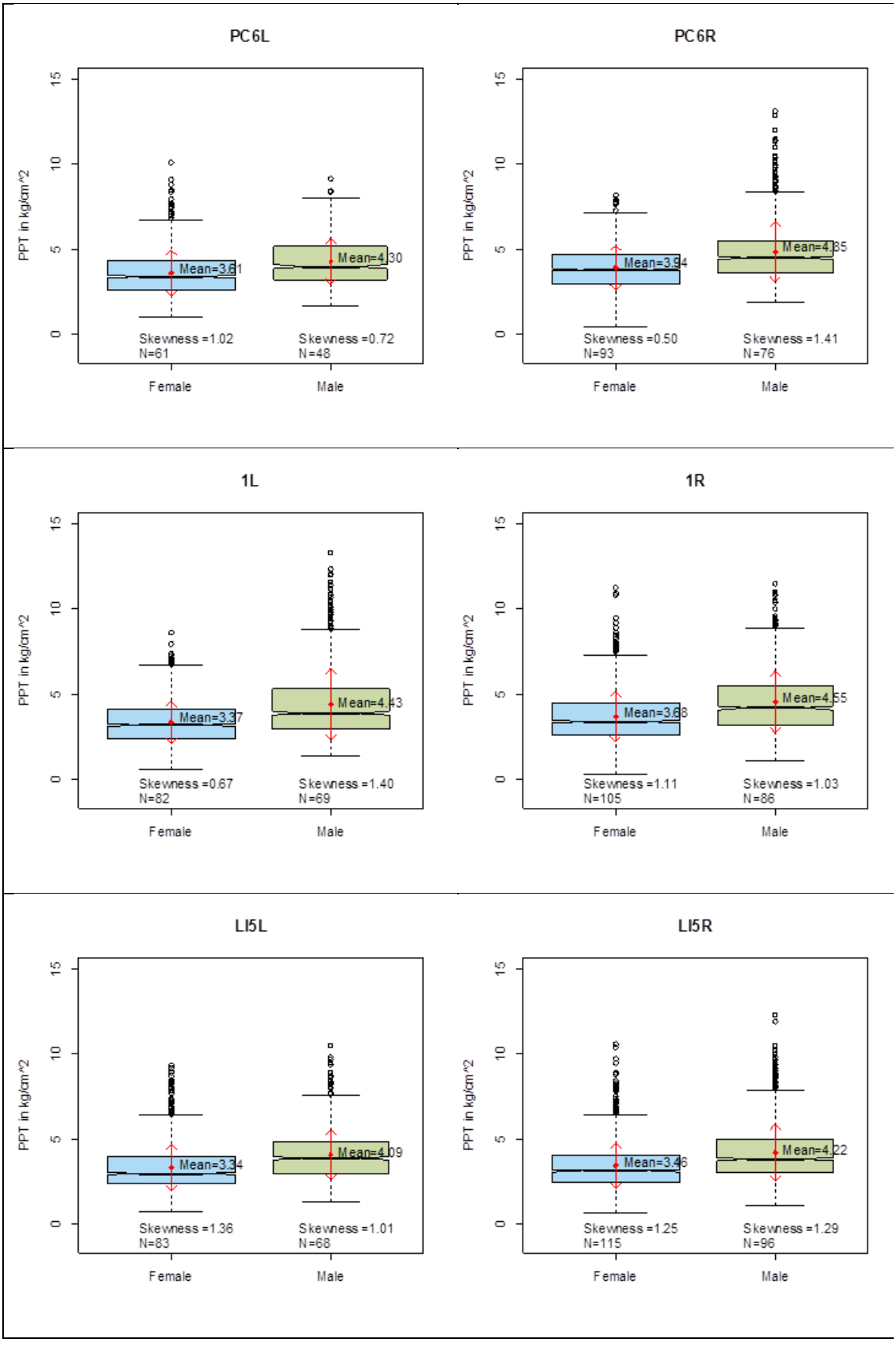
4.2 Aim Two: To examine the overall mean PPT, overall median PPT, PPT_{mean} and PPT_{median} by genders at each of the 17 PPT measurement sites

Research questions:

a) *Was there a difference in overall mean PPT between genders?*
b) *Was there a difference in overall median PPT between genders?*
c) *Was there a difference in mean PPT_{mean} between genders?*
d) *Was there a difference in mean PPT_{median} between genders?*

The influence of gender on PPT of each measurement site was systematically examined from different perspectives, namely the overall mean PPT, the overall median PPT, the mean PPT_{mean} (PPT_{mean} = mean of three PPT measures within session) and the mean PPT_{median} (PPT_{median} = median of three PPT measures within session = middle PPT measure).


LI20L
PPT in kg/cm^2
0
5
10
15
Mean=1.86
Mean=2.14
Skewness =0.31
N=71
Skewness =1.04
N=58
Female
Male
LI20R
PPT in kg/cm^2
0
5
10
15
Mean=1.82
Mean=2.38
Skewness =0.28
N=105
Skewness =0.55
N=86
Female
Male
GB12R
PPT in kg/cm^2
0
5
10
15
Mean=2.94
Mean=3.54
Skewness =0.52
N=83
Skewness =1.17
N=70
Female
Male
LI10L
PPT in kg/cm^2
0
5
10
15
Mean=3.23
Mean=4.33
Skewness =1.60
N=83
Skewness =1.51
N=70
Female
Male
2L
PPT in kg/cm^2
0
5
10
15
Mean=4.50
Mean=5.53
Skewness =0.65
N=83
Skewness =0.73
N=65
Female
Male
2R
PPT in kg/cm^2
0
5
10
15
Mean=4.72
Mean=5.56
Skewness =0.52
N=80
Skewness =0.55
N=60
Female
Male


PC6L
PPT in kg/cm^2
Mean=3.61
Mean=4.30
Skewness =1.02
N=61
Skewness =0.72
N=48
Female
Male
PC6R
PPT in kg/cm^2
Mean=3.94
Mean=4.85
Skewness =0.50
N=93
Skewness =1.41
N=76
Female
Male
1L
PPT in kg/cm^2
Mean=3.37
Mean=4.43
Skewness =0.67
N=82
Skewness =1.40
N=69
Female
Male
1R
PPT in kg/cm^2
Mean=3.68
Mean=4.55
Skewness =1.11
N=105
Skewness =1.03
N=86
Female
Male
LI5L
PPT in kg/cm^2
Mean=3.34
Mean=4.09
Skewness =1.36
N=83
Skewness =1.01
N=68
Female
Male
LI5R
PPT in kg/cm^2
Mean=3.46
Mean=4.22
Skewness =1.25
N=115
Skewness =1.29
N=96
Female
Male

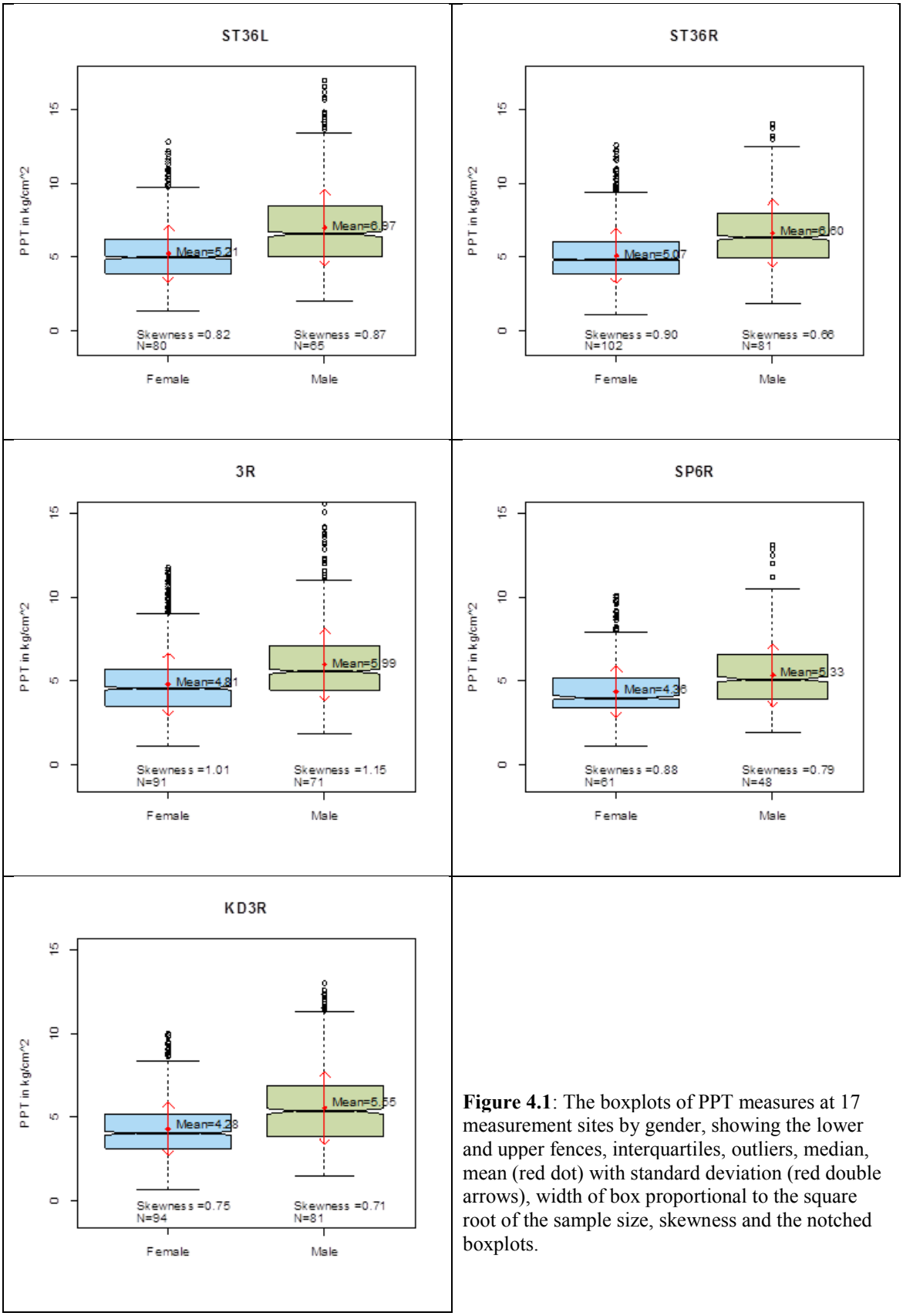


Figure 4.1: The boxplots of PPT measures at 17 measurement sites by gender, showing the lower and upper fences, interquartiles, outliers, median, mean (red dot) with standard deviation (red double arrows), width of box proportional to the square root of the sample size, skewness and the notched boxplots.

As seen in the notched boxplots, the notches of two boxes at each measurement site for both genders did not overlap which indicated statistical significant different between medians of

overall PPT. The non-parametric median test with alpha=0.05 showed that p=0.000 in all cases. For comparing the means of overall PPT, UNIANOVA by GLM on PPT was employed which showed that the mean PPT of males was statistically significantly higher than of females (in all cases, p=0.000). Table 4.2 gives the overall mean PPT and overall median PPT at all 17 measurement sites by gender with F-values by GLM shown for comparison of mean PPT between genders. The degrees of freedom for PPT in F were large as repeated measures (3 readings x 4 visits) were not yet taken into consideration.

Comparing the overall mean PPT or median PPT between genders					
Site	Overall Mean PPT			Overall Median PPT	
	Female	Male	F-value	Female	Male
LI20L	1.66	2.14	$F_{1,1546} = 107.0$	1.60	2.00
LI20R	1.82	2.38	$F_{1,2290} = 221.5$	1.80	2.30
GB12R	2.94	3.54	$F_{1,1834} = 80.0$	2.80	3.10
2L	4.50	5.53	$F_{1,1774} = 108.2$	4.20	5.13
2R	4.72	5.56	$F_{1,1678} = 83.4$	4.55	5.40
PC6L	3.61	4.30	$F_{1,1306} = 85.5$	3.40	4.00
PC6R	3.94	4.85	$F_{1,2026} = 175.1$	3.80	4.50
LI10L	3.23	4.33	$F_{1,1834} = 178.4$	3.00	3.65
1L	3.37	4.43	$F_{1,1810} = 179.4$	3.20	3.90
1R	3.68	4.55	$F_{1,2290} = 163.3$	3.40	4.20
LI5L	3.34	4.09	$F_{1,1810} = 131.9$	3.00	3.88
LI5R	3.46	4.22	$F_{1,2530} = 167.4$	3.15	3.85
ST36L	5.21	6.97	$F_{1,1738} = 256.4$	4.95	6.55
ST36R	5.07	6.60	$F_{1,2194} = 294.6$	4.80	6.30
3R	4.81	5.99	$F_{1,1942} = 164.0$	4.55	5.55
SP6R	4.36	5.33	$F_{1,1306} = 106.2$	4.00	5.10
KD3R	4.28	5.55	$F_{1,2098} = 234.5$	4.05	5.35

Table 4.2: The overall mean PPT and median PPT at each measurement site by gender.

For a more robust analysis, repeated measures ANOVA by GLM were performed to examine the difference in mean PPT_{mean} (then mean PPT_{median}) between genders (Table 4.3). Test of normality and homogeneity of variance at each site by gender were tolerable with robust sample size of ≥30. The ANOVA revealed statistically that the males had significantly higher mean PPT_{mean} (or mean PPT_{median}) than for females at each of the 17 measurement sites (in all cases $p<0.003$ except GB12R with p=0.004). Figure 4.2 shows the bar charts for the overall mean PPT, overall median PPT, mean PPT_{mean} and mean PPT_{median} by site by gender with error bars of 95% confidence intervals.

In summary, the males had statistically demonstrated significantly higher means of PPT, PPT_{mean}, and PPT_{median} than for females at all 17 measurement sites, independent of temporal sessions. Hence, all subsequent analyses involving genders were split by gender.

Comparing mean PPT_{mean} (or mean PPT_{median}) between genders						
Site	PPT_{mean}			PPT_{median}		
	Female	Male	F-values	Female	Male	F-values
LI20L	1.66	2.14	$F_{1,127} = 10.8$	1.66	2.14	$F_{1,127} = 10.8$
LI20R	1.82	2.38	$F_{1,189} = 22.8$	1.82	2.38	$F_{1,189} = 22.7$
GB12R	2.94	3.54	$F_{1,151} = 8.3$	2.93	3.54	$F_{1,151} = 8.4$
2L	4.50	5.53	$F_{1,146} = 11.8$	4.51	5.51	$F_{1,146} = 11.0$
2R	4.72	5.56	$F_{1,138} = 9.8$	4.72	5.56	$F_{1,138} = 9.8$
PC6L	3.61	4.30	$F_{1,107} = 10.2$	3.60	4.31	$F_{1,107} = 10.5$
PC6R	3.94	4.85	$F_{1,167} = 20.6$	3.94	4.84	$F_{1,167} = 19.6$
LI10L	3.23	4.33	$F_{1,151} = 18.5$	3.22	4.33	$F_{1,151} = 19.2$
1L	3.37	4.43	$F_{1,149} = 20.1$	3.37	4.44	$F_{1,149} = 19.8$
1R	3.68	4.55	$F_{1,189} = 18.2$	3.68	4.57	$F_{1,189} = 18.5$
LI5L	3.34	4.09	$F_{1,149} = 15.0$	3.34	4.07	$F_{1,149} = 14.5$
LI5R	3.46	4.22	$F_{1,209} = 19.5$	3.45	4.22	$F_{1,209} = 19.0$
ST36L	5.21	6.97	$F_{1,143} = 30.0$	5.21	7.00	$F_{1,143} = 30.6$
ST36R	5.07	6.60	$F_{1,181} = 35.6$	5.07	6.58	$F_{1,181} = 34.2$
3R	4.81	5.99	$F_{1,160} = 19.2$	4.81	5.96	$F_{1,160} = 18.4$
SP6R	4.36	5.33	$F_{1,107} = 11.8$	4.34	5.35	$F_{1,107} = 12.6$
KD3R	4.28	5.55	$F_{1,173} = 27.2$	4.29	5.54	$F_{1,173} = 26.4$

Table 4.3: The comparison of mean PPT_{mean} (or mean PPT_{median}) between genders by repeated measures ANOVA by GLM with F statistics (in all cases, $p<0.003$ except GB12R with $p=0.004$).

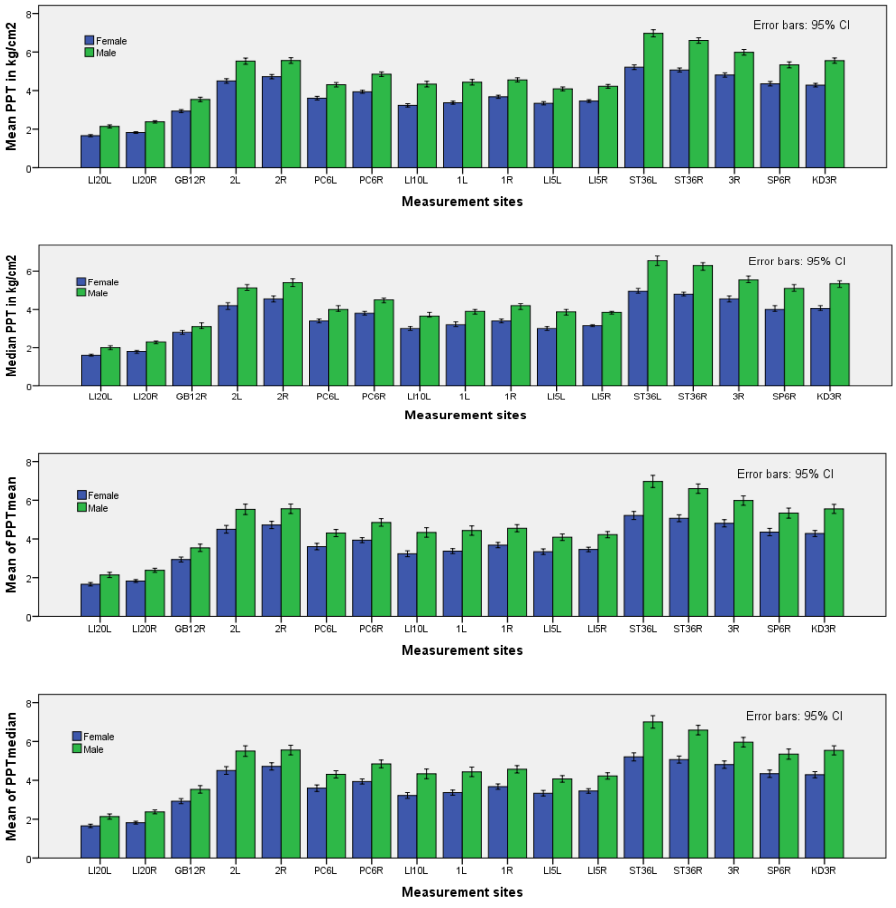


Figure 4.2: The bar graphs of overall mean PPT, overall median PPT, mean PPT_{mean} and mean PPT_{median} by gender by site.

4.3 Aim Three: To examine the mean PPT and median PPT among the three PPT readings by regional site by gender, independent of visits

Research question: Independent of visits, how stable were the mean PPT or median PPT among the three readings by gender?

Three PPT readings were recorded for all 17 regional sites during each of the four data collection visits. Figure 4.3 shows the overall mean PPT for each of the three measurement cycles by regional site and gender with error bars for 95% CI. The repeated measures ANOVA on PPT among three PPT readings by Post Hoc Tukey's test revealed that the mean PPT were stable across measurement cycles by gender independent of temporal visits, with $p>0.05$ in all cases (Table 4.4). Similarly for each site by gender, the non-parametric Median Tests on PPT by measurement cycles revealed that the median PPT for each of the three measurement cycles were generally stable independent of temporal visits with $p>0.05$ in all cases (Figure 4.4, Table 4.4). These results generally supported the stability and reproducibility of regional PPT among the three PPT readings, independent of visits.

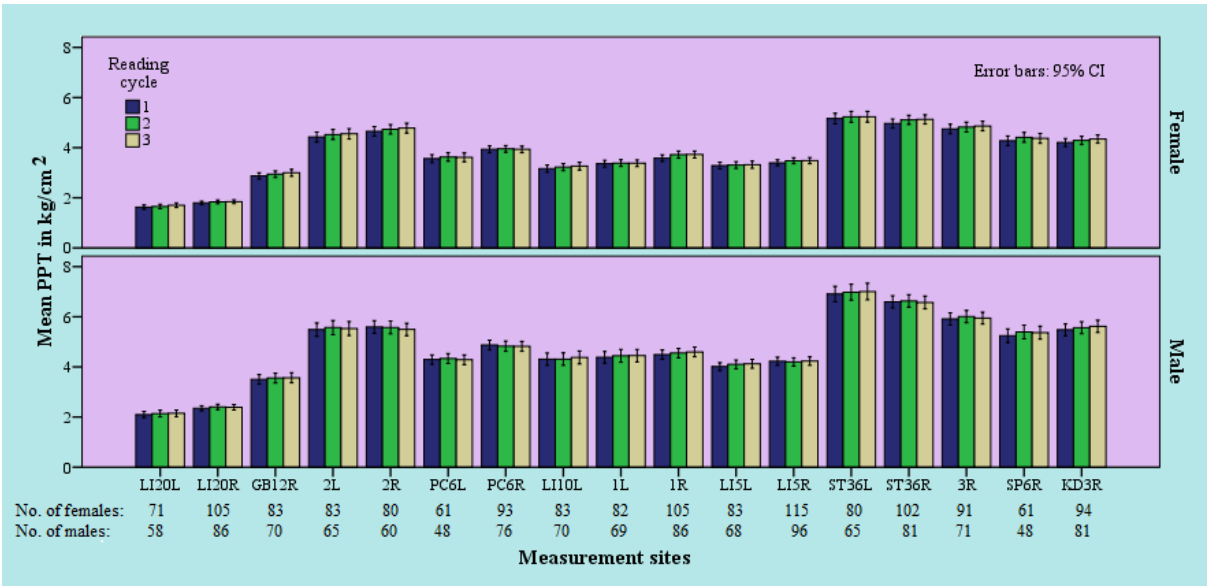


Figure 4.3: The mean PPT for three measurement cycles at 17 regional sites by gender, independent of visits.

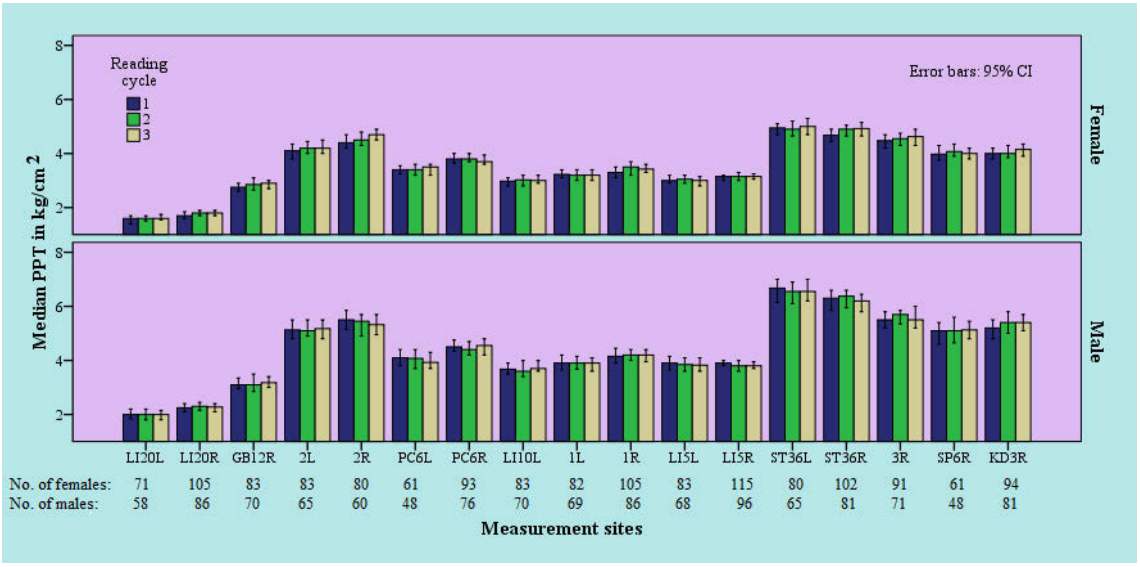


Figure 4.4: The median PPT for three measurement cycles at 17 regional sites by gender, independent of visits.

The p-values				
Site	GLM		Median Test	
	Female	Male	Female	Male
LI20L	0.794	0.951	0.645	0.928
LI20R	0.845	0.923	0.580	0.846
GB12R	0.767	0.963	0.400	0.927
2L	0.873	0.973	0.841	0.681
2R	0.866	0.963	0.212	0.689
PC6L	0.973	0.974	0.844	0.531
PC6R	0.991	0.977	0.798	0.636
LI10L	0.874	0.974	0.532	0.648
1L	0.986	0.978	0.882	0.967
1R	0.658	0.925	0.384	0.996
LI5L	0.984	0.814	0.783	0.943
LI5R	0.783	0.992	0.966	0.650
ST36L	0.964	0.963	0.850	0.965
ST36R	0.692	0.979	0.320	0.631
3R	0.888	0.969	0.671	0.501
SP6R	0.833	0.900	0.817	0.973
KD3R	0.790	0.900	0.526	0.688

Table 4.4: The p-values of repeated measures ANOVA and the Median Test on PPT by reading, independent of visits. In all cases, $p>0.05$.

4.4 Aim Four: To examine the temporal stability of the means of PPT_{mean} and PPT_{median} across four measurement visits at each regional site by gender

Research question: How stable were the means of the PPT_{mean} and PPT_{median} across the four measurement occasions?

Of interest after obtaining the stability of PPT among measurement cycles, exploration was undertaken on whether the regional PPT were stable across temporal sessions irrespective of measurement cycles. Hence the focus was to examine whether there was a significant difference in means of PPT_{mean} and PPT_{median} in subsequent visits V2, V3 and V4 with respect to the means in V1. As such, the exploration of outcome measures for multiple interactions among four visits and three measurement cycles were selective.

Figure 4.5 provides a graphical view of the 95% confidence interval (CI) of the overall mean PPT and overall median PPT obtained at four visits (V1, V2, V3, V4) at 17 measurement sites by gender.

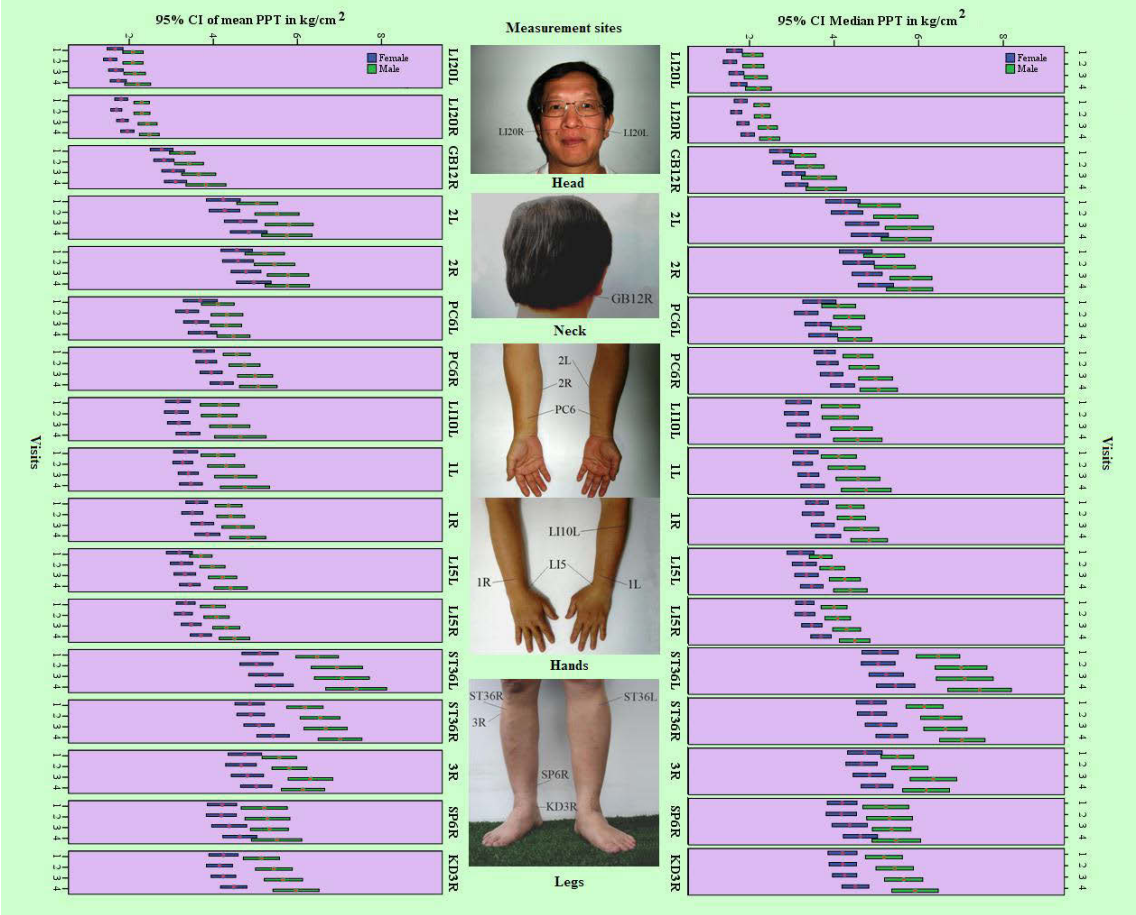


Figure 4.5: The 95% confidence interval (CI) of overall mean PPT and median PPT by regional site and sessions (V1, V2, V3, V4) shown separately by gender. The body regions for the measurement sites are also indicated.

Figure 4.6 gives the means of PPT_{mean} and PPT_{median} by gender, regional site and visits. The repeated measures ANOVA by GLM on PPT_{mean} and PPT_{median} by using Post Hoc tests with Tukey's multiple comparisons for visits revealed some significant increases (*) in the means of

PPT_{mean} and PPT_{median} across temporal sessions of V1 to V2, V1 to V3 and V1 to V4. However, Bonferroni corrections with p=0.05/17<0.003 largely reduced the significancy into sites marked with red arrow.

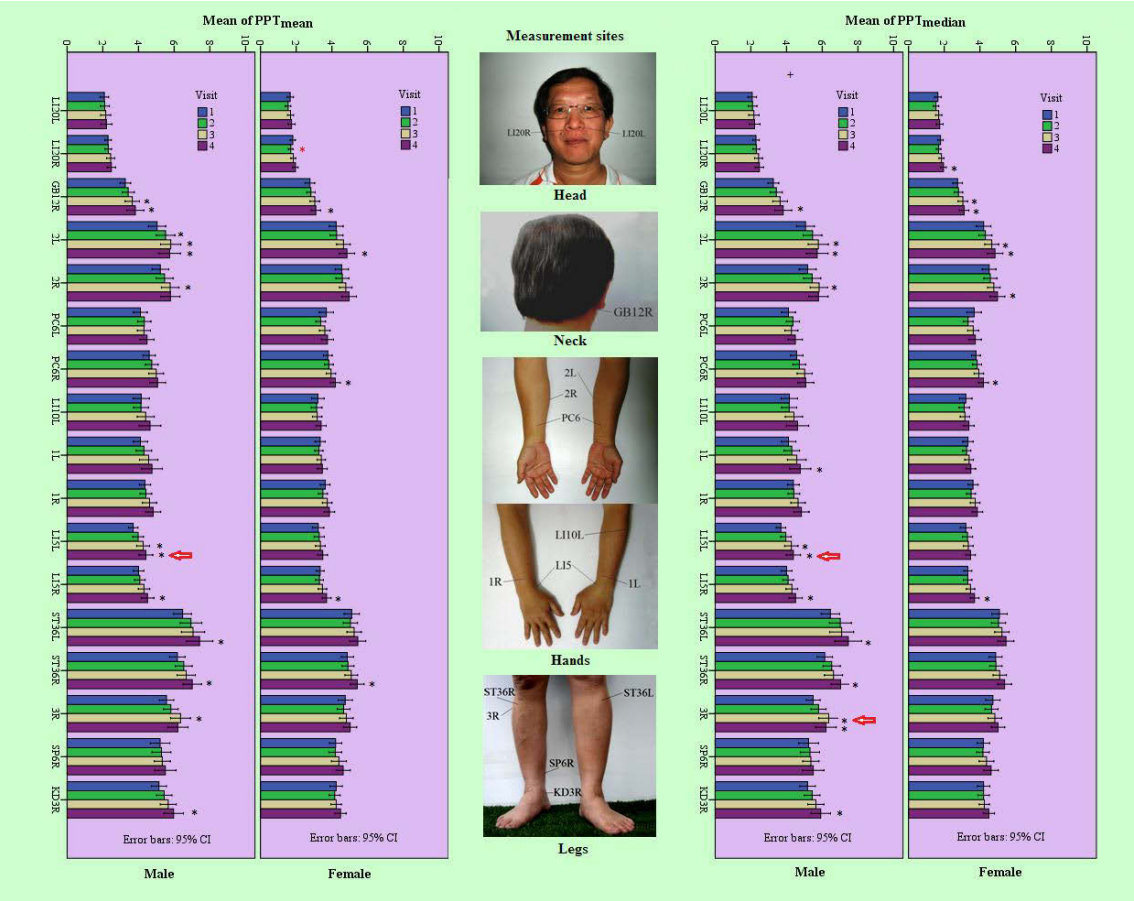


Figure 4.6: The means of PPT_{mean} and PPT_{median} (in kg/cm^2) by gender, regional site and session. The GLM on PPT_{mean} and PPT_{median} between visits revealed some significant increases (*) in the means of PPT_{mean} and PPT_{median} and a decrease (*) in mean PPT_{mean} across temporal intervals of V1 to V2, V3 and V4. Bonferroni corrections yielded only sites marked with red arrow.

Figure 4.7 provides the percentage of the 17 regional measurement sites that showed statistical significant increase in the means of PPT_{mean} and PPT_{median} at interval sessions of V1 to V2, V1 to V3, and V1 to V4. Both Figures 4.6 and 4.7 show a similar pattern among sites for both genders, with a trend where sites showed a gradual increase in the means of PPT_{mean} and PPT_{median} over delayed temporal sessions. Statistically significant effects were more frequent for males. Several comparisons of the means of regional PPT_{mean} and PPT_{median} values as well as its consistency over the extended temporal period are evident. However, Bonferroni adjustment had largely corrected the number of sites into none for females and at most one (6%) each for male (Figure 4.6).

Figures 4.6 and 4.7 show that there were gender differences evident in the rate of temporal change where the means of PPT_{mean} and PPT_{median} for males increased significantly (ie $p<0.05$) at more sites than for females. There were no significant changes in the means of PPT_{mean} and PPT_{median} thresholds for any site for both genders from Visit 1 to Visit 2. For Visit 3, this effect involved 23.5% of sites for means of PPT_{mean} and PPT_{median} of males compared with 17.6% for females in means of PPT_{median}. By Visit 4, these effects were evident for high proportions of sites for both means of PPT_{mean} and PPT_{median} for females (29.4% in both means) and males (47.1% and 52.9% respectively). These findings indicate the importance of recognising the presence of temporal drift if PPT measures are used in longitudinal clinical or research studies, as well as the need to evaluate findings for the genders separately. The means of PPT_{mean} were more stable as compared with means of PPT_{median}.

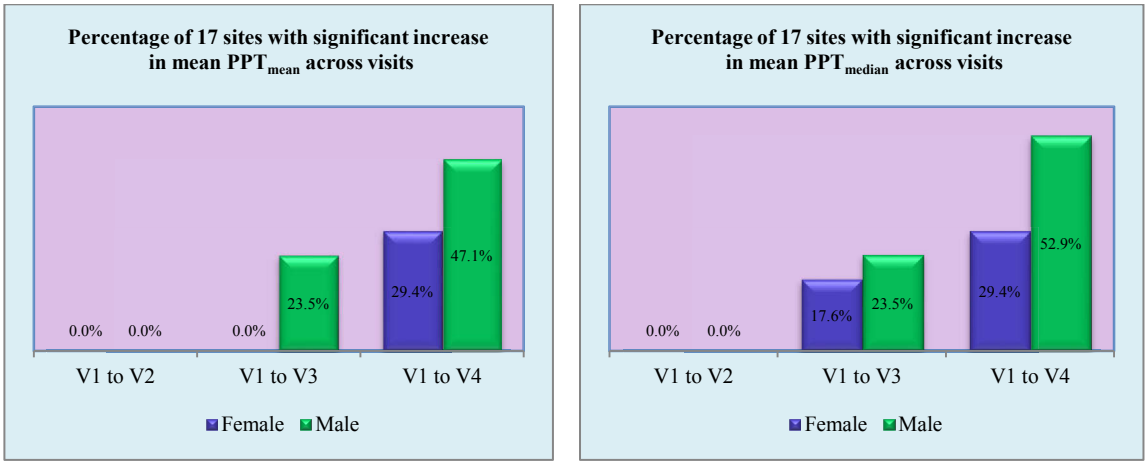


Figure 4.7: Percentage of the 17 regional measurement sites that showed statistical significant increase in the means of PPT_{mean} and PPT_{median} (in kg/cm^2) at interval sessions of V1 to V2, V1 to V3, and V1 to V4 for females (blue) and males (green). Bonferroni corrections reduced the percentages to at most 6%.

4.5 Aim Five: To determine the relationship between regional PPT_{mean} and PPT_{median} in Visit 1 (pre-intervention) with age or BMI

Research question: Was there a strong effect of age or BMI onto regional PPT_{mean} and PPT_{median} collected from Visit 1 at each measurement site by gender?

Figure 4.8 shows the distribution of ages and BMI for the subjects. In view of the study inclusion criteria that required healthy adults with no medical history of chronic musculoskeletal disorder, it would be expected that the group overwhelmingly comprised individuals in the designated healthy weight range (70% of subjects) followed by the overweight range (18%) (NSW 2013). Table 4.5 summarises the distribution of age and BMI

with standard deviation (SD) of both females and males at each measurement site. Table 4.6 gives the distribution of BMI in terms of its classification (NSW 2013).

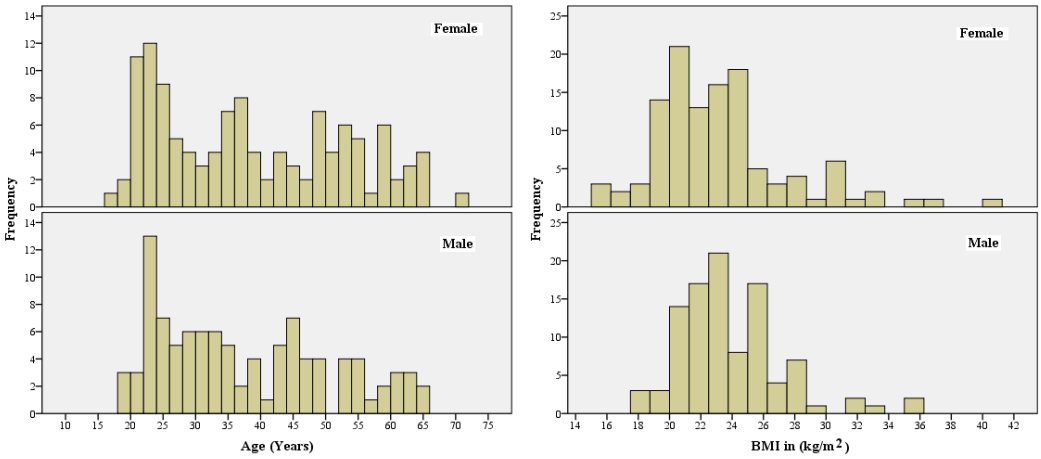


Figure 4.8: Distribution of age and BMI by gender for the study subjects.

Site	Female			Male		
	N	age(SD)	BMI(SD)	N	age(SD)	BMI(SD)
LI20L	71	46.3(12.6)	24.3(4.9)	58	43.8(12.8)	24.6(3.9)
LI20R	105	38.6(14.3)	23.3(4.4)	86	38.2(13.4)	24.2(3.5)
GB12R	83	43.6(13.5)	23.9(4.6)	70	40.7(13.3)	24.2(3.7)
2L	83	42.7(13.7)	23.6(4.5)	65	40.7(13.1)	24.3(3.7)
2R	80	41.7(14.6)	23.6(4.5)	60	42.6(13.0)	24.6(3.9)
PC6L	61	45.9(12.2)	24.0(4.8)	48	44.1(12.7)	24.9(3.8)
PC6R	93	42.0(14.6)	23.8(4.5)	76	41.3(13.1)	24.4(3.7)
LI10L	83	43.6(13.5)	23.9(4.6)	70	40.7(13.3)	24.2(3.7)
1L	82	41.9(13.6)	23.8(4.8)	69	39.6(14.0)	24.3(3.6)
1R	105	40.0(14.6)	23.4(4.5)	86	39.4(13.2)	24.3(3.6)
LI5L	83	41.1(13.7)	23.5(4.7)	68	39.5(13.7)	24.3(3.6)
LI5R	115	39.1(14.6)	23.5(4.5)	96	38.4(13.4)	24.0(3.5)
ST36L	80	42.1(13.8)	23.8(5.0)	65	40.5(14.0)	24.3(3.8)
ST36R	102	39.0(14.2)	23.3(4.4)	81	38.8(13.4)	24.2(3.6)
3R	91	40.2(14.3)	23.5(4.3)	71	40.4(13.1)	24.3(3.7)
SP6R	61	48.7(10.8)	24.3(5.0)	48	47.1(10.6)	25.1(4.0)
KD3R	94	41.8(13.7)	23.7(4.8)	81	39.0(13.6)	24.1(3.5)

Table 4.5: The distribution of age and BMI by gender in each measurement site.

Gender	Classification of BMI	Percentage
Female	Underweight	7.0%
	Healthy Weight	71.3%
	Overweight	11.3%
	Obese	10.4%
Male	Underweight	2.0%
	Healthy Weight	63.4%
	Overweight	28.7%
	Obese	5.9%

Table 4.6: The distribution of BMI by classification from Department of Health, NSW.

For examining the relationship between regional PPT_{mean} and PPT_{median} with age and BMI, the PPT_{mean} and PPT_{median} in Visit 1 (no intervention) of each subject with known age and BMI was used. Figure 4.9 gives the scatterplots of PPT_{mean} and PPT_{median} with age and BMI which provide evidence of heteroscedasticity in the relationships among the parameters with presence of some noise at some PPT measurement sites.

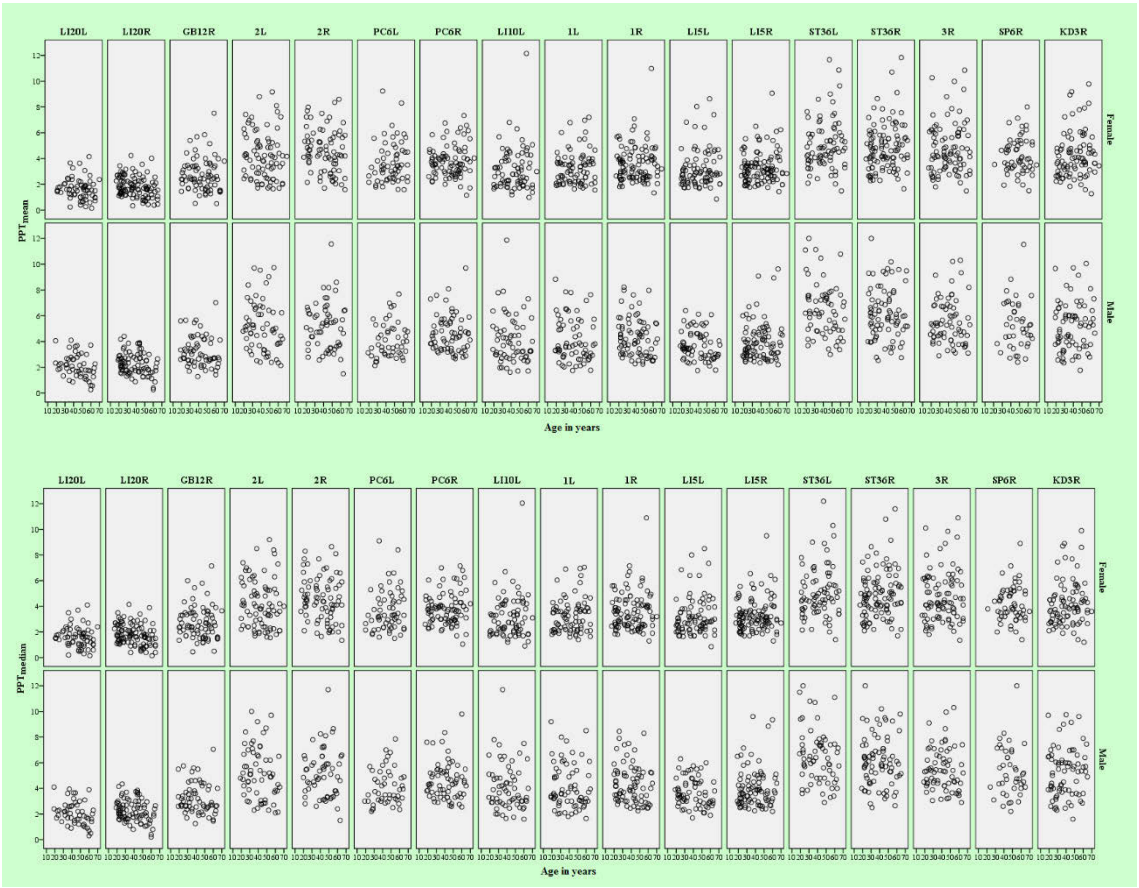


Figure 4.9a: The scatterplots of PPT_{mean} and PPT_{median} with age.

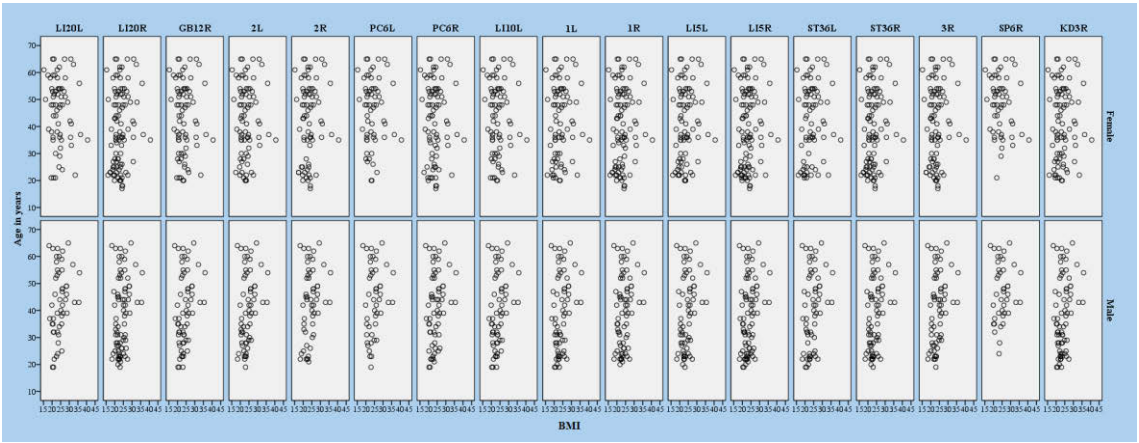


Figure 4.9b: The scatterplots of age and BMI.

Figure 4.9c: The scatterplots of PPT_{mean} and PPT_{median} with BMI (kg/m^2).

Table 4.7 shows the Pearson correlation coefficients between PPT_{mean} and age, PPT_{mean} and BMI, age and BMI whilst Table 4.8 gives the similar details for PPT_{median}. There were no strong effect of age or BMI onto PPT_{mean} at all measurement sites with the maximum correlation coefficients occurred at LI20R (R = -0.259 between PPT_{mean} and age) for en bloc, at PC6L (R = 0.338 between PPT_{mean} and BMI) for females, and at LI20L (R = -0.333 between PPT_{mean} and age) for males. Similarly, there were no strong effect of age or BMI on PPT_{median} at all measurement sites with the maximum correlation coefficients occurring at LI20R (R = -0.268 between PPT_{median} and age) for en bloc, at PC6L (R = 0.336 between PPT_{median} and BMI) for females, and at 1L (R = -0.348 between PPT_{median} and BMI) for males.

Research question: How was the relationship of PPT_{mean} or PPT_{median} with gender, age and BMI?

Table 4.9 gives the stepwise multiple regression established based on the relationship of gender, age and BMI with PPT_{mean} and PPT_{median}.

Site	Pearson correlation coefficients between PPT_{mean} and age, PPT_{mean} and BMI, age and BMI								
	En Bloc			Female			Male		
	PPT_{mean} & age	PPT_{mean} & BMI	BMI & age	PPT_{mean} & age	PPT_{mean} & BMI	BMI & age	PPT_{mean} & age	PPT_{mean} & BMI	BMI & age
LI20L	-0.234	-0.021	0.019	-0.114	0.104	-0.124	-0.333	-0.218	0.249
LI20R	-0.259	0.013	0.208	-0.268	0.054	0.174	-0.264	-0.123	0.279
GB12R	-0.089	0.002	0.089	-0.031	0.072	-0.042	-0.124	-0.137	0.303
2L	-0.162	0.066	0.134	-0.120	0.170	0.038	-0.187	-0.125	0.305
2R	-0.106	0.154	0.163	-0.185	0.147	0.105	-0.016	0.125	0.262
PC6L	0.140	0.239	0.061	0.154	0.338	-0.009	0.150	0.026	0.190
PC6R	0.025	0.041	0.094	0.099	0.198	0.002	-0.045	-0.224	0.261
LI10L	-0.036	-0.013	0.089	0.103	0.147	-0.042	-0.131	-0.250	0.303
1L	-0.033	-0.059	0.161	0.134	0.129	0.099	-0.135	-0.330	0.278
1R	-0.062	0.027	0.178	0.042	0.107	0.139	-0.195	-0.154	0.258
LI5L	-0.003	0.130	0.200	0.128	0.220	0.161	-0.188	-0.100	0.284
LI5R	0.088	0.091	0.177	0.104	0.187	0.116	0.092	-0.073	0.294
ST36L	-0.058	0.035	0.182	0.158	0.152	0.118	-0.266	-0.181	0.297
ST36R	0.070	0.055	0.217	0.166	0.186	0.180	-0.032	-0.207	0.291
3R	0.033	-0.047	0.178	0.059	-0.014	0.106	-0.010	-0.167	0.303
SP6R	-0.019	-0.075	-0.076	0.043	0.037	-0.159	-0.037	-0.288	0.076
KD3R	0.092	-0.042	0.144	0.151	0.040	0.067	0.091	-0.192	0.286

Table 4.7: The Pearson product moment correlation coefficient (R) between the PPT_{mean} and age, PPT_{mean} and BMI, age and BMI. Only PPT_{mean} of Visit 1 were considered. Highlighted in red are the coefficients of highest correlation among all sites.

Site	Pearson correlation coefficients between PPT_{median} and age, PPT_{median} and BMI, age and BMI								
	En Bloc			Female			Male		
	PPT_{median} & age	PPT_{median} & BMI	BMI & age	PPT_{median} & age	PPT_{median} & BMI	BMI & age	PPT_{median} & age	PPT_{median} & BMI	BMI & age
LI20L	-0.227	-0.031	0.019	-0.111	0.092	-0.124	-0.319	-0.227	0.249
LI20R	-0.268	0.000	0.208	-0.278	0.051	0.174	-0.271	-0.153	0.279
GB12R	-0.100	0.004	0.089	-0.046	0.077	-0.042	-0.128	-0.138	0.303
2L	-0.155	0.053	0.134	-0.094	0.172	0.038	-0.204	-0.159	0.305
2R	-0.094	0.160	0.163	-0.182	0.132	0.105	0.014	0.160	0.262
PC6L	0.135	0.247	0.061	0.157	0.336	-0.009	0.134	0.055	0.190
PC6R	0.022	0.045	0.094	0.092	0.206	0.002	-0.044	-0.217	0.261
LI10L	-0.032	-0.007	0.089	0.101	0.159	-0.042	-0.120	-0.252	0.303
1L	-0.025	-0.070	0.161	0.134	0.121	0.099	-0.118	-0.348	0.278
1R	-0.053	0.026	0.178	0.051	0.099	0.139	-0.187	-0.146	0.258
LI5L	0.000	0.118	0.200	0.124	0.215	0.161	-0.172	-0.126	0.284
LI5R	0.079	0.090	0.177	0.112	0.187	0.116	0.063	-0.072	0.294
ST36L	-0.072	0.025	0.182	0.123	0.138	0.118	-0.259	-0.182	0.297
ST36R	0.071	0.057	0.217	0.167	0.187	0.180	-0.035	-0.203	0.291
3R	0.013	-0.048	0.178	0.050	-0.004	0.106	-0.054	-0.189	0.303
SP6R	-0.027	-0.081	-0.076	0.050	0.026	-0.159	-0.060	-0.291	0.076
KD3R	0.083	-0.050	0.144	0.148	0.034	0.067	0.082	-0.203	0.286

Table 4.8: The Pearson product moment correlation coefficient (R) between the PPT_{median} and age, PPT_{median} and BMI, age and BMI. Only PPT_{median} of Visit 1 were considered. Highlighted in red are the coefficients of highest correlation among all sites.

Site	Stepwise multiple regression models
LI20L	PPT_{mean} = 2.681−0.019(age)
	PPT_{mean} = 2.428−0.018(age)+0.400(gender)
LI20R	PPT_{mean} = 1.781+0.473(gender)
	PPT_{mean} = 2.356−0.015(age)+0.461(gender)
GB12R	PPT_{mean} = 2.714+0.433(gender)
2L	PPT_{mean} = 4.189+0.951(gender)
2R	PPT_{mean} = 4.550+0.630(gender)
PC6L	PPT_{mean} = 1.893+0.081(BMI)
PC6R	PPT_{mean} = 3.782+0.759(gender)
LI10L	PPT_{mean} = 3.167+0.869(gender)
1L	PPT_{mean} = 3.278+0.779(gender)
1R	PPT_{mean} = 3.597+0.691(gender)
LI5L	PPT_{mean} = 3.238+0.465(gender)
LI5R	PPT_{mean} = 3.324+0.599(gender)
ST36L	PPT_{mean} = 4.987+1.416(gender)
ST36R	PPT_{mean} = 4.881+1.241(gender)
3R	PPT_{mean} = 4.735+0.803(gender)
SP6R	PPT_{mean} = 4.252+1.022(gender)
KD3R	PPT_{mean} = 4.240+0.893(gender)

Table 4.9a: The stepwise multiple regression models of PPT_{mean} with age and BMI.

Site	Stepwise multiple regression models
LI20L	PPT_{median} = 2.643−0.019(age)
	PPT_{median} = 2.390−0.017(age)+0.402(gender)
LI20R	PPT_{median} = 1.763+0.486(gender)
	PPT_{median} = 2.355−0.015(age)+0.473(gender)
GB12R	PPT_{median} = 2.693+0.451(gender)
2L	PPT_{median} = 4.169+0.993(gender)
2R	PPT_{median} = 4.550+0.630(gender)
PC6L	PPT_{median} = 1.782+0.085(BMI)
PC6R	PPT_{median} = 3.788+0.716(gender)
LI10L	PPT_{median} = 3.162+0.882(gender)
1L	PPT_{median} = 3.265+0.780(gender)
1R	PPT_{median} = 3.590+0.714(gender)
LI5L	PPT_{median} = 3.220+0.464(gender)
LI5R	PPT_{median} = 3.317+0.612(gender)
ST36L	PPT_{median} = 4.965+1.418(gender)
ST36R	PPT_{median} = 4.894+1.181(gender)
3R	PPT_{median} = 4.709+0.763(gender)
SP6R	PPT_{median} = 4.227+1.058(gender)
KD3R	PPT_{median} = 4.191+0.976(gender)

Table 4.9b: The stepwise multiple regression models of PPT_{median} with age and BMI.

The stepwise regression revealed that BMI was a significant factor with regression coefficients of 0.081 to PPT_{mean} and 0.085 to PPT_{median} at PC6L (PPT_{mean}: R=0.239 for en bloc, R=0.338 for

females, R=0.026 for males; PPT_{median}: R=0.247 for en bloc, R=0.336 for females, R=0.055 for males). Other than PC6L, gender was found to be significant predictors to PPT_{mean} and PPT_{median} at 16 sites. Two sites (LI20L and LI20R) involved age and gender as significant factors to PPT_{mean} and PPT_{median} and hence adjusted analysis (ANCOVA) with age as covariate were followed.

4.6 Aim Six: To examine the temporal stability of the adjusted means of PPT_{mean} and PPT_{median} with age as covariate across the four measurement visits at LI20L and LI20R by gender

Research question: How stable were the adjusted means of the PPT_{mean} and PPT_{median} with age across the four measurement occasions at LI20L and LI20R?

At LI20L and LI20R (Table 4.9), a repeated measures analysis of covariance (ANCOVA) was conducted on PPT_{mean} and PPT_{median} by using age as the covariate at α=0.05. The multiple comparisons of Sidak for visits revealed no significant differences in the adjusted means of PPT_{mean} and PPT_{median} across temporal sessions of V1 to V2, V1 to V3 and V1 to V4 (Figure 4.10). This approach has adjusted the mean PPT_{mean} in V2 and mean PPT_{median} in V4 at LI20R of females from the presence of significant differences to no significant differences from corresponding means in V1.

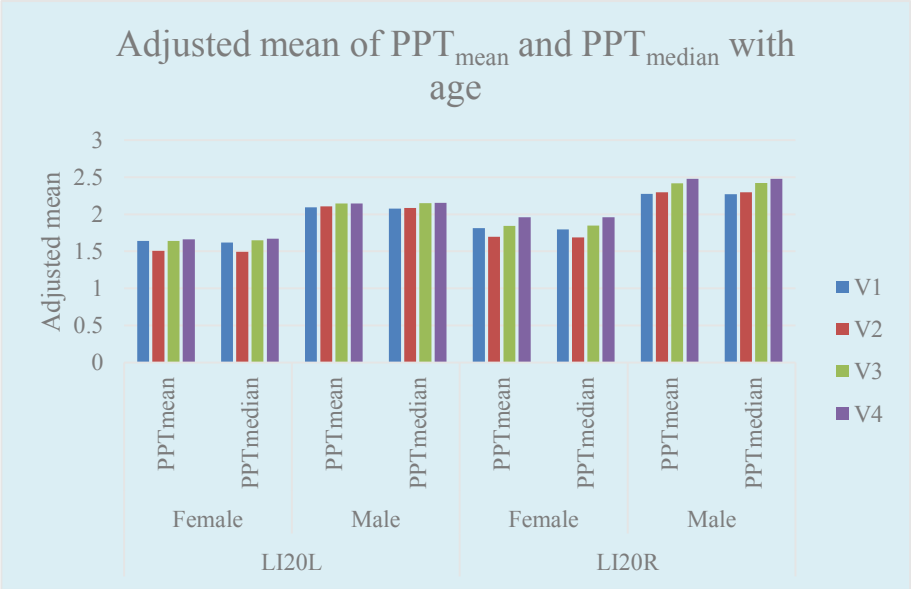


Figure 4.10: The adjusted means of PPT_{mean} and PPT_{median} by gender at LI20L and LI20R in four visits with age as covariate. The ANCOVA by GLM on PPT_{mean} and PPT_{median} between visits revealed no significant differences in the adjusted means across temporal intervals of V1 to V2, V3 and V4.

4.7 Aim Seven: To examine the temporal stability of the adjusted means of PPT_{mean} and PPT_{median} with BMI as covariate across the four measurement visits at PC6L by gender

Research question: How stable were the adjusted means of the $PPT_{mean\ and}$ PPT_{median} at PC6L with BMI as covariate across the four measurement occasions?

The PPT_{mean} and PPT_{median} of PC6L were analysed with a repeated measures analysis of covariance (ANCOVA), using BMI as the covariate at α=0.05. The multiple comparisons of Sidak for visits revealed no significant differences in the adjusted means of PPT_{mean} and PPT_{median} across temporal sessions of V1 to V2, V1 to V3 and V1 to V4. Figure 4.11 gives the adjusted means of PPT_{mean} and PPT_{median} with BMI as covariate by gender and visit.

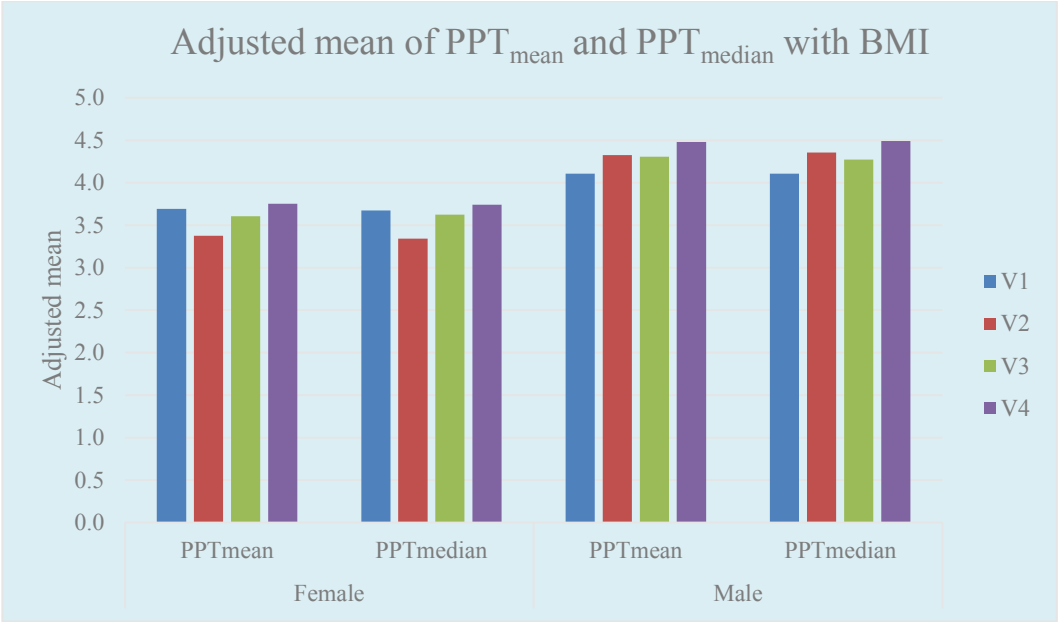


Figure 4.11: The adjusted means of PPT_{mean} and PPT_{median} by gender at PC6L in four visits with BMI as covariate. The ANCOVA by GLM on PPT_{mean} and PPT_{median} between visits revealed no significant differences in the adjusted means across temporal intervals of V1 to V2, V3 and V4.

4.8 Aim Eight: To compare the means of PPT_{mean} and PPT_{median} between BMI groups by gender at Visit 1, then with BMI as covariate

Research question: Was there a difference in the means of regional PPT_{mean} and PPT_{median} between BMI groups for each gender in Visit 1 only? Then with BMI as covariate?

At PC6L, the subjects were being categorised according to the BMI classification into four BMI groups (Table 4.10). However, due to small sample sizes, data analysis involving Underweight for both genders and Obese for males were not carried out.

Site	Female				Male			
	UW	HW	OW	OB	UW	HW	OW	OB
PC6L	3	40	10	8	1	25	18	4
UW:Underweight; HW: Healthyweight; OW:Overweight; OB:Obese								

Table 4.10: The number of subjects by BMI-group by gender at PC6L.

The one-way ANOVA was employed to compare the means of PPT_{mean} and PPT_{median} in Visit 1 between BMI groups (HW, OW and OB of females, HW and OW of males) for PC6L by gender. Table 4.11 provides the means of PPT_{mean} and PPT_{median} with associated standard deviations for Healthy Weight and Overweight by gender and F-values by ANOVA. Healthy Weight had significantly lower means of PPT_{mean} and PPT_{median} than the Overweight for females. For Obese of females, ANOVA was used in comparing the means of PPT_{mean} and PPT_{median} between Obese and Healthy Weight or Overweight. The results revealed that Healthy Weight had significantly lower means of PPT_{mean} and PPT_{median} than the Obese at PC6L.

Comparing means of PPT_{mean} and PPT_{median} between Healthy and Overweight in Visit 1				
		Healthy weight	Overweight	F
Female	PPT_{mean}	3.35(1.28)	4.47(1.75)	$F_{1,48}$=5.21*
	PPT_{median}	3.32(1.29)	4.52(1.89)	$F_{1,48}$=5.69*
Male	PPT_{mean}	3.96(1.27)	4.39(1.50)	$F_{1,41}$=1.02
	PPT_{median}	3.93(1.29)	4.43(1.54)	$F_{1,41}$=1.36

Table 4.11: The mean (SD) of PPT_{mean} of PC6L in Visit 1 and the results of one-way ANOVA on PPT_{mean} and PPT_{median} between Healthy Weight and Overweight by gender. The asterisk indicates $p<0.05$.

Table 4.12 provides the adjusted means of PPT_{mean} and PPT_{median} associated standard errors for Healthy Weight and Overweight by gender and F-values by UNIANOVA on PPT_{mean} and PPT_{median} with BMI as covariate. The results revealed that there were no significant differences ($p>0.05$ in all comparisons) between the adjusted means of PPT_{mean} and PPT_{median} for BMI groups (HW, OW and OB of females, HW and OW of males) at PC6L in Visit 1.

Comparing adjusted means of PPT_{mean} and PPT_{median} between Healthy and Overweight in Visit 1 with BMI as covariate				
		Healthy weight	Overweight	p
Female	PPT_{mean}	3.56(0.24)	3.63(0.63)	$F_{1,47}$=0.01
	PPT_{median}	3.54(0.25)	3.64(0.65)	$F_{1,47}$=0.02
Male	PPT_{mean}	3.90(0.40)	4.49(0.52)	$F_{1,40}$=0.52
	PPT_{median}	3.86(0.41)	4.52(0.53)	$F_{1,40}$=0.63

Table 4.12: The adjusted mean (SE) of PPT_{mean} of PC6L in Visit 1 and the results of univariate ANOVA on PPT_{mean} and PPT_{median} between Healthy Weight and Overweight by gender. In all cases, p>0.05.

4.9 Aim Nine: To examine the stability of the means of regional PPT_{mean} and PPT_{median} of PC6L across visits by BMI-group by gender, then with BMI as covariate

Research question: How stable were the means of regional PPT_{mean} and PPT_{median} of PC6L between follow-up visits and baseline visit by BMI-group by gender? Then with BMI as covariate?

The repeated measures ANOVA by GLM using Sidak multiple comparisons for visits by BMI-group by gender revealed no significant differences (p>0.05 in all cases) in the means of PPT_{mean} and PPT_{median} across temporal sessions of V1 to V2, V1 to V3 and V1 to V4 (Figure 4.12). The results remained unchanged (p>0.05 in all cases) with adjusted means for BMI as covariate.

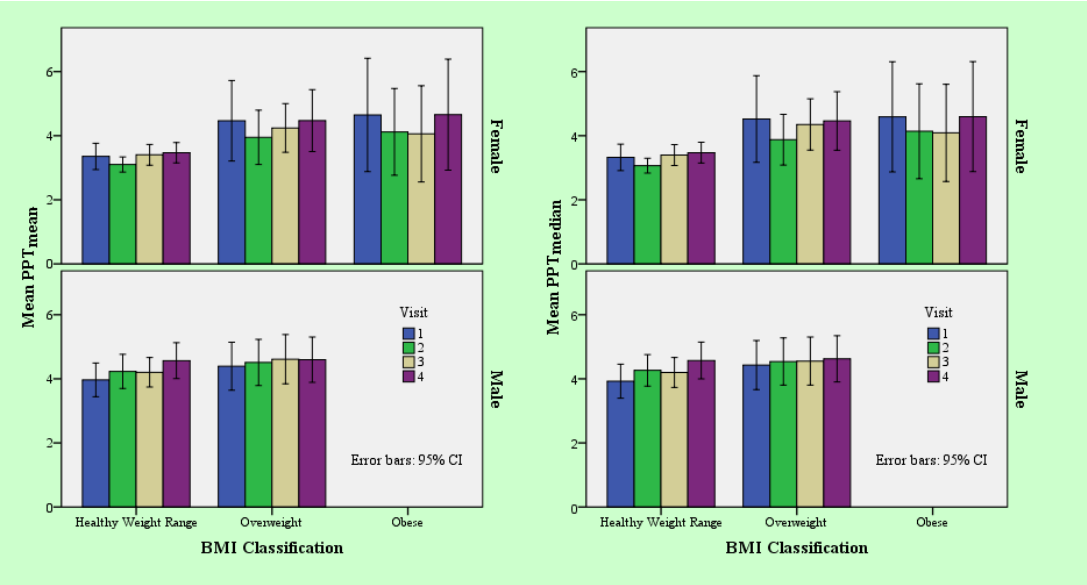


Figure 4.12 The bar graphs of mean PPT_{mean} of PC6L across four consecutive visits by selected BMI groups by gender.

As outlined before Section 4.1, the previous UTS PPT studies (Studies 1 to 6) included various types of interventions whilst the current Study 7 was of a non-intervention design. Hence two treatment groups were established, namely the Intervention that included pre-intervention regional PPT database (Studies 1 to 6), and the Control group with PPT database from the non-intervention (Study 7).

Sections 4.10 to 4.17 reported the results from data analyses on PPT database grouped according to treatment groups.

4.10 Aim Ten: To examine, by Intervention and Control groups, the stability of the means and medians of overall regional PPT among the three measurement cycles by gender

Research question: In general, by treatment groups by gender, how stable were the means or medians of regional PPT across three measurement cycles independent of visit?

Figure 4.13 shows the overall mean PPT for each of the three measurement cycles by treatment group, site and gender. With treatment by gender, the repeated measures ANOVA on PPT among measurement cycles by Post Hoc Tukey's test revealed that the means of regional PPT were stable across measurement cycles independent of temporal visits, with $p>0.05$ in all cases. Similarly, the non-parametric Median Tests on PPT by measurement cycles revealed that the medians of regional PPT for each of the three measurement cycles were generally stable with $p>0.05$ in all cases for each site (Figure 4.14). These results were consistent with the results for combined group as outlined in Section 4.

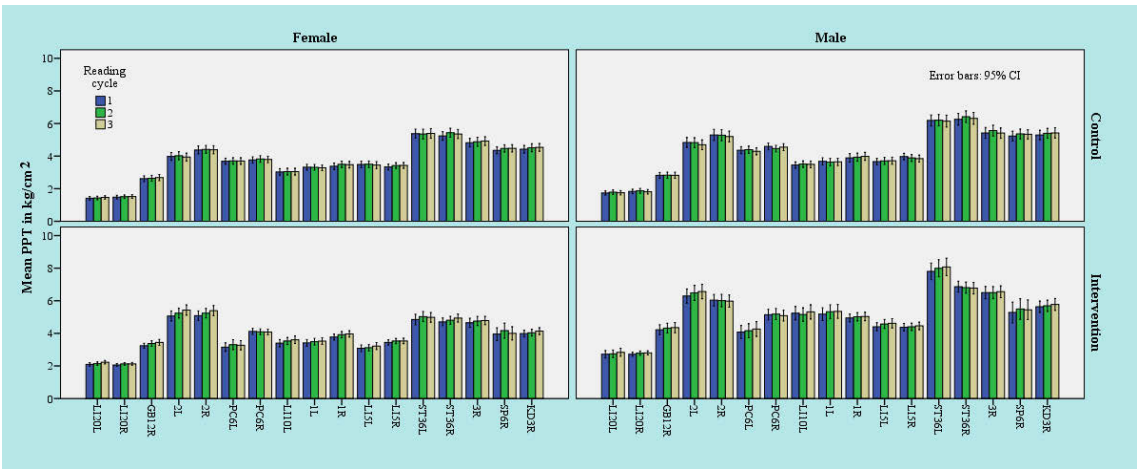


Figure 4.13: The mean PPT for three measurement cycles at 17 regional sites by treatment group by gender, independent of visit.

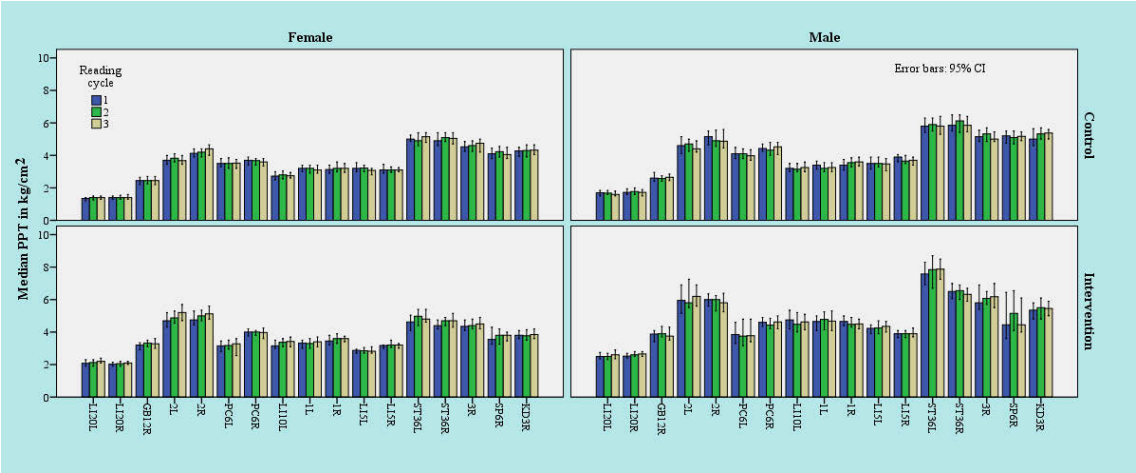


Figure 4.14: The median PPT for three measurement cycles at 17 regional sites by treatment group by gender, independent of visit.

4.11 Aim 11: To examine, by treatment group by gender, the temporal stability of the means of PPT_{mean} and PPT_{median} across the four measurement visits at each regional site.

Research question: Separately by treatment by gender, how stable were the means of regional PPT_{mean} and PPT_{median} across the four measurement occasions?

By treatment group by gender, Figures 4.15 and 4.17 give the means of PPT_{mean} and PPT_{median} at each regional site and visits. The GLM by using Post Hoc tests for visits with Tukey's multiple comparisons by Sidak adjustments revealed some significant increases (*) in the means of PPT_{mean} and PPT_{median} across temporal sessions of V1 to V2, V1 to V3 and V1 to V4 whilst Bonferroni corrections with $p=0.05/17<0.003$ yielded a more conservative outome with less noise. Figures 4.16 and 4.18 provides the percentage of the 17 regional measurement sites that showed statistical significant increase in the means of PPT_{mean} and PPT_{median} at interval sessions of V1 to V2, V1 to V3, and V1 to V4 for Intervention before and after Bonferroni corrections. Figures 4.15 to 4.18 show a similar pattern for both Intervention and Control groups, among sites by gender, with a trend where sites showed a gradual increase in the means of PPT_{mean} and PPT_{median} over delayed temporal sessions whilst the Control demonstrated a stable means of PPT_{mean} and PPT_{median} across temporal sessions. For the Intervention, statistically significant effects were more frequent for males. The higher percentages acquired by Intervention at V3 and V4 would imply the possible remaining of washout effects from other interventions on top of $LI4m^{+}21$ for both genders.

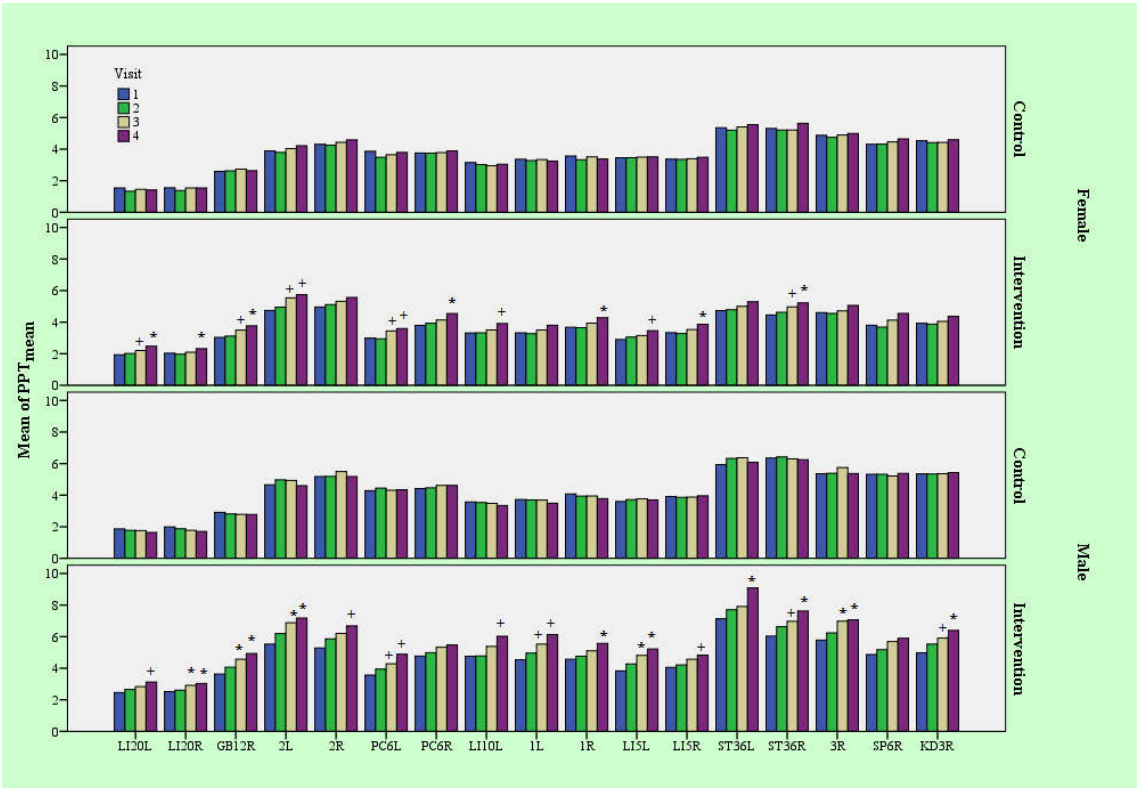


Figure 4.15: The means of PPT_{mean} by treatment, gender, regional site and session. The GLM on PPT_{mean} between visits revealed some significant increases with $p<0.05$ (denoted by +) in the means of PPT_{mean} across temporal intervals of V1 to V2, V3 and V4 whilst Bonferroni correction yielded a more conservative result with $p<0.003$ (denoted by *).

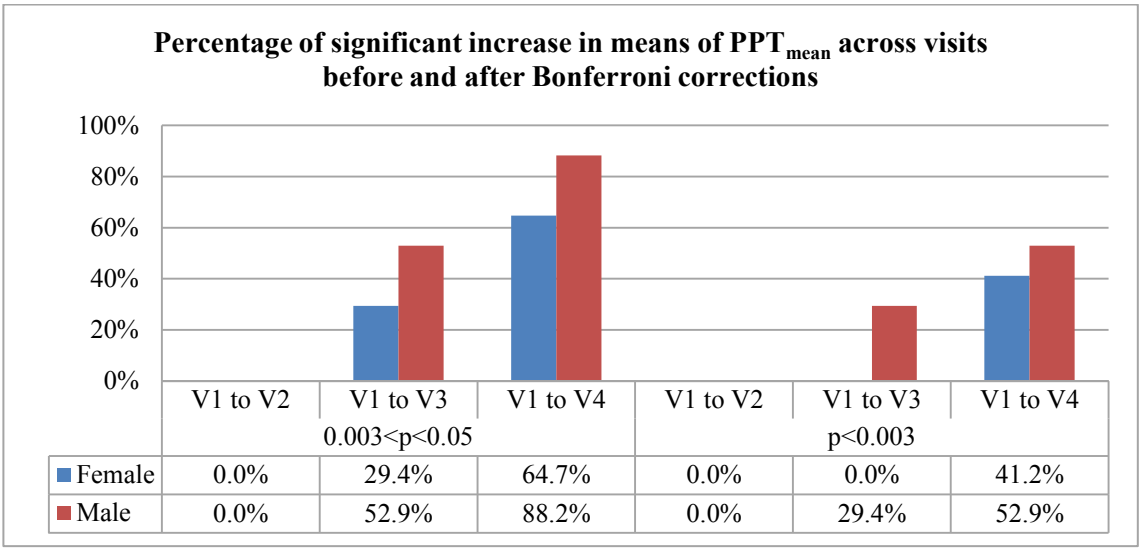


Figure 4.16: Percentage of the 17 regional measurement sites that showed statistical significant increase in the means of PPT_{mean} at interval sessions of V1 to V2, V1 to V3, and V1 to V4 for females (blue) and males (red) for Intervention before and after Bonferroni corrections.

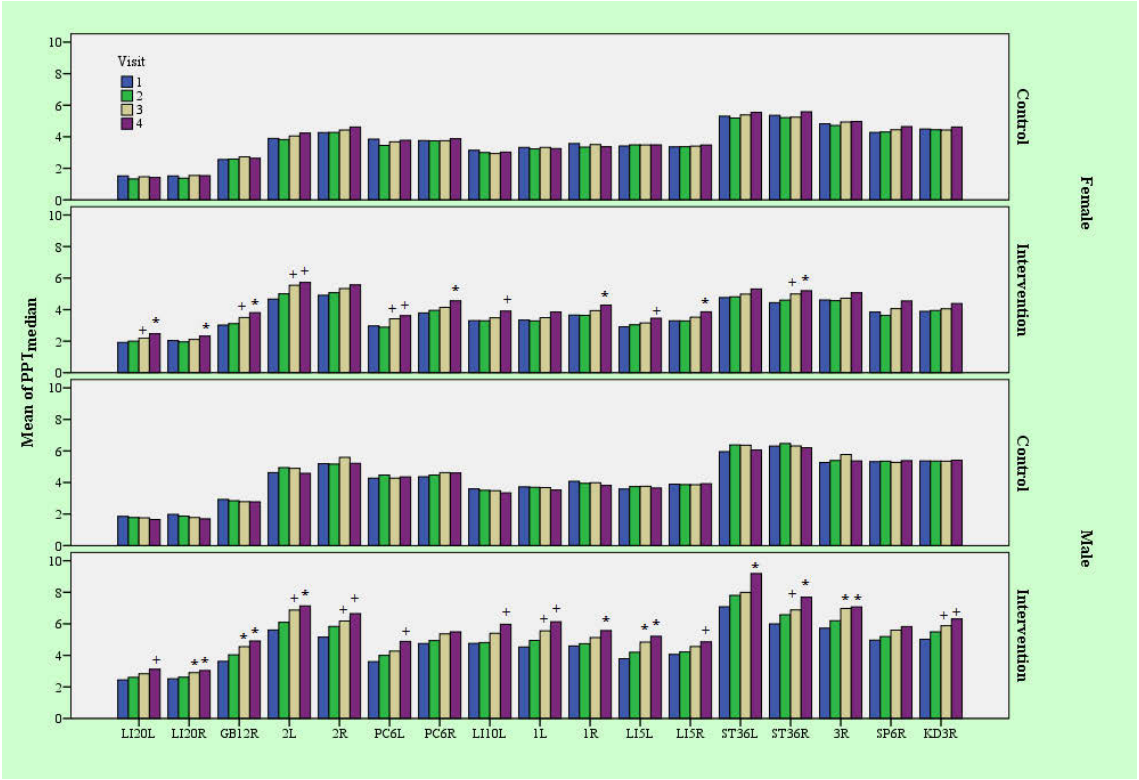


Figure 4.17: The mean of PPT_{median} by treatment, gender, site and session. The GLM on PPT_{median} between visits revealed some significant increases with $p<0.05$ (denoted by +) in the means of PPT_{median} across temporal intervals of V1 to V2, V3 and V4 whilst Bonferroni correction yielded a more conservative result with $p<0.003$ (denoted by *).

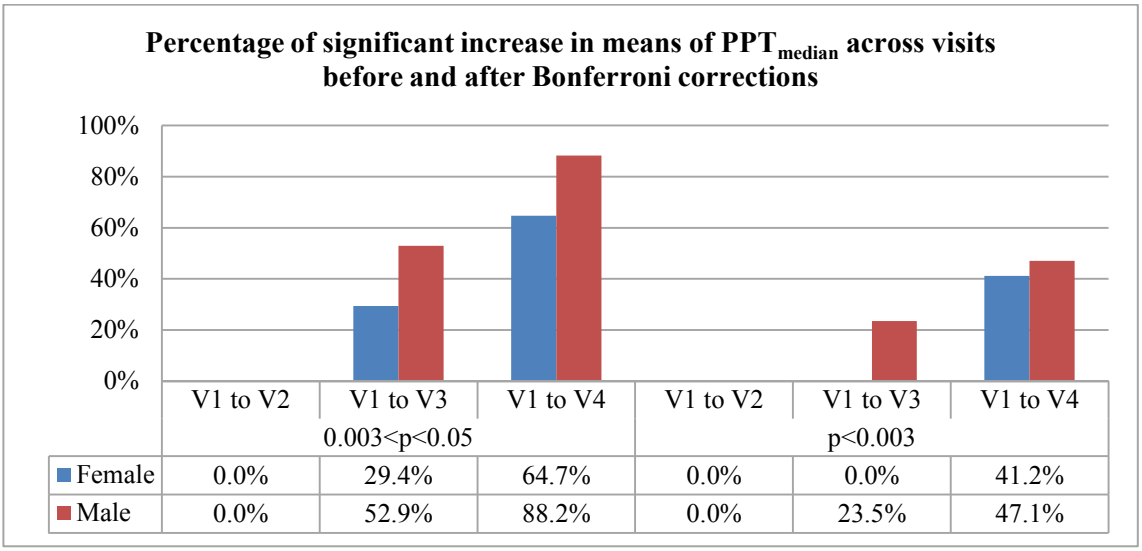


Figure 4.18: Percentage of the 17 regional measurement sites that showed statistical significant increase in the means of PPT_{median} at interval sessions of V1 to V2, V1 to V3, and V1 to V4 for females (blue) and males (red) Intervention before and after Bonferroni corrections.

4.12 Aim 12: To compare the means of PPT_{mean} and PPT_{median} between treatment groups by gender in overall visits and in Visit 1 only

Research question: By gender, was there a difference in the means of regional PPT_{mean} and PPT_{median} between treatment groups in overall visits and in Visit 1 only?

The repeated measures ANOVA by GLM with Sidak and Bonferroni adjustments was employed to compare the means of PPT_{mean} and PPT_{median} between treatment groups for all measurement sites by gender in overall visits whilst a one-way ANOVA was employed for Visit 1 only. Table 4.13 provides the means of PPT_{mean} and PPT_{median} for overall visits at each treatment group of females with its F-values by GLM between treatment groups. The GLM results revealed that five sites (LI20L, LI20R, GB12R, 2L, 2R) showed significant increase in each of the means of PPT_{mean} or PPT_{median} from Control to Intervention whilst three sites (LI20R, 2L, ST36R for PPT_{mean}; LI20L, LI20R, ST36R for PPT_{median}) had shown significant increase in Visit 1 in which ST36R did not show significant difference in the respective means in overall visits. Table 4.14 provides the means of PPT_{mean} and PPT_{median} for overall visits at each treatment group of males with its F-values by GLM between treatment groups. The GLM results revealed that ten sites (LI20L, LI20R, GB12R, 2L, LI10L, 1L, 1R, LI5L, ST36L, 3R) showed significant increase in each of the mean of PPT_{mean} or PPT_{median} from Control to Intervention in which six sites (LI20L, LI20R, GB12R, LI10L, 1L, ST36L) had shown significant increase in the means in Visit 1.

Comparing means of PPT_{mean} and PPT_{median} between treatment groups of females						
Site	PPT_{mean}			PPT_{median}		
	Mean		GLM	Mean		GLM
	Control	Intervention	F	Control	Intervention	F
LI20L	1.44	2.16	$F_{1,69}=20.9$*	1.43	2.15	$F_{1,69}=20.7$*[1]
LI20R	1.50	2.11	$F_{1,103}=23.3$*[1]	1.49	2.11	$F_{1,103}=24.4$*[1]
GB12R	2.65	3.35	$F_{1,81}=9.4$*	2.62	3.36	$F_{1,81}=10.1$*
2L	3.98	5.24	$F_{1,81}=13.6$*[1]	4.00	5.23	$F_{1,81}=12.6$*
2R	4.39	5.24	$F_{1,78}=6.5^{+}$	4.39	5.22	$F_{1,78}=6.1^{+}$
PC6L	3.69	3.24	$F_{1,59}=1.6$	3.69	3.22	$F_{1,59}=1.6$
PC6R	3.79	4.10	$F_{1,91}=1.9$	3.78	4.11	$F_{1,91}=2.1$
LI10L	3.04	3.51	$F_{1,81}=3.2$	3.03	3.50	$F_{1,81}=3.2$
1L	3.30	3.48	$F_{1,80}=0.6$	3.28	3.49	$F_{1,80}=0.8$
1R	3.45	3.89	$F_{1,103}=3.2$	3.45	3.88	$F_{1,103}=3.0$
LI5L	3.48	3.14	$F_{1,81}=1.7$	3.47	3.14	$F_{1,81}=1.6$
LI5R	3.39	3.50	$F_{1,113}=0.3$	3.40	3.49	$F_{1,113}=0.2$
ST36L	5.38	4.95	$F_{1,78}=1.3$	5.36	4.97	$F_{1,78}=1.2$
ST36R	5.34	4.82	$F_{1,100}=2.9$[1]	5.35	4.81	$F_{1,100}=3.0$[1]
3R	4.88	4.73	$F_{1,89}=0.2$	4.86	4.75	$F_{1,89}=0.1$
SP6R	4.43	4.04	$F_{1,59}=0.9$	4.42	4.02	$F_{1,59}=0.9$
KD3R	4.49	4.05	$F_{1,92}=2.6$	4.49	4.07	$F_{1,92}=2.6$

Table 4.13: Comparisons by GLM on means of PPT_{mean} and PPT_{median} between treatment groups of females where * indicates $p<0.003$ (Bonferroni correction) and $^{+}$ for $p<0.05$ for comparisons in overall visits and [1] in Visit 1 only.

Comparing means of PPT_{mean} and PPT_{median} between treatment groups of males						
Site	PPT_{mean}			PPT_{median}		
	Mean		GLM	Mean		GLM
	Control	Intervention	F	Control	Intervention	F
LI20L	1.76	2.77	$F_{1,56}=19.7$*[1]	1.76	2.75	$F_{1,56}=18.7$*[1]
LI20R	1.84	2.77	$F_{1,84}=30.1$*[1]	1.83	2.77	$F_{1,84}=30.3$*[1]
GB12R	2.82	4.30	$F_{1,68}=22.3$*[1]	2.83	4.28	$F_{1,68}=20.9$*[1]
2L	4.79	6.45	$F_{1,63}=13.2$*	4.76	6.43	$F_{1,63}=13.2$*
2R	5.26	6.01	$F_{1,58}=3.0$	5.29	5.95	$F_{1,58}=2.3$
PC6L	4.35	4.17	$F_{1,46}=0.2$	4.35	4.19	$F_{1,46}=0.2$
PC6R	4.53	5.14	$F_{1,74}=3.1$	4.52	5.13	$F_{1,74}=3.1$
LI10L	3.48	5.24	$F_{1,68}=18.0$*[1]	3.48	5.24	$F_{1,68}=18.1$*[1]
1L	3.65	5.29	$F_{1,67}=16.5$*[1]	3.65	5.29	$F_{1,67}=15.9$*[1]
1R	3.94	5.00	$F_{1,84}=11.0$*	3.96	5.01	$F_{1,84}=10.4$*
LI5L	3.70	4.53	$F_{1,66}=9.4^{+}$	3.68	4.51	$F_{1,66}=9.0^{+}$
LI5R	3.90	4.41	$F_{1,94}=3.1$	3.89	4.42	$F_{1,94}=3.3$
ST36L	6.18	7.96	$F_{1,63}=11.5$*[1]	6.19	8.02	$F_{1,63}=11.7$*[1]
ST36R	6.33	6.81	$F_{1,79}=1.3$	6.33	6.79	$F_{1,79}=1.1$
3R	5.47	6.52	$F_{1,69}=6.6^{+}$	5.45	6.49	$F_{1,69}=6.5^{+}$
SP6R	5.31	5.41	$F_{1,46}=0.0$	5.34	5.40	$F_{1,46}=0.0$
KD3R	5.37	5.70	$F_{1,79}=0.6$	5.37	5.68	$F_{1,79}=0.5$

Table 4.14: Comparisons by GLM on means of PPT_{mean} and PPT_{median} between treatment groups of males where * indicates $p<0.003$ (Bonferroni correction) and $^{+}$ for $p<0.05$ for comparisons in overall visits and [1] in Visit 1 only.

4.13 Aim 13: To examine, by treatment by gender, the temporal stability of the adjusted means of PPT_{mean} and PPT_{median} at LI20L and LI20R with age as covariate across the four measurement visits

Research question: By treatment by gender, how stable were the adjusted means of the PPT_{mean} and PPT_{median} with age across the four measurement occasions at LI20L and LI20R?

As derived from stepwise multiple regression equations in Table 4.9, the factor age played a significant role in PPT_{mean} and PPT_{median} at LI20L and LI20R. Hence, by treatment group and gender, a repeated measures analysis of covariance (ANCOVA) was conducted on PPT_{mean} and PPT_{median} by using age as the covariate at $\alpha=0.05$. The multiple comparisons of Sidak for visits revealed nine significant increases ($p<0.05$ for $^{+}$ and $p<0.025$ for * for Bonferroni corrections) in the adjusted means of PPT_{mean} and PPT_{median} across temporal sessions of V1 to V2, V1 to V3 and V1 to V4 (Figure 4.19). This attempt has adjusted the means of PPT_{mean} and PPT_{median} in V4 of males and PPT_{median} in V3 of females at LI20L from presence of significant differences to no significant differences from corresponding means in V1.

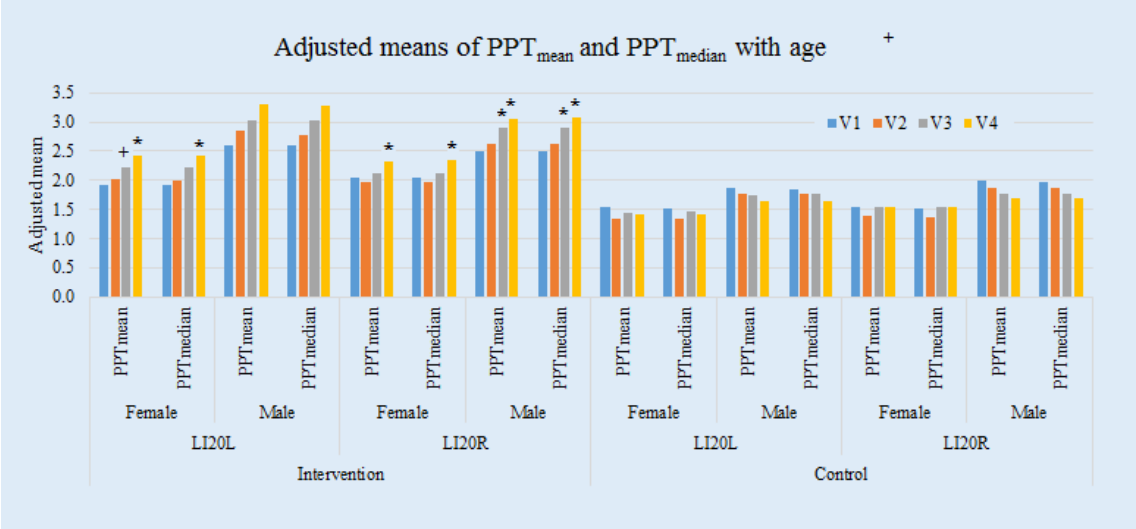


Figure 4.19: By treatment group by gender, the adjusted means of PPT_{mean} and PPT_{median} by gender at LI20L and LI20R in four visits with age as covariate. The ANCOVA by GLM on PPT_{mean} and PPT_{median} between visits revealed nine significant differences ($p<0.05$ for + and $p<0.025$ for *) in the adjusted means across temporal intervals of V1 to V2, V3 and V4.

4.14 Aim 14: To examine, by treatment by gender, the temporal stability of the adjusted means of PPT_{mean} and PPT_{median} with BMI as covariate across the four measurement visits at PC6L

Research question: By treatment by gender, how stable were the adjusted means of the PPT_{mean} and PPT_{median} at PC6L with BMI as covariate across the four measurement occasions?

The stepwise multiple regression equations in Table 4.9 indicated that BMI was a significant factor in PPT_{mean} and PPT_{median} at PC6L. Hence, by treatment by gender, the PPT_{mean} and PPT_{median} at PC6L were analysed with a repeated measures analysis of covariance (ANCOVA), using BMI as the covariate at $\alpha=0.05$. The multiple comparisons of Sidak for visits revealed four significant increases in the adjusted means of PPT_{mean} and PPT_{median} across temporal sessions of V1 to V2, V1 to V3 and V1 to V4 (Figure 4.20). This adjustment has reduced the number of significant increases from seven to four (excluded V4 of PPT_{mean} and PPT_{median} for females and V4 of PPT_{median} for males).

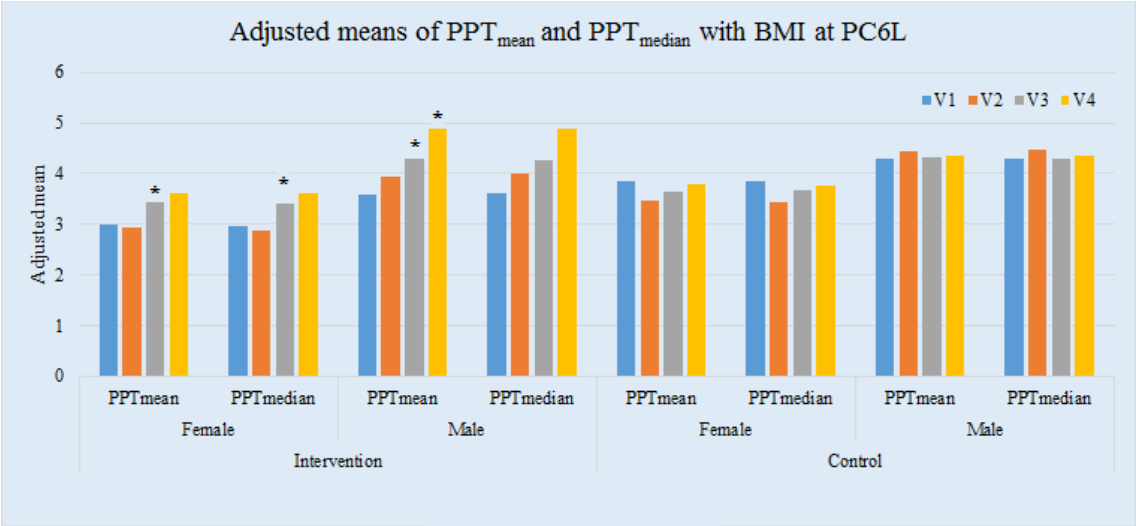


Figure 4.20: By treatment by gender, the Sidak adjusted means of PPT_{mean} and PPT_{median} at PC6L in four visits with BMI as covariate. The ANCOVA by GLM on PPT_{mean} and PPT_{median} between visits revealed four significant increases in the adjusted means across temporal intervals of V1 to V2, V3 and V4.

Sections 4.15 to 4.17 focused on PC6L in which BMI was reported as a significant factor in the regression models (Table 4.9). Table 4.15 shows the frequency distribution of subjects recruited in each BMI-group by treatment group by gender for PC6L. Due to small sample sizes, data analyses by non-parametric test were performed on Healthy Weight between treatment groups for both genders; on Healthy Weight, Overweight and Obese of females and Healthy Weight and Overweight of males in Control.

Female								Male							
Intervention				Control				Intervention				Control			
UW	HW	OW	OB	UW	HW	OW	OB	UW	HW	OW	OB	UW	HW	OW	OB
0	11	1	0	3	29	9	8	0	11	1	0	1	14	17	4
UW:Underweight; HW: Healthy Weight; OW:Overweight; OB:Obese															

Table 4.15: The frequency distribution of subjects in each BMI group by treatment by gender for PC6L.

4.15 Aim 15: To compare, at PC6L of Healthy Weight by gender, the means of PPT_{mean} and PPT_{median} between treatment groups in overall visits and in Visit 1 only

Research question: At PC6L of Healthy Weight, was there a difference in the means of regional PPT_{mean} and PPT_{median} between treatment groups for each gender in overall visits and in Visit 1 only?

At PC6L of Healthy Weight by gender, a repeated measures ANOVA by GLM was employed to compare the means of PPT_{mean} and PPT_{median} between treatment groups in overall visits whilst

a one-way ANOVA was employed for Visit 1 only. Table 4.16 provides the means of PPT_{mean} and PPT_{median} for overall visits by treatment by gender with F-values by repeated measures ANOVA for overall visits and one-way ANOVA for Visit 1 between treatment groups. The ANOVA results revealed that no significant differences in the means of PPT_{mean} and PPT_{median} for overall visits and Visit 1 between Intervention and Control for both genders.

Comparing means of PPT_{mean} and PPT_{median} between treatment groups								
Gender	PPT_{mean}				PPT_{median}			
	Mean		ANOVA		Mean		ANOVA	
	Control	Intervention	Overall	Visit 1	Control	Intervention	Overall	Visit 1
Female	3.37	3.24	$F_{1,38}$=0.2	$F_{1,38}$=1.4	3.35	3.22	$F_{1,38}$=0.2	$F_{1,38}$=1.4
Male	4.21	4.29	$F_{1,23}$=0.0	$F_{1,23}$=1.1	4.19	4.3	$F_{1,23}$=0.1	$F_{1,23}$=0.5

Table 4.16: Comparisons of means of PPT_{mean} and PPT_{median} at PC6L of Healthy Weight between treatment groups by gender. The GLM with Sidak adjustment revealed no significant differences ($p>0.05$) in the means between treatment groups in all cases.

4.16 Aim 16: To examine, at PC6L of Control, the means of PPT_{mean} and PPT_{median} between BMI groups by gender at Visit 1, then with BMI as covariate

Research question: At PC6L of Control, was there a difference in the means of regional PPT_{mean} and PPT_{median} between BMI groups for each gender in Visit 1 only? Then with BMI as covariate?

At PC6L of Control, the univariate ANOVA was employed to compare the means of PPT_{mean} and PPT_{median} in Visit 1 between BMI groups (HW, OW and OB of females, HW and OW of males) by gender. Table 4.17 provides the means of PPT_{mean} and PPT_{median} for BMI groups at PC6L of Control by gender and F-values by ANOVA whereby Bonferroni correction would waive p=0.045 as significant difference between HW and OW of females for PPT_{median}.

Comparing the means of PPT_{mean} and PPT_{median} between BMI groups in Visit 1				
		Healthy weight	Overweight	GLM
Female	PPT_{mean}	3.50	4.59	$F_{1,36}$= 3.968
	PPT_{median}	3.47	4.66	$F_{1,36}$= 4.314*
Male	PPT_{mean}	4.20	4.51	$F_{1,29}$= 0.373
	PPT_{median}	4.10	4.55	$F_{1,29}$= 0.761
		Healthy Weight	Obese	GLM
Female	PPT_{mean}	3.50	4.65	$F_{1,35}$= 3.629
	PPT_{median}	3.47	4.59	$F_{1,35}$= 3.437
		Overweight	Obese	GLM
Female	PPT_{mean}	4.59	4.65	$F_{1,15}$= 0.003
	PPT_{median}	4.66	4.59	$F_{1,15}$= 0.005

Table 4.17: The means of PPT_{mean} and PPT_{median} of PC6L of Control in Visit 1 and the results of univariate ANOVA on PPT_{mean} and PPT_{median} between BMI groups (HW, OW and OB of females, HW and OW of males) by gender. The asterisk * indicates $p=0.045<0.05$. Note that Bonferroni adjustment would remove this statistical significant difference.

Table 4.18 provides the adjusted means of PPT_{mean} and PPT_{median} for BMI groups for both genders (HW, OW and OB of females, HW and OW of males) by gender and F-values by UNIANOVA on PPT_{mean} and PPT_{median} with BMI as covariate ($p>0.05$ in all cases). The results revealed that there were no significant differences ($p>0.05$ in all comparisons) between the adjusted means of PPT_{mean} and PPT_{median} for BMI groups for both genders (HW, OW and OB of females, HW and OW of males) at PC6L in Visit 1.

Comparing adjusted means of PPT_{mean} and PPT_{median} between BMI groups in Visit 1 with BMI as covariate

		Healthy weight	Overweight	GLM
Female	PPT_{mean}	3.75	3.81	$F_{1,47}=0.005$
	PPT_{median}	3.74	3.78	$F_{1,47}=0.002$
Male	PPT_{mean}	4.33	4.40	$F_{1,40}=0.004$
	PPT_{median}	4.28	4.40	$F_{1,40}=0.014$
		Healthy Weight	Obese	GLM
Female	PPT_{mean}	3.48	4.71	$F_{1,34}=0.721$
	PPT_{median}	3.49	4.52	$F_{1,34}=0.509$
		Overweight	Obese	GLM
Female	PPT_{mean}	4.37	4.90	$F_{1,14}=0.102$
	PPT_{median}	4.46	4.81	$F_{1,14}=0.042$

Table 4.18: The adjusted means of PPT_{mean} of PC6L of Control in Visit 1 and the results of univariate ANOVA on PPT_{mean} and PPT_{median} between BMI groups (HW, OW and OB of females, HW and OW of males) by gender. In all cases, $p>0.05$.

4.17 Aim 17: To examine, at PC6L of Control, the stability of the means of regional PPT_{mean} and PPT_{median} across visits by BMI-group by gender, then with BMI as covariate

Research question: How stable were the means of regional PPT_{mean} and PPT_{median} of PC6L of Control between follow-up visits and baseline visit by BMI-group by gender? Then with BMI as covariate?

The repeated measures ANOVA by GLM using Sidak multiple comparisons for visits by BMI-group by gender revealed no significant differences ($p>0.05$ in all cases) in the means of PPT_{mean} and PPT_{median} at PC6L of Control across temporal sessions of V1 to V2, V1 to V3 and V1 to V4 (Figure 4.21). The results remained unchanged ($p>0.05$ in all cases) with adjusted means for BMI as covariate.

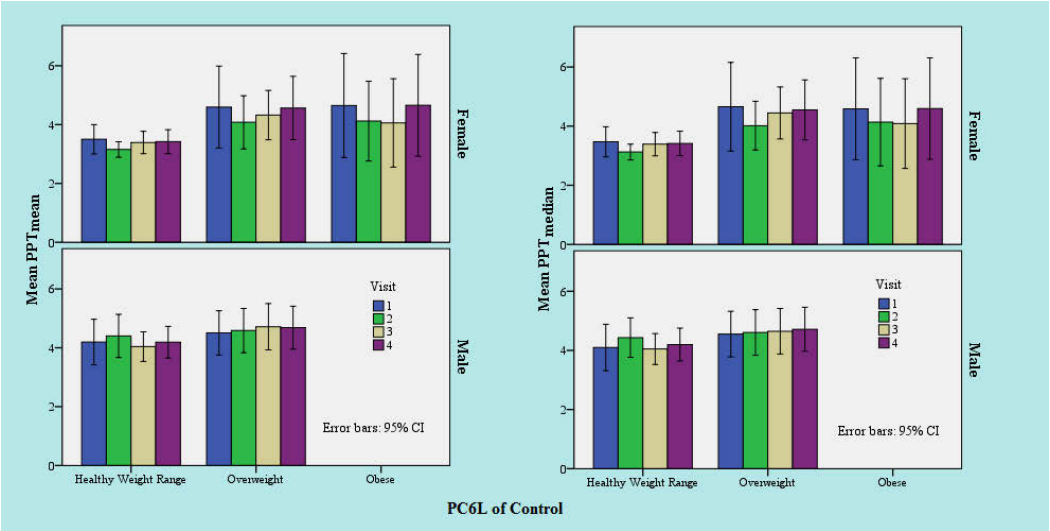


Figure 4.21: The bar graphs of mean PPT_{mean} and mean PPT_{median} of PC6L at Control across four consecutive visits by selected BMI groups by gender.

For Section 4.18, only the PPT database from the unilateral LI4m^{+}21 (LI4R) intervention was established to explore the stability of PPT_{mean} and PPT_{median} after intervention. Whilst all intervention studies involved LI4m^{+}21, Studies 1, 2, 3 and 6 involved LI4R and Studies 4 and 5 applied bilateral LI4. As such, there were 15 measurement sites (excluded LI20L and SP6R) being included in the data analysis.

4.18 Aim 18: To compare the means of absolute and relative differences of PPT_{mean} and PPT_{median} respectively between post-intervention and pre-intervention during LI4R intervention

Research questions:

a. *Did the intervention LI4R affect the means of absolute difference of PPT_{mean} between pre and post interventions?*
b. *Did the intervention LI4R affect the means of absolute difference of PPT_{median} between pre and post interventions?*
c. *Did the intervention LI4R affect the means of relative difference of PPT_{mean} between pre and post interventions?*
d. *Did the intervention LI4R affect the means of relative difference of PPT_{media} between pre and post interventions?*

A one-sample t-test was conducted to determine whether the means of absolute and relative differences of PPT_{mean} and PPT_{median} was the same as the test value of zero at alpha level of 0.05. Bonferroni correction with $p<0.05/15=0.003$ was employed to compromise the familywise error casued by four tests. Tables 4.19a to 4.19d show the t and p-values with associated mean

difference (MD) yielded by t-test at 15 measurement sites by gender. The results in Table 4.19a revealed that all sites for both genders except GB12R, 2L, PC6L, LI10L and KD3R for females and 2L, PC6R, 1R, ST36L, ST36R and KD3R for males, had displayed significant increase in the mean absolute difference of PPT_{mean} from zero whereby the mean differences of absolute difference between post and pre PPT_{mean} varied from 0.24kg/cm^2 (LI20R) to 0.74kg/cm^2 (ST36R) for females and from 0.37kg/cm^2 (ST36R) to 1.01kg/cm^2 (2R) for males. The results in Table 4.19b revealed that all sites for both genders except seven (GB12R, 2L, PC6L, LI10L, LI5L, ST36L, KD3R) for females and seven (2R, PC6L, PC6R, 1R, ST36L, ST36R, KD3R) for males, had displayed significant increase in the mean absolute difference of PPT_{median} from zero in which the mean differences of absolute difference between post and pre PPT_{median} varied from 0.22kg/cm^2 (LI20R) to 0.70kg/cm^2 (ST36R) for females and from 0.25kg/cm^2 (ST36L) to 1.06kg/cm^2 (2R) for males. For relative differences, the results in Table 4.19c revealed that all sites for both genders except 2L, PC6L, LI10L, ST36L and KD3R for females and 2L, PC6R, 1R and ST36L for males, had displayed significant increase in the mean difference of PPT_{mean} from zero whereby the mean differences of relative difference between post and pre PPT_{mean} varied from 8% (2L) to 20% (PC6R) for females and from 6% (ST36L and ST36R) to 20% (LI5R) for males. Table 4.19d revealed that all sites for both genders except four sites (2L, PC6L, LI10L, ST36L) for females, and seven sites (PC6L, PC6R, 1R, ST36L, ST36R, KD3R) for males, had displayed significant increase in the mean relative difference of PPT_{median} from zero in which the mean differences of relative difference between post and pre PPT_{median} varied from 7% (2L, ST36L) to 20% (PC6R, LI10L) for females and from 4% (ST36L) to 21% (2R) for males. Figure 4.22 displayed Tables 4.19a-d graphically.

One sample T-test on absolute difference between POST PPT_{mean} and PRE PPT_{mean}						
Site	Female			Male		
	t	p	MD	t	p	MD
LI20R	t_{55}=5.5	0.000	0.24	t_{49}=4.9	0.000	0.38
GB12R	t_{11}=3.3	*0.007*	0.47	t_{11}=4.5	0.001	0.51
2L	t_{22}=2.8	*0.011*	0.34	t_{20}=3.0	*0.007*	0.63
2R	t_{30}=6.3	0.000	0.70	t_{23}=3.6	0.001	1.01
PC6L	t_{11}=2.7	*0.022*	0.30	t_{11}=4.2	0.002	0.68
PC6R	t_{21}=8.6	0.000	0.72	t_{17}=2.3	*0.037*	0.46
LI10L	t_{11}=3.1	*0.010*	0.52	t_{11}=4.7	0.001	0.86
1L	t_{22}=4.0	0.001	0.39	t_{22}=3.9	0.001	0.48
1R	t_{43}=5.5	0.000	0.60	t_{37}=2.7	*0.011*	0.45
LI5L	t_{33}=3.4	0.002	0.28	t_{31}=3.6	0.001	0.54
LI5R	t_{43}=7.2	0.000	0.58	t_{37}=4.6	0.000	0.73
ST36L	t_{20}=3.7	0.001	0.43	t_{18}=1.8	*0.089*	0.41
ST36R	t_{52}=6.3	0.000	0.74	t_{44}=2.8	*0.008*	0.37
3R	t_{41}=3.7	0.001	0.49	t_{34}=4.1	0.000	0.61
KD3R	t_{22}=2.3	*0.033*	0.28	t_{22}=2.9	*0.008*	0.62

Table 4.19a: The results of one-sample t-test on absolute difference between POST PPT_{mean} and PRE PPT_{mean} with Bonferroni correction ($p<0.003$).

One sample T-test on absolute difference between POST PPT_{median} and PRE PPT_{median}						
Site	Female			Male		
	t	p	MD	t	p	MD
LI20R	t_{55}=4.6	0.000	0.22	t_{49}=4.9	0.000	0.37
GB12R	t_{11}=3.2	*0.008*	0.43	t_{11}=4.8	0.001	0.46
2L	t_{22}=1.9	*0.073*	0.27	t_{20}=3.3	0.003	0.71
2R	t_{30}=5.5	0.000	0.68	t_{23}=3.2	*0.004*	1.06
PC6L	t_{11}=2.1	*0.062*	0.27	t_{11}=3.2	*0.008*	0.66
PC6R	t_{21}=8.2	0.000	0.69	t_{17}=1.4	*0.183*	0.37
LI10L	t_{11}=2.3	*0.039*	0.51	t_{11}=4.2	0.002	0.91
1L	t_{22}=3.8	0.001	0.37	t_{22}=3.3	0.003	0.53
1R	t_{43}=4.9	0.000	0.59	t_{37}=3.0	*0.005*	0.51
LI5L	t_{33}=2.7	*0.010*	0.27	t_{31}=3.5	0.001	0.54
LI5R	t_{43}=6.5	0.000	0.53	t_{37}=4.0	0.000	0.70
ST36L	t_{20}=2.1	*0.051*	0.32	t_{18}=1.3	*0.207*	0.25
ST36R	t_{52}=6.3	0.000	0.70	t_{44}=2.2	*0.035*	0.33
3R	t_{41}=3.4	0.002	0.50	t_{34}=3.4	0.002	0.58
KD3R	t_{22}=3.0	*0.007*	0.33	t_{22}=2.6	*0.017*	0.62

Table 4.19b: The results of one-sample t-test on absolute difference between POST PPT_{median} and PRE PPT_{median} with Bonferroni correction ($p<0.003$).

One sample T-test on relative difference between POST PPT_{mean} and PRE PPT_{mean}						
Site	Female			Male		
	t	p	MD	t	p	MD
LI20R	t_{55}=5.6	0.000	0.12	t_{49}=5.2	0.000	0.14
GB12R	t_{11}=4.6	0.001	0.14	t_{11}=5.3	0.000	0.13
2L	t_{22}=2.8	*0.011*	0.08	t_{20}=2.9	*0.008*	0.11
2R	t_{30}=6.0	0.000	0.16	t_{23}=3.9	0.001	0.19
PC6L	t_{11}=2.8	*0.018*	0.10	t_{11}=3.9	0.003	0.15
PC6R	t_{21}=8.4	0.000	0.20	t_{17}=2.5	*0.023*	0.13
LI10L	t_{11}=3.5	*0.005*	0.20	t_{11}=6.4	0.000	0.19
1L	t_{22}=4.4	0.000	0.12	t_{22}=4.6	0.000	0.10
1R	t_{43}=6.2	0.000	0.18	t_{37}=2.7	0.011	0.10
LI5L	t_{33}=4.0	0.000	0.11	t_{31}=3.3	0.002	0.12
LI5R	t_{43}=8.1	0.000	0.19	t_{37}=4.7	0.000	0.20
ST36L	t_{20}=3.3	*0.004*	0.09	t_{18}=1.7	*0.108*	0.06
ST36R	t_{52}=6.3	0.000	0.15	t_{44}=3.2	0.003	0.06
3R	t_{41}=4.0	0.000	0.12	t_{34}=4.1	0.000	0.10
KD3R	t_{22}=3.1	*0.005*	0.09	t_{22}=3.4	0.002	0.11

Table 4.19c: The results of one-sample t-test on relative difference between POST PPT_{mean} and PRE PPT_{mean} with Bonferroni correction ($p<0.003$).

One sample T-test on relative difference between POST PPT_{median} and PRE PPT_{median}						
Site	Female			Male		
	t	p	MD	t	p	MD
LI20R	t_{55}=4.9	0.000	0.12	t_{49}=5.3	0.000	0.13
GB12R	t_{11}=4.4	0.001	0.12	t_{11}=5.6	0.000	0.12
2L	t_{22}=2.2	*0.039*	0.07	t_{20}=3.5	0.002	0.12
2R	t_{30}=5.4	0.000	0.15	t_{23}=3.4	0.003	0.21
PC6L	t_{11}=2.3	*0.040*	0.10	t_{11}=2.9	*0.015*	0.14
PC6R	t_{21}=8.2	0.000	0.20	t_{17}=2.0	*0.057*	0.12
LI10L	t_{11}=2.9	*0.015*	0.20	t_{11}=4.8	0.001	0.20
1L	t_{22}=4.0	0.001	0.12	t_{22}=3.7	0.001	0.11
1R	t_{43}=5.3	0.000	0.18	t_{37}=3.0	*0.005*	0.12
LI5L	t_{33}=3.3	0.002	0.10	t_{31}=3.4	0.002	0.12
LI5R	t_{43}=7.2	0.000	0.17	t_{37}=4.3	0.000	0.20
ST36L	t_{20}=2.1	*0.048*	0.07	t_{18}=1.2	*0.247*	0.04
ST36R	t_{52}=6.3	0.000	0.15	t_{44}=2.7	*0.011*	0.06
3R	t_{41}=3.8	0.000	0.11	t_{34}=3.5	0.001	0.09
KD3R	t_{22}=3.7	0.001	0.11	t_{22}=2.8	*0.010*	0.11

Table 4.19d: The results of one-sample t-test on relative difference between POST PPT_{median} and PRE PPT_{median} with Bonferroni correction ($p<0.003$).

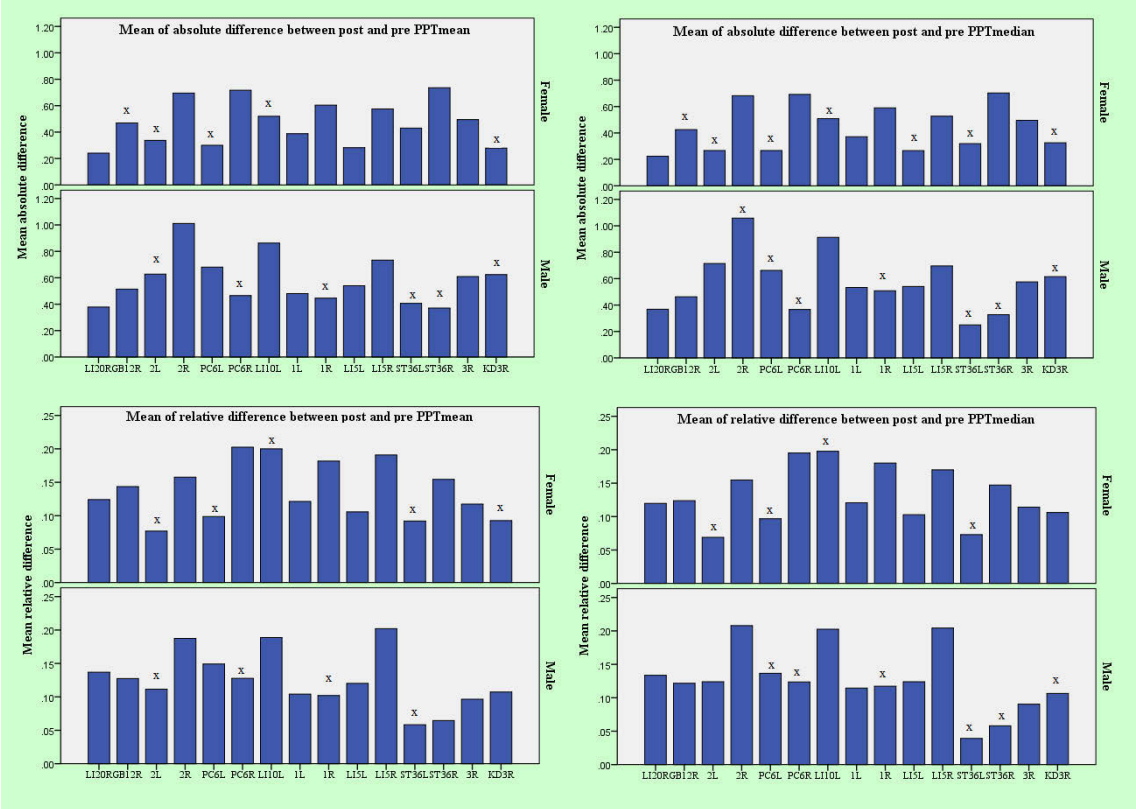
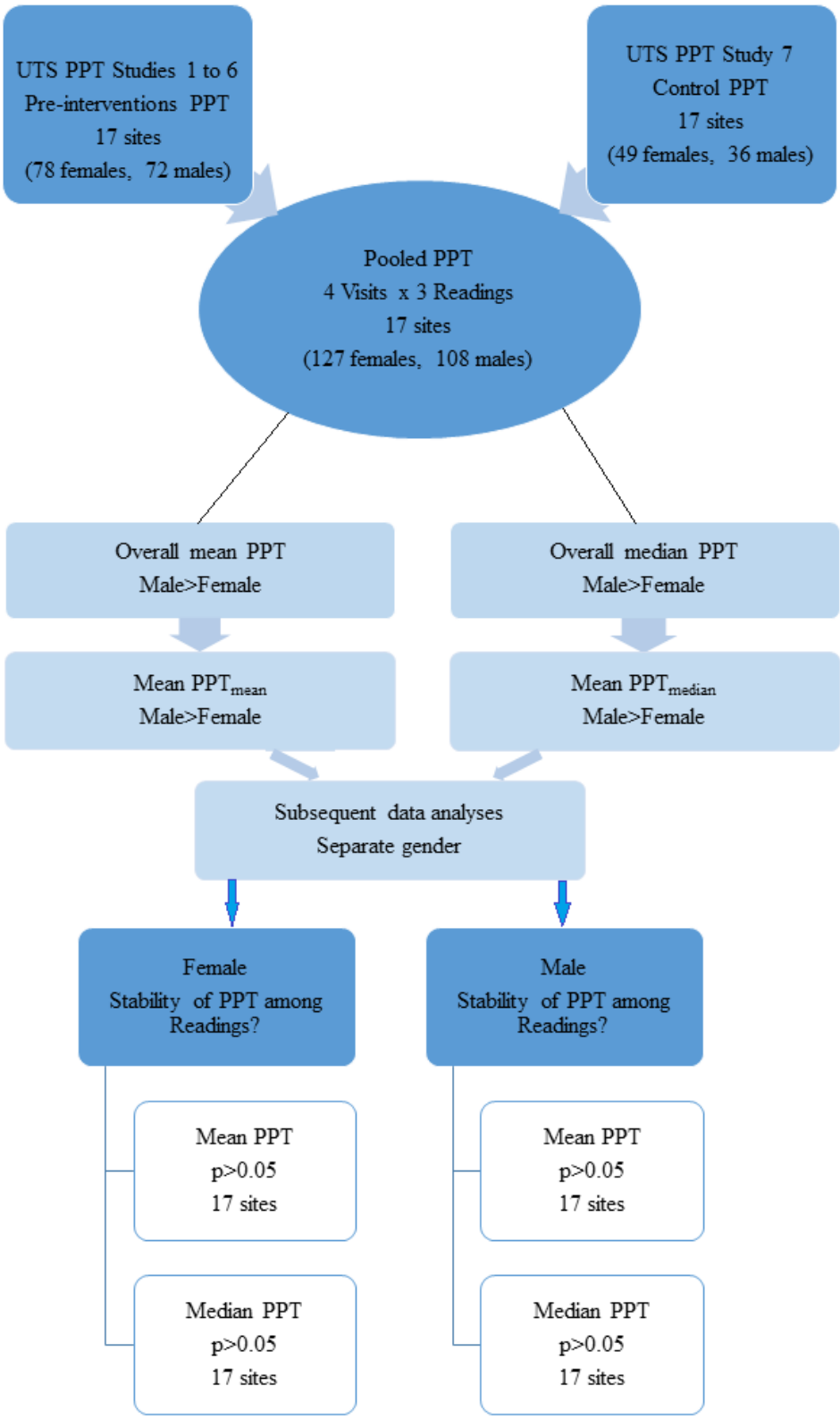
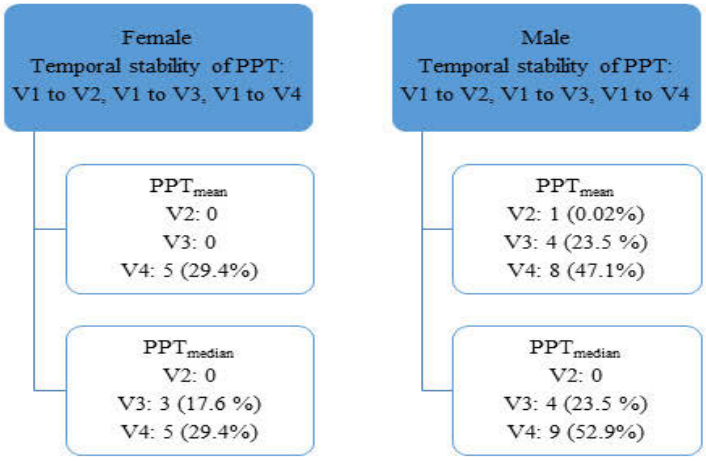


Figure 4.22: The means of absolute differences and the means of relative differences for PPT_{mean} and PPT_{median}. The marker x indicates no significant differences presence in the mean differences from zero with Bonferroni correction ($p<0.003$).

4.19 Flow charts summary for Sections 4.1 to 4.17

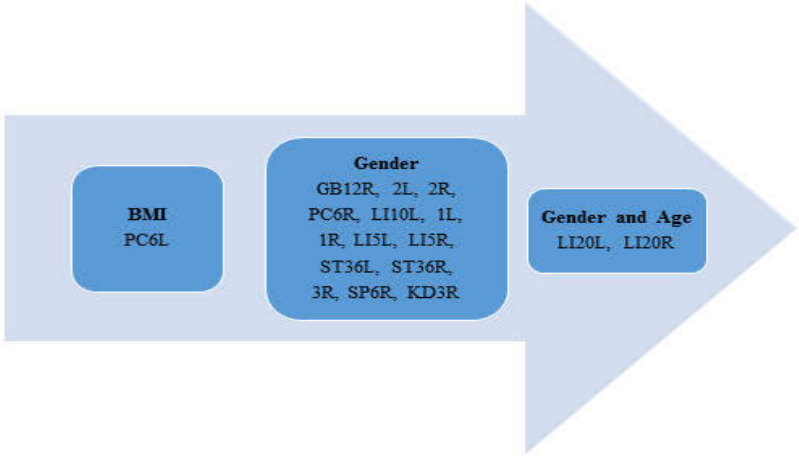


Flow chart 4.1: Flow charts for sequence of data analyses in Sections 4.1 to 4.3.

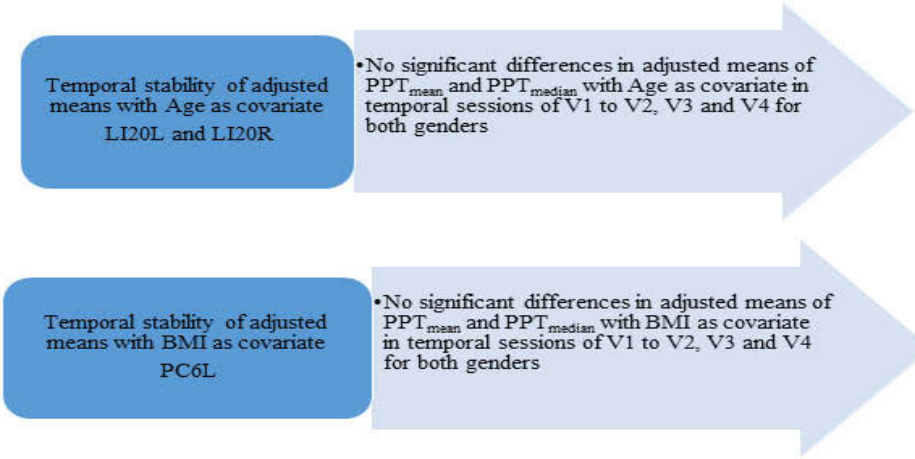


Stepwise regression models between PPTmean and PPTmedian with Gender, Age and BMI

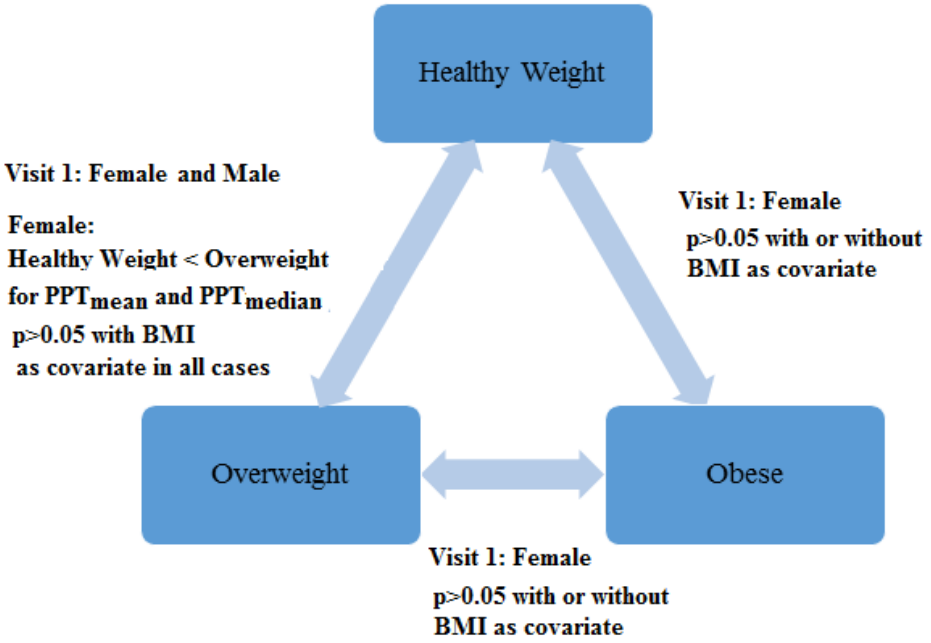
Significant factors for regression models were identified for each site



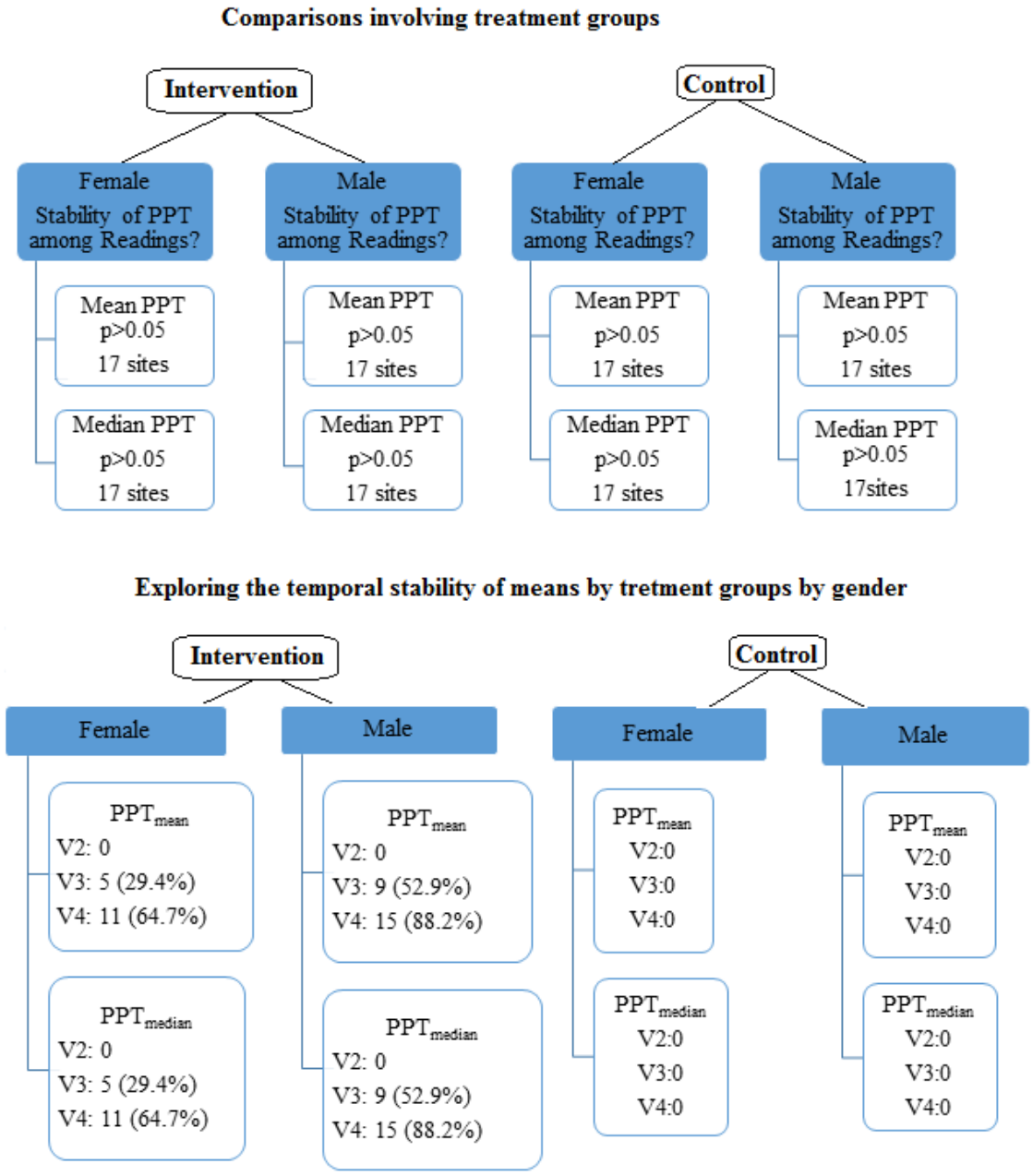
Exploration on sites LI20L, LI20R with Age and PC6L with BMI as covariate



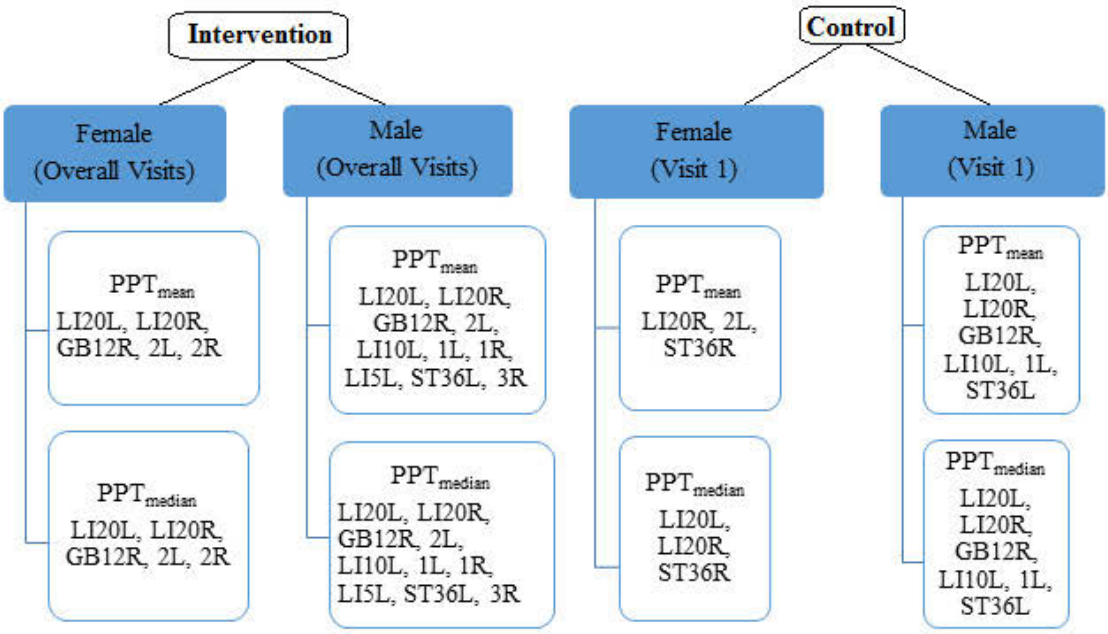
Flow chart 4.2: Flow charts for sequence of data analyses in Sections 4.4 to 4.6.



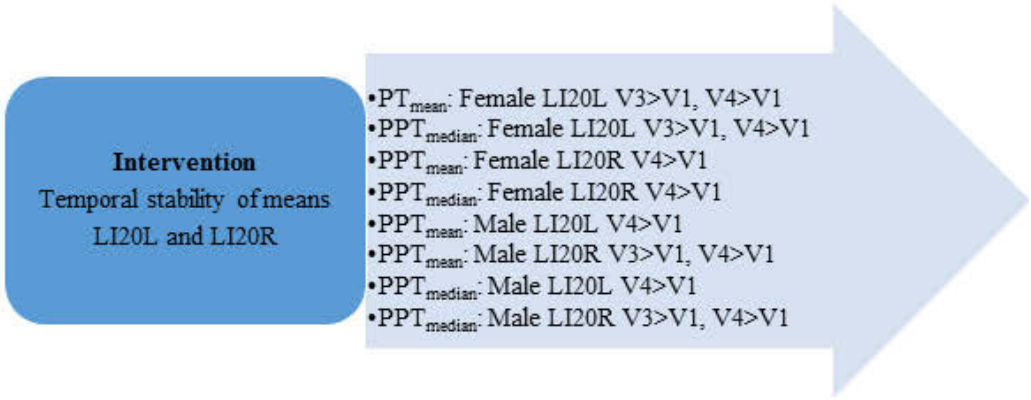
Flow chart 4.3: Flow charts for sequence of data analyses in Sections 4.7 to 4.9.

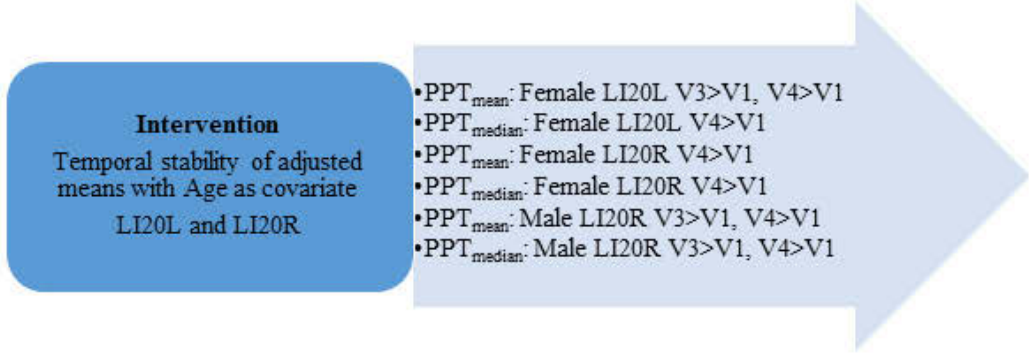


Flow chart 4.4: Flow charts for sequence of data analyses in Sections 4.10 to 4.11.



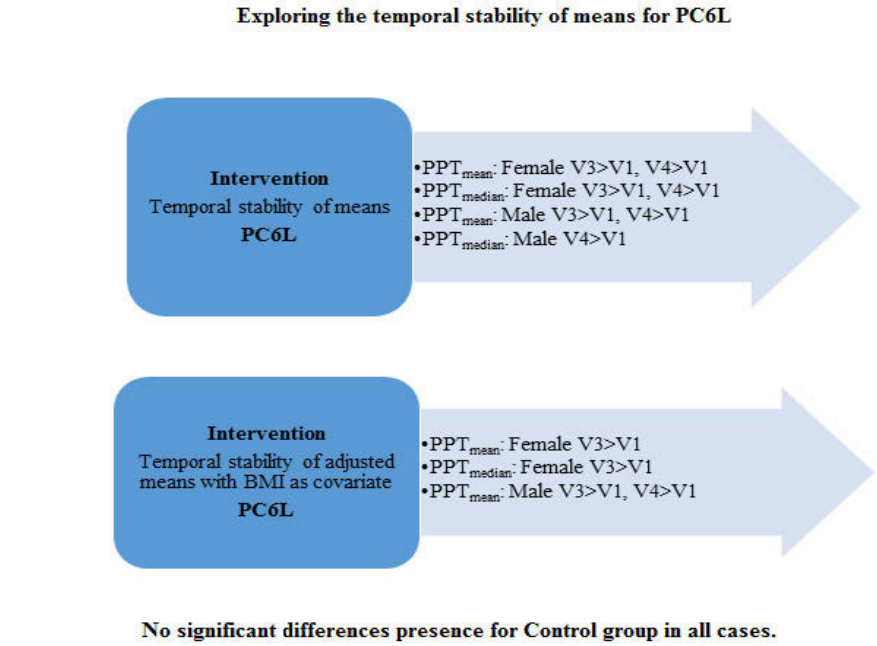
Examining temporal stability of means with and without Age as covariate

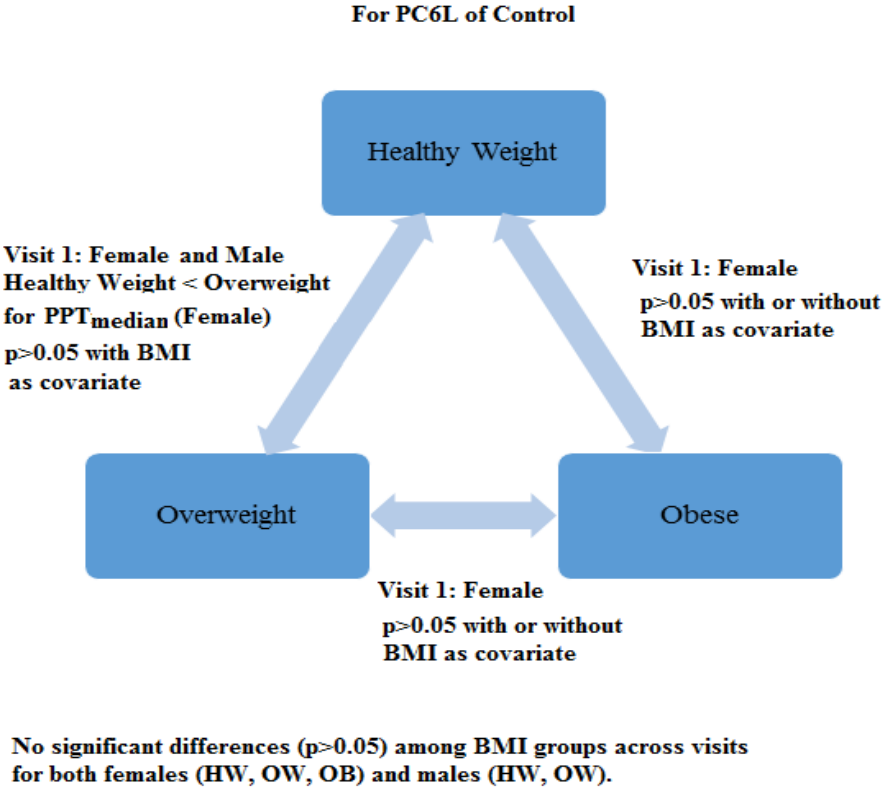




No sifnificant differences presence for Control group in all cases.

Flow chart 4.5: Flow charts for sequence of data analyses in Sections 4.12 and 4.13.





Flow chart 4.6: Flow charts for sequence of data analyses in Sections 4.14 to 4.17.

II. Research Study Two

Research Study Two aimed to examine the regional PPT measures at LI10 and LI11 between the affected and non-affected elbow for subjects with lateral epicondylitis. Three regional PPT measurements were being collected in each pre and post sessions of the four occasions at Week 0, Week 1, Week 5 and Week 9. Week 1 and Week 5 involved intervention of either acupuncture or sham laser whilst Week 0 and Week 9 did not involve any intervention. The time interval between two sessions at each occasion was 20 minutes with a rest time of 10 seconds between PPT measurements at one site within same session. Research Study Two included 11 females (age=45.8±6.8 years, BMI=23.6±3.1kg/m^2) and 9 males (age=46.6±5.7 years, BMI=24.6±3.1kg/m^2) with age ranged from 35 to 55 years for women and 35 to 53 years for men. The subjects were randomised with five men and six women in the treatment group and four men and five women in the control group. In particular, caution was paid to Bonferroni corrections in protection of Type I error from familywise error whenever multiple comparisons were made.

4.20 Aim 19: To compare the regional mean PPT between genders in overall occasions

Research question: Was there a difference in regional mean PPT between genders in each affected and non-affected site for lateral epicondylitis in overall occasions?

For each of the affected and non-affected measurement site, GLM for repeated measures with Sidak comparisons was employed for data analysis on PPT between genders which showed significant differences in mean PPT between genders in all cases with $p<0.05$ (Table 4.20). Table 4.20 provides the mean PPT and the associated standard error (SE) of PPT in overall occasions at each measurement site with last column shows the F-values from GLM between PPT by gender. The statistical significant differences in mean PPT between genders suggested subsequent data analyses to be conducted separately by gender.

Site	Mean(SE)		F	p
	Female	Male		
LI10 Non-affected	1.94(0.28)	3.18(0.31)	$F_{1,18}=8.8$	0.008
LI10 Affected	2.05(0.41)	3.58(0.45)	$F_{1,18}=6.3$	0.022
LI11 Non-affected	2.59(0.39)	4.16(0.43)	$F_{1,18}=7.3$	0.015
LI11 Affected	2.66(0.44)	4.42(0.48)	$F_{1,18}=7.2$	0.015

Table 4.20: The mean (SE) PPT and the F statistics of GLM with Sidak adjustments on PPT between genders. In all cases, $p<0.05$.

4.21 Aim 20: To compare the regional mean PPT between sessions in each occasion

Research question: Was there a difference in regional mean PPT between sessions in each occasion?

The GLM for repeated measures with Sidak adjustment was employed to compare the mean PPT between sessions in each occasion in which Week 0 as practice visit, Week 1 and Week 5 involved interventions, and Week 9 as one-month follow-up with no intervention. Time interval between pre and post sessions was standardized as 20 minutes for each occasion. Table 4.21 gives the mean (SE) of PPT and the F statistics of GLM on PPT between sessions for each affected and non-affected site by session by occasion by gender. The GLM on PPT between sessions by occasion by gender revealed that the females had significantly lower mean PPT after 20 minutes interval in Week 0 for all sites whereas the mean PPT of males did not differ statistically between sessions. In Week 1, the mean PPT of the affected LI10 of females decreased after the interventions. The females had mean PPT of non-affected LI11 increased significantly in Week 5. Figure 4.23 provides the bar graphs of mean PPT at each session by occasion by gender.

	Site	Female			Male		
		PRE	POST	p	PRE	POST	p
Week 0	LI10 Non-affected	2.58(0.33)	2.26(0.29)	*0.033*	3.56(0.69)	3.28(0.88)	0.303
	LI10 Affected	2.80(0.51)	2.20(0.34)	*0.014*	3.69(0.73)	3.41(0.88)	0.123
	LI11 Non-affected	3.35(0.44)	2.84(0.35)	*0.028*	4.14(0.69)	3.93(0.82)	0.228
	LI11 Affected	3.39(0.56)	2.77(0.38)	*0.039*	4.38(0.75)	4.18(0.86)	0.375
Week 1	LI10 Non-affected	1.66(0.13)	1.55(0.15)	0.116	2.72(0.45)	2.54(0.30)	0.378
	LI10 Affected	1.72(0.17)	1.52(0.16)	*0.032*	3.64(1.07)	3.42(0.99)	0.202
	LI11 Non-affected	2.02(0.27)	2.15(0.33)	0.231	3.94(0.68)	3.91(0.59)	0.843
	LI11 Affected	2.18(0.25)	1.86(0.24)	0.061	4.01(0.92)	4.11(0.81)	0.720
Week 5	LI10 Non-affected	1.79(0.19)	1.69(0.16)	0.497	3.46(0.44)	3.07(0.37)	0.070
	LI10 Affected	1.91(0.24)	1.82(0.19)	0.291	3.82(0.55)	3.76(0.54)	0.815
	LI11 Non-affected	2.30(0.38)	2.63(0.44)	*0.033*	4.23(0.54)	4.40(0.49)	0.490
	LI11 Affected	2.57(0.42)	2.69(0.42)	0.508	4.99(0.62)	4.60(0.57)	0.208
Week 9	LI10 Non-affected	2.02(0.18)	1.96(0.23)	0.511	3.42(0.33)	3.40(0.37)	0.920
	LI10 Affected	2.29(0.25)	2.16(0.28)	0.225	3.39(0.36)	3.50(0.38)	0.261
	LI11 Non-affected	2.83(0.47)	2.58(0.34)	0.161	4.29(0.46)	4.47(0.54)	0.318
	LI11 Affected	2.97(0.41)	2.88(0.38)	0.439	4.66(0.56)	4.40(0.61)	0.218

Table 4.21: The mean (SE) of PPT and the results from GLM with Sidak adjustments on PPT between pre and post intervention sessions. Statistical significant differences are marked with italic ($p<0.05$).

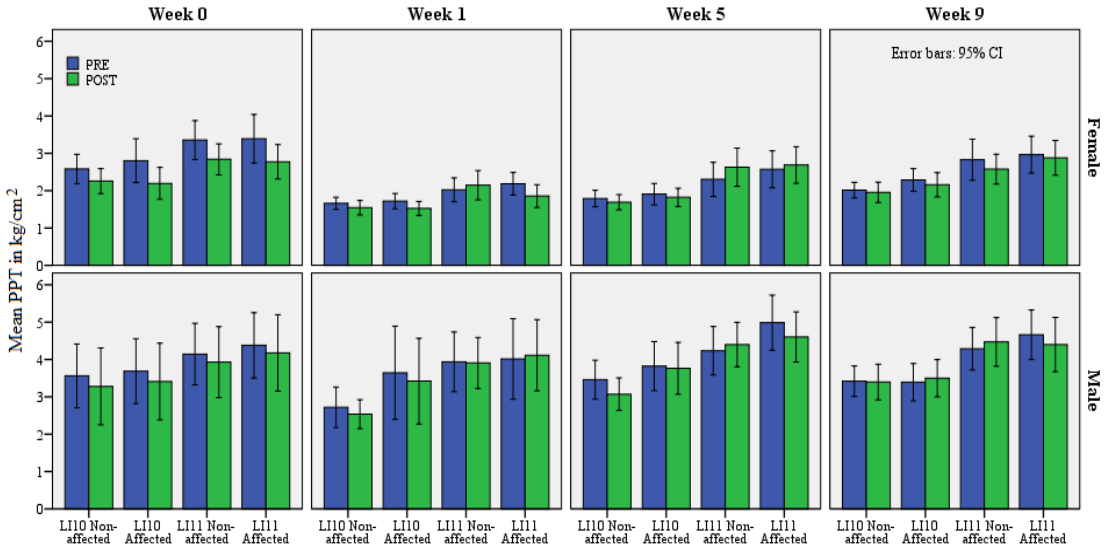


Figure 4.23: The mean PPT at both sessions by occasion by gender. The error bar shows the 95% confidence interval.

4.22 Aim 21: To compare the regional mean PPT between sessions in each occasion by treatment group

Research question: Was there a difference in regional mean PPT between sessions in each occasion by treatment group?

As the normality was not met for PPT of small sample sized subgroups (treatment x gender x occasion x site) for applying GLM of repeated measures, the alternative non-parametric Friedman test was applied to compare the distribution of PPT of two sessions. Tables 4.22 gives, by treatment group, the mean (SD) of PPT, the p-values from Friedman test on PPT between sessions for each affected and non-affected site by occasion by gender with significant results marked with *. For Acupuncture group, three sites for each gender (Female: LI10 Non-affected, LI11 Non-affected and LI11 Affected; Male: LI10 Non-affected, LI10 Affected, LI11 Affected) had significant decrease in PPT after 20 minutes interval on Week 0, then at LI10 Affected on Week 1 for females and at LI11 Affected in Week 5 for males. For Sham Laser group, the females had PPT at LI10 Affected in Week 0 and LI11 Affected in both Week 0 and Week 1 decreased significantly after 20 minutes interval. Figure 4.24 gives a graphical presentation of the mean PPT with asterisks denote the significant changes in PPT between sessions.

Treatment Group: Acupuncture							
Occasion	Site	Female			Male		
		PRE	POST	p	PRE	POST	p
Week 0	LI10 Non-affected	2.96(1.15)	2.51(0.97)	0.005*	2.96(1.21)	2.52(1.11)	0.033*
	LI10 Affected	3.27(2.03)	2.54(1.47)	0.059	2.93(1.03)	2.44(1.17)	0.008*
	LI11 Non-affected	4.01(1.38)	3.33(1.09)	0.008*	3.78(1.61)	3.45(1.74)	0.071
	LI11 Affected	4.07(2.11)	3.27(1.32)	0.029*	3.79(1.80)	3.24(1.51)	0.001*
Week 1	LI10 Non-affected	1.76(0.52)	1.61(0.65)	0.225	2.15(0.91)	2.24(0.91)	0.593
	LI10 Affected	1.71(0.44)	1.46(0.51)	0.018*	2.30(0.81)	2.09(0.91)	0.763
	LI11 Non-affected	2.11(0.92)	2.28(1.24)	0.090	3.16(1.64)	3.17(1.35)	0.109
	LI11 Affected	2.24(0.70)	1.95(0.95)	0.225	3.16(1.80)	3.45(2.24)	0.593
Week 5	LI10 Non-affected	1.96(0.67)	1.78(0.51)	0.346	3.37(1.30)	3.11(1.13)	0.248
	LI10 Affected	2.13(0.86)	1.98(0.74)	0.808	3.49(1.32)	3.31(1.16)	0.439
	LI11 Non-affected	2.41(1.36)	2.87(1.60)	0.317	4.33(1.78)	4.41(1.31)	0.593
	LI11 Affected	2.77(1.42)	2.76(1.28)	0.637	5.13(2.12)	4.25(1.76)	0.001*
Week 9	LI10 Non-affected	2.19(0.65)	2.19(0.87)	0.796	3.29(1.25)	3.24(1.13)	0.782
	LI10 Affected	2.44(0.96)	2.39(0.89)	0.796	2.99(0.82)	3.01(0.72)	0.593
	LI11 Non-affected	3.05(1.84)	2.82(1.33)	0.285	4.43(1.47)	4.79(1.53)	0.166
	LI11 Affected	2.97(1.38)	3.05(1.36)	1.000	4.51(1.34)	4.21(1.47)	0.593

(a)

Treatment Group: Sham Laser							
Occasion	Site	Female			Male		
		PRE	POST	p	PRE	POST	p
Week 0	LI10 Non-affected	2.12(0.87)	1.95(0.84)	0.197	4.31(2.84)	4.23(3.56)	0.083
	LI10 Affected	2.24(0.78)	1.78(0.62)	0.013*	4.64(2.87)	4.62(3.36)	0.763
	LI11 Non-affected	2.56(1.20)	2.26(1.02)	0.071	4.60(2.56)	4.53(3.02)	0.248
	LI11 Affected	2.58(1.02)	2.17(1.01)	0.001*	5.12(2.53)	5.35(3.19)	0.564
Week 1	LI10 Non-affected	1.55(0.36)	1.47(0.39)	0.405	3.43(1.55)	2.91(0.98)	0.763
	LI10 Affected	1.74(0.71)	1.60(0.56)	0.564	5.33(4.14)	5.09(3.66)	0.527
	LI11 Non-affected	1.93(0.90)	1.99(0.94)	1.000	4.91(2.10)	4.83(1.75)	0.763
	LI11 Affected	2.12(1.03)	1.74(0.76)	0.033*	5.08(3.34)	4.94(2.45)	1.000
Week 5	LI10 Non-affected	1.58(0.52)	1.58(0.64)	1.000	3.57(1.39)	3.03(1.12)	0.058
	LI10 Affected	1.64(0.68)	1.63(0.59)	1.000	4.24(1.98)	4.33(2.23)	0.083
	LI11 Non-affected	2.17(1.24)	2.34(1.21)	0.109	4.11(1.52)	4.38(1.78)	1.000
	LI11 Affected	2.34(1.38)	2.60(1.53)	0.197	4.80(1.56)	5.05(1.57)	0.564
Week 9	LI10 Non-affected	1.80(0.43)	1.68(0.54)	0.285	3.58(0.71)	3.59(1.32)	0.763
	LI10 Affected	2.10(0.69)	1.87(0.91)	0.052	3.89(1.56)	4.12(1.54)	0.564
	LI11 Non-affected	2.57(1.11)	2.29(0.78)	0.405	4.10(1.44)	4.07(1.77)	0.366
	LI11 Affected	2.97(1.46)	2.68(1.27)	0.564	4.85(2.09)	4.63(2.25)	0.083

(b)

Table 4.22: The mean (SD) of PPT and the p-values of Friedman test on PPT between sessions for (a) Acupuncture and (b) Sham Laser. The asterisk * denotes significant decrease in mean PPT from PRE to POST.

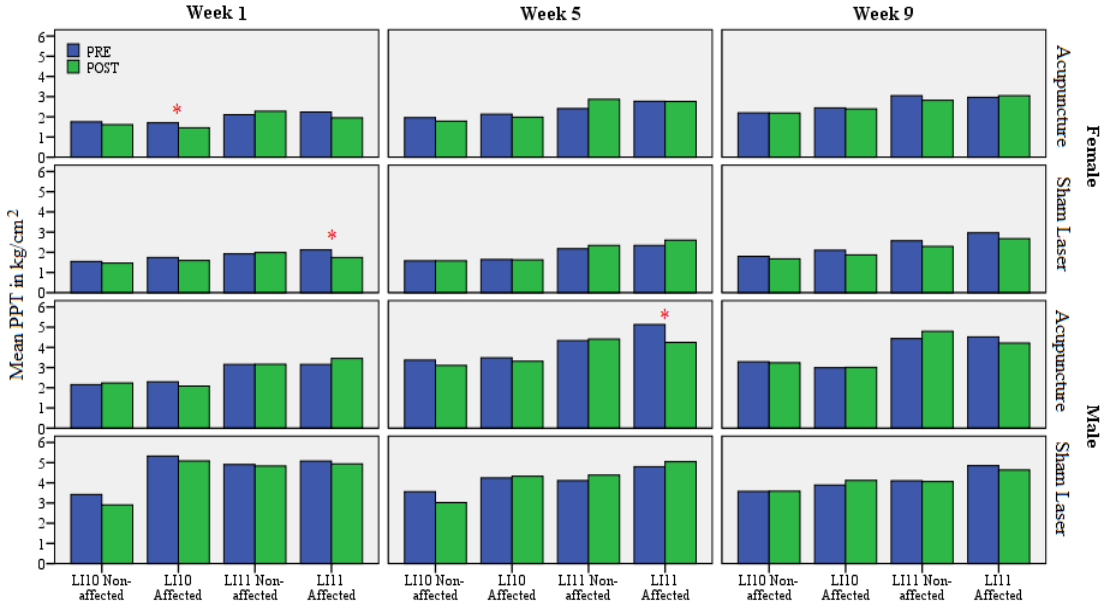


Figure 4.24: The mean PPT between sessions for each site by treatment by gender in intervention weeks and the one-month follow-up. Friedman test revealed three significant decreases (*) in mean PPT between sessions.

4.23 Aim 22: To compare the regional mean PPT between non-affected and affected sites in each occasion by treatment group

Research question: Was there a difference in regional mean PPT between affected and non-affected sites in each occasion by treatment group?

Tables 4.23 and 4.24 listed the p-values ($p<0.05$ indicates statistical significant change) of Friedman test on PPT between the affected and non-affected LI10 and LI11 respectively for each occasion by treatment group by gender by session. The results revealed that LI10 Non-affected had higher PPT than LI10 Affected on Week 1 POST session, and LI11 Affected had higher mean PPT than LI11 Non-affected on Week 1 PRE session for females in Acupuncture, whereas the non-affected LI10 and LI11 of males demonstrated lower mean PPT at the affected sites before and after interventions on Week 5. Figures 4.25 and 4.26 showed the mean PPT between non-affected and affected LI10 and LI11 respectively by treatment by gender in each occasion with asterisk indicates statistical significant change in mean PPT (* for increase, * for decrease) from non-affected to affected site.

Friedman test: Non-affected LI10 versus Affected LI10								
	Acupuncture				Sham Laser			
Occasion	Female		Male		Female		Male	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST
Week 0	0.346	0.808	1.000	0.796	0.197	0.109	0.248	0.083
Week 1	0.346	0.033*	0.782	0.285	0.439	1.000	0.564	0.564
Week 5	0.593	0.808	0.197	0.071	1.000	0.593	0.001*	0.021*
Week 9	0.134	0.157	0.197	0.439	0.052	0.285	0.564	0.083

Table 4.23: The p-values of Friedman test on PPT between LI10 Non-affected and LI10 Affected by session by gender for Acupuncture and Sham Laser. The asterisk indicates statistical significant change (* for increase, * for decrease) in mean PPT from non-affected to affected site.

Friedman test: Non-affected LI11 versus Affected LI11								
	Acupuncture				Sham Laser			
Occasion	Female		Male		Female		Male	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST
Week 0	0.346	0.346	0.593	0.796	0.593	0.052	0.564	0.083
Week 1	0.046*	0.157	0.439	0.439	0.405	0.366	0.248	0.564
Week 5	0.090	0.808	0.071	0.796	0.166	0.052	0.021*	0.007*
Week 9	0.346	0.197	0.796	0.071	0.109	0.197	0.132	0.132

Table 4.24: The p-values of Friedman test on PPT between LI11 Non-affected and LI11 Affected by session by gender for Acupuncture and Sham Laser. The asterisks * indicate statistical significant increases in mean PPT from non-affected to affected site.

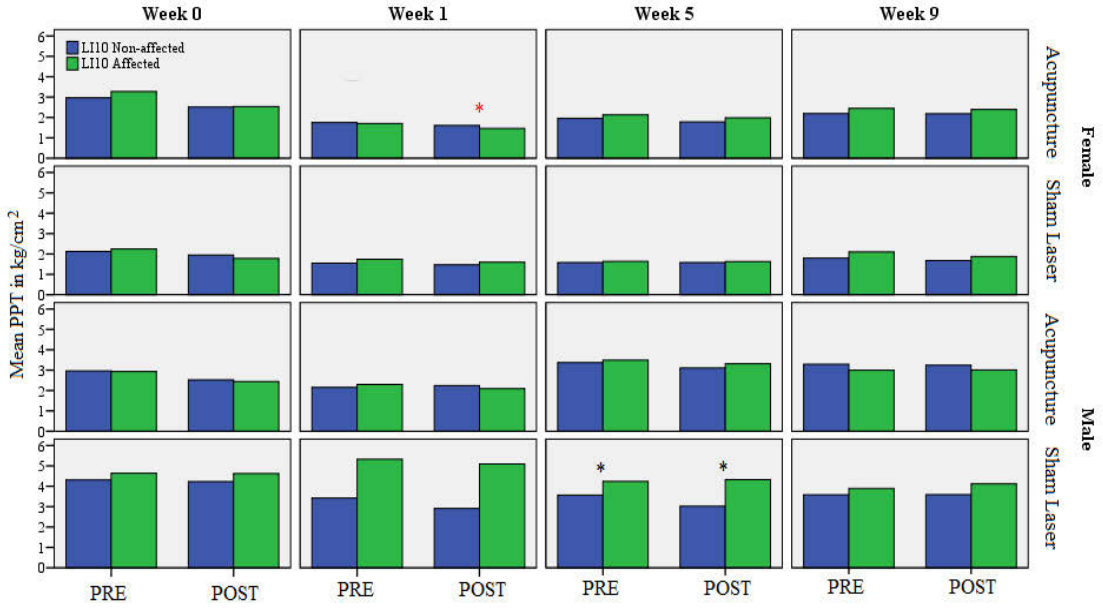


Figure 4.25: The mean PPT between LI10 Non-affected and LI10 Affected by treatment by gender in each occasion. The asterisk indicates statistical significant change in mean PPT (* for increase, * for decrease) from non-affected to affected site.

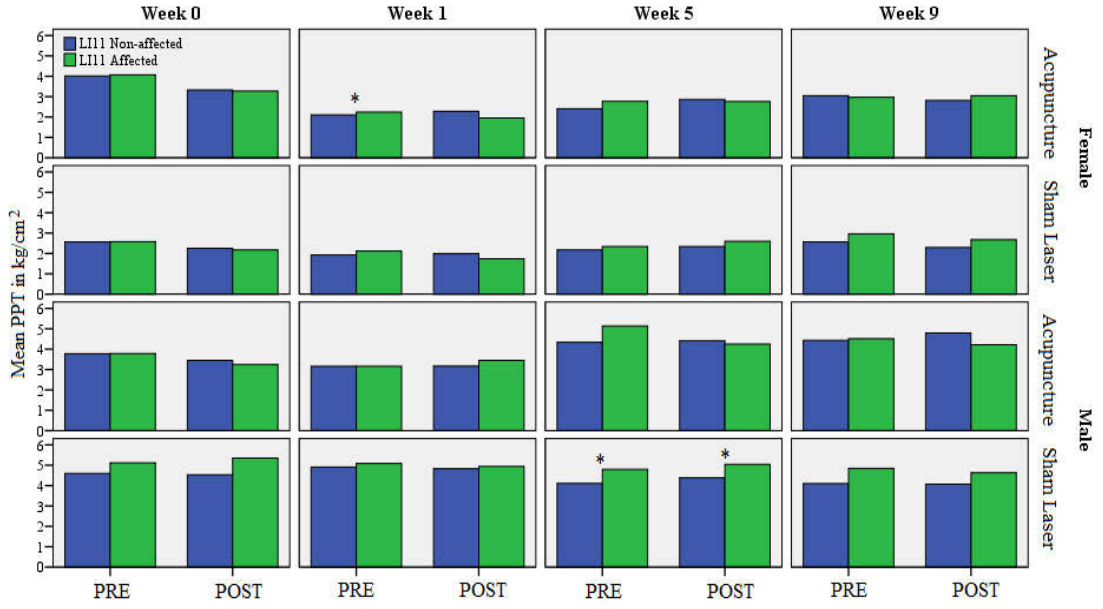


Figure 4.26: The mean PPT between LI11 Non-affected and LI11 Affected by treatment by gender in each occasion. The asterisk indicates statistical significant change in mean PPT (* for increase, * for decrease) from non-affected to affected site.

4.24 Aim 23: To compare the regional mean PPT between treatment groups

Research question: Was there a statistical significant difference in regional mean PPT between treatment groups in each occasion by gender?

As the normality was not met for PPT of small sample sized subgroups (treatment x gender x occasion x site) for applying GLM of unequal independent groups, the alternative Mann-Whitney non-parametric test was applied to compare the mean PPT between treatment groups. Table 4.25 gives the p-values from Mann-Whitney U test on PPT between treatment groups at intervention weeks and the one-month follow-up. The results showed that, in Week 1, the Sham Laser had mean PPT higher than the Acupuncture at LI10 Non-affected and LI11 Non-affected before intervention and at LI10 Affected and LI11 Non-affected after intervention for males. Figures 4.27 and 4.28 presented the bar graphs of mean PPT between the two groups for females and males respectively with * indicates significant differences in mean PPT between the treatment groups.

	Site	Week 1		Week 5		Week 9	
		PRE	POST	PRE	POST	PRE	POST
Female	LI10 Non-affected	0.343	0.735	0.274	0.421	0.100	0.108
	LI10 Affected	0.817	0.532	0.486	0.259	0.381	0.093
	LI11 Non-affected	0.682	0.556	0.682	0.509	1.000	0.630
	LI11 Affected	0.986	0.580	0.307	0.656	0.817	0.580
Male	LI10 Non-affected	0.009*	0.083	0.683	0.792	0.516	0.581
	LI10 Affected	0.103	0.047*	0.614	0.399	0.236	0.093
	LI11 Non-affected	0.041*	0.019*	0.719	0.792	0.456	0.183
	LI11 Affected	0.093	0.083	0.867	0.277	0.719	0.581

Table 4.25: The p-values of Mann-Whitney U test on PPT between treatment groups. The asterisks * indicate statistical significant higher mean PPT in Sham Laser group.

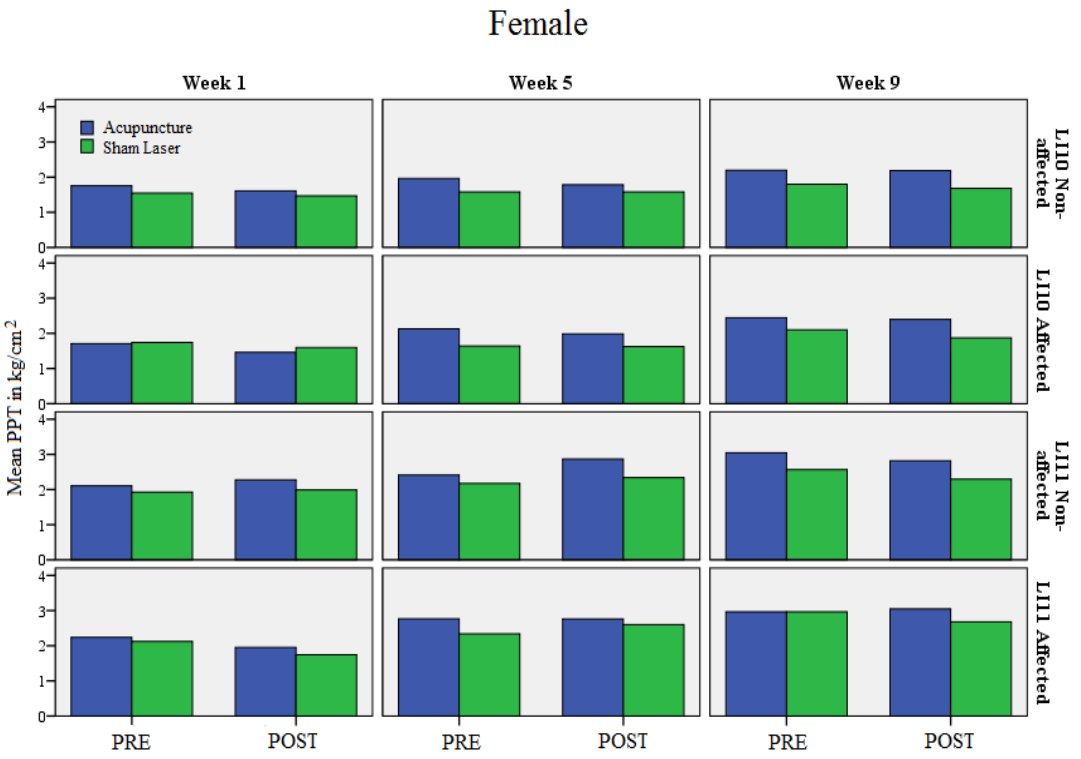


Figure 4.27: The mean PPT between treatment groups at non-affected and affected LI10 and LI11 for females. Mann-Whitney test revealed no statistical significant differences in mean PPT between the two groups.

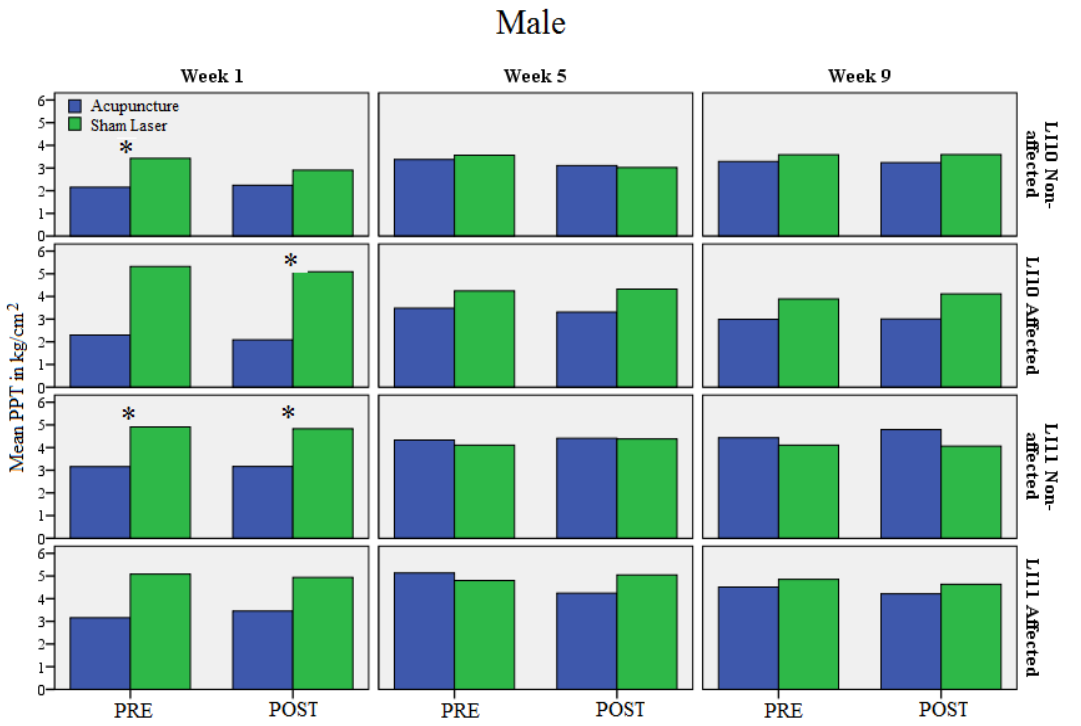


Figure 4.28: The mean PPT between treatment groups at non-affected and affected LI10 and LI11 for males. Mann-Whitney test revealed four statistical significant differences (*) in mean PPT between the two groups in Week 1.

4.25 Aim 24: To evaluate the mean percentage changes of regional PPT from baseline mean PPT on Week 1

Research question: Was there a significant change in the mean percentage change of PPT from its pre-intervention mean PPT on Week 1?

The percentage change of PPT was computed based on the baseline mean PPT derived from the pre-intervention session on Week 1. The one-sample T-test was employed to test whether the mean percentage change of PPT at each subsequent session for each treatment group by gender at each site was different from zero. Table 4.26 shows the results from T-test with * denote significant increase in mean percentage change of PPT and * for significant decrease. The results revealed an increase of mean percentage change of PPT at all non-affected and affected sites in both sessions of Week 5 and Week 9 for males in Acupuncture group whilst the females in Acupuncture had all sites in PRE session and three sites (except LI10 Non-affected) in POST session of Week 9 that showed an increase in mean percentage change of PPT. In Sham Laser, the females had three sites (except LI10 Affected) in PRE session of Week 9 showed an increase in mean percentage change of PPT whilst the males showed a decrease in mean percentage change of PPT at LI10 Affected in both sessions of Week 9. Figure 4.29 gives the bar graphs of mean percentage changes in PPT at subsequent sessions for each gender.

	Group	Site	Week 1	Week 5		Week 9	
			POST	PRE	POST	PRE	POST
Female	Acupuncture	LI10 Non-affected	t_{17}=-0.95	t_{17}=1.30	t_{17}=0.23	t_{17}=2.89*	t_{17}=2.11
		LI10 Affected	t_{17}=-2.05	t_{17}=2.09	t_{17}=1.58	t_{17}=3.27*	t_{17}=3.29*
		LI11 Non-affected	t_{17}=0.59	t_{17}=0.95	t_{17}=2.02	t_{17}=2.17*	t_{17}=2.27*
		LI11 Affected	t_{17}=-1.29	t_{17}=1.57	t_{17}=1.73	t_{17}=2.23*	t_{17}=2.52*
	Sham Laser	LI10 Non-affected	t_{14}=-0.79	t_{14}=0.25	t_{14}=0.20	t_{14}=2.28*	t_{14}=0.95
		LI10 Affected	t_{14}=-0.98	t_{14}=-0.57	t_{14}=-0.75	t_{14}=2.02	t_{14}=0.57
		LI11 Non-affected	t_{14}=0.26	t_{14}=0.77	t_{14}=1.32	t_{14}=2.22*	t_{14}=1.82
		LI11 Affected	t_{14}=-1.93	t_{14}=0.62	t_{14}=1.22	t_{14}=2.25*	t_{14}=1.71
Male	Acupuncture	LI10 Non-affected	t_{14}=0.37	t_{14}=3.64*	t_{14}=3.26*	t_{14}=3.52*	t_{14}=3.73*
		LI10 Affected	t_{14}=-0.90	t_{14}=3.47*	t_{14}=3.40*	t_{14}=3.29*	t_{14}=3.79*
		LI11 Non-affected	t_{14}=0.02	t_{14}=2.56*	t_{14}=3.72*	t_{14}=3.35*	t_{14}=4.14*
		LI11 Affected	t_{14}=0.51	t_{14}=3.61*	t_{14}=2.39*	t_{14}=3.92*	t_{14}=2.77*
	Sham Laser	LI10 Non-affected	t_{11}=-1.83	t_{11}=0.35	t_{11}=-1.24	t_{11}=0.77	t_{11}=0.44
		LI10 Affected	t_{11}=-0.22	t_{11}=-1.90	t_{11}=-1.56	t_{11}=-3.18*	t_{11}=-2.72*
		LI11 Non-affected	t_{11}=-0.15	t_{11}=-1.82	t_{11}=-1.02	t_{11}=-1.94	t_{11}=-1.65
		LI11 Affected	t_{11}=-0.20	t_{11}=-0.63	t_{11}=-0.07	t_{11}=-0.39	t_{11}=-0.69

Table 4.26: The results from one-sample T test on percentage change of PPT from baseline mean PPT on Week 1. The asterisk * indicates statistical significant increase and * for significant decrease in mean percentage change of PPT.

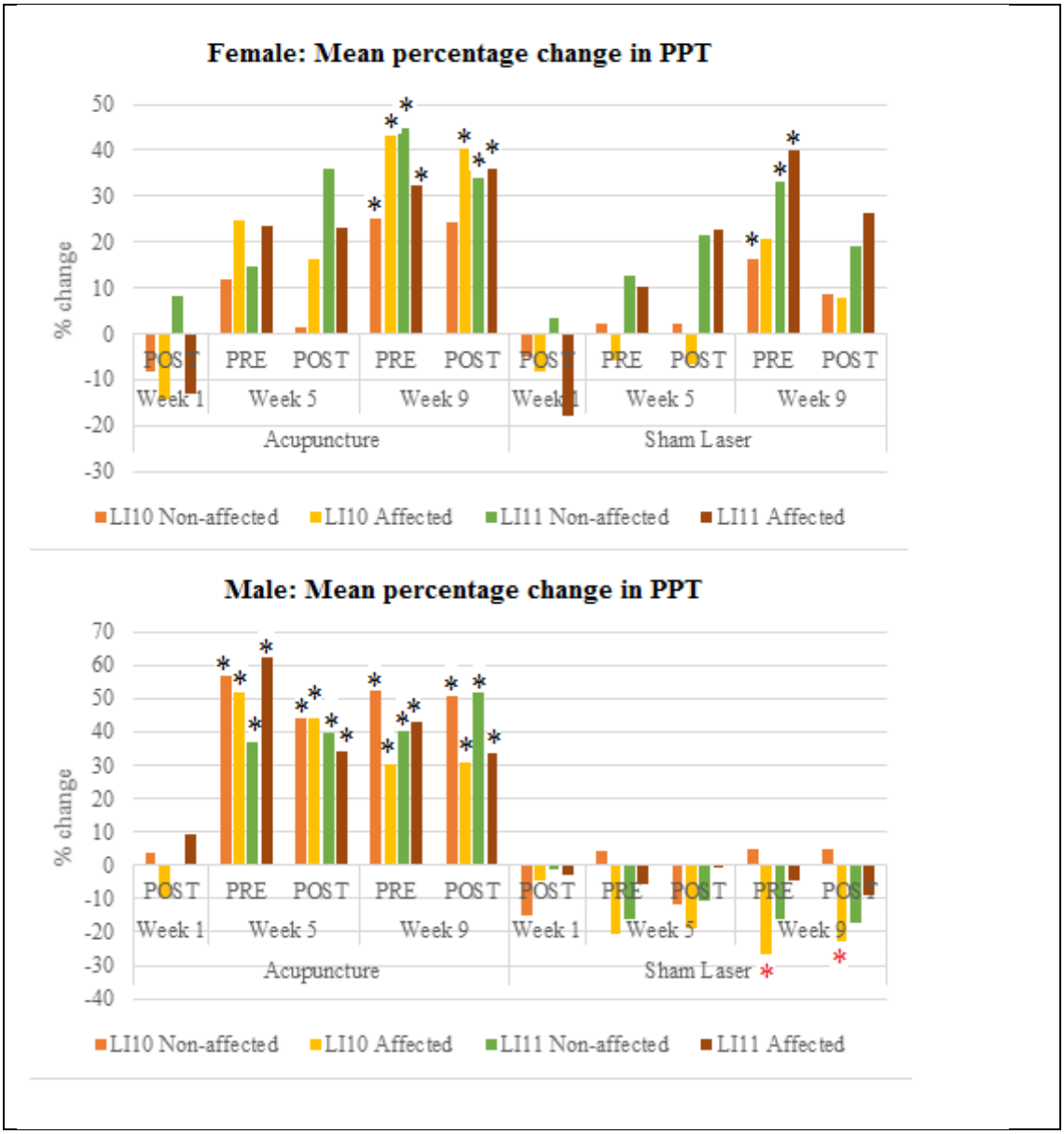


Figure 4.29: The mean percentage change in PPT from the baseline mean PPT on Week 1 for each gender. The asterisk * indicates statistical significant increase and * for significant decrease in mean percentage change in PPT.

4.26 Aim 25: To examine the mean percentage changes of regional PPT between treatment groups

Research question: Was there a significant difference between treatment groups in mean percentage change of PPT at each subsequent session for each measurement site by gender?

The Mann-Whitney U-Test was employed to compare between treatment groups the mean percentage change in PPT w.r.t. its baseline mean PPT on Week 1 (Table 4.27). The results

revealed statistically that the Acupuncture group for males showed significantly higher mean percentage change in PPT over Sham Laser on Week 5 and Week 9 for both PRE and POST sessions except LI10 Non-affected (pre-intervention) and LI11 Affected (post-intervention) on Week 5.

	Site	Week 1	Week 5		Week 9	
		POST	PRE	POST	PRE	POST
Female	LI10 Non-affected	0.656	0.789	0.845	0.486	0.442
	LI10 Affected	0.708	0.361	0.166	0.307	0.067
	LI11 Non-affected	0.762	0.957	0.708	0.580	1.000
	LI11 Affected	0.929	0.442	0.817	0.656	0.735
Male	LI10 Non-affected	0.256	0.053	0.003*	0.032*	0.019*
	LI10 Affected	0.614	0.001*	0.001*	0.001*	0.000*
	LI11 Non-affected	0.905	0.009*	0.003*	0.004*	0.001*
	LI11 Affected	0.981	0.007*	0.093	0.010*	0.037*

Table 4.27: The p-values of Mann-Whitney U test on percentage change in PPT from its baseline mean between treatment groups. The asterisks * indicate statistical significant difference in mean percentage change in PPT between treatment groups.

4.27 Aim 26: To compare the mean percentage change in PPT between sessions in each occasion by treatment group

Research question: Was there a significant difference in the mean percentage change in PPT between sessions in each occasion by treatment group?

A non-parametric Friedman test was applied to compare the mean percentage change in PPT between two sessions. Tables 4.28 gives, by treatment group, the p-values from Friedman test on percentage change in PPT between sessions for each affected and non-affected site by occasion by gender with significant results marked with asterisks. For females, the mean percentage change in PPT at LI10 Affected in Acupuncture and LI11 Affected in Sham Laser of Week 1 had significantly reduced after intervention. For males, the mean percentage change in PPT at LI11 Affected in Acupuncture of Week 5 had significantly reduced after intervention.

Occasion	Site	Female		Male	
		Acupuncture	Sham Laser	Acupuncture	Sham Laser
Week 1	LI10 Non-affected	0.225	0.405	0.593	0.763
	LI10 Affected	0.018*	0.564	0.763	0.527
	LI11 Non-affected	0.090	1.000	0.109	0.763
	LI11 Affected	0.225	0.033*	0.593	1.000
Week 5	LI10 Non-affected	0.346	1.000	0.248	0.058
	LI10 Affected	0.808	1.000	0.439	0.083
	LI11 Non-affected	0.317	0.109	0.593	1.000
	LI11 Affected	0.637	0.197	0.001*	0.564
Week 9	LI10 Non-affected	0.796	0.285	0.782	0.763
	LI10 Affected	0.796	0.052	0.593	0.564
	LI11 Non-affected	0.285	0.405	0.166	0.366
	LI11 Affected	1.000	0.564	0.593	0.083

Table 4.28: The p-values of Friedman test on percentage change in PPT between sessions. The asterisk * denotes significant decrease in mean percentage change in PPT from PRE to POST.

4.28 Aim 27: To compare the mean percentage change in PPT between non-affected and affected sites

Research question: Was there a difference in mean percentage change in PPT between affected and non-affected sites in each session by treatment group by gender?

Table 4.29 showed the results of Friedman test between the mean percentage change in PPT of the affected and non-affected sites of LI10 and LI11 respectively for each occasion by treatment group by gender by session. The results revealed that LI10 Non-affected had higher mean percentage change in PPT than LI10 Affected at three sessions (Week 5 PRE, Week 9 PRE and POST) in Sham Laser of males whilst LI11 Non-affected had higher mean percentage change in PPT than LI11 Affected in two sessions (Week 1 POST Acupuncture and Sham Laser) for females and LI11 Affected had higher mean percentage change in PPT than LI11 Non-affected on Week 5 POST session for males in Sham Laser.

Friedman test on %Change PPT: Non-affected LI10 versus Affected LI10								
Occasion	Female				Male			
	Acupuncture		Sham Laser		Acupuncture		Sham Laser	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST
Week 1	0.346	0.346	0.796	0.197	0.796	0.071	0.248	1.000
Week 5	0.157	0.637	0.439	0.439	0.439	0.796	0.001*	0.083
Week 9	0.059	0.157	0.796	0.796	0.197	0.197	0.004*	0.021*
Friedman test on %Change PPT: Non-affected LI11 versus Affected LI11								
Occasion	Female				Male			
	Acupuncture		Sham Laser		Acupuncture		Sham Laser	
	PRE	POST	PRE	POST	PRE	POST	PRE	POST
Week 1	0.157	0.018*	0.439	0.005*	0.439	0.439	0.248	0.564
Week 5	0.157	0.637	0.796	0.796	0.071	0.796	0.083	0.021*
Week 9	0.637	1.000	0.439	0.796	0.796	0.071	0.248	0.248

Table 4.29: The p-values of Friedman test on percentage change in PPT between non-affected and affected LI10 and LI11. The asterisk indicates statistical significant change (* for increase, * for decrease) in mean percentage change in PPT from non-affected to affected site.

III. Research Study Three

Research Study Three aimed to examine the inter-device reliability of two PPT measurement devices (mechanical and electronic algometers) of same measurement parameters: 1cm^2 flat circular tip and force application rate of 1kg/cm^2/s.

This study recruited 17 adults (8 females: age=49.4±6.9 years, BMI=25.9±6.4kg/m^2; 9 males: age=48.4±8.7 years, BMI=27.2±3.8kg/m^2) with age ranged from 35 to 58 years for women and 35 to 65 years for men. Six measurement cycles were performed at six PPT measurement sites with two different algometers measuring the PPT scores in alternate order at each site. This resulted in three PPT measures per site for each device. All measurements were done in one occasion.

4.29 Aim 28: To examine the consistency of PPT measures between two algometry devices

Research question: Were the algometers of same measuring tip size and application force rate provided the same mean PPT measures?

Paired samples t-tests were conducted to examine the consistency of readings between the mechanical and electronic algometers at all six sites. Tables 4.30 and 4.31 show statistically that the mean PPT measures obtained by mechanical and electronic algometers did not differ

significantly at all sites. The significant correlations between PPT measures obtained by different devices ranged from 0.55 to 0.82 independent of measurement cycles.

Paired-samples t-test					
Site	t	p	Mean difference	SD	Correlation
1R	t_{50}=-1.68	0.099	-0.31	1.32	0.55
1L	t_{50}=0.17	0.866	0.02	1.03	0.72
LI5R	t_{50}=-0.84	0.404	-0.14	1.19	0.63
LI5L	t_{50}=0.13	0.894	0.02	0.99	0.74
PC6R	t_{50}=0.08	0.935	0.01	1.11	0.74
PC6L	t_{50}=-0.20	0.842	-0.03	1.08	0.82
All	t_{305}=-1.11	0.270	-0.07	1.12	0.71

Table 4.30: The results from paired samples t tests on PPT at six regional PPT measurement sites.

Comparisons of PPT between mechanical and electronic algometers at each measurement cycle						
Site	Cycle	$t_{1,17}$	p	Mean difference	SD	Correlation
1R	1	-0.42	.679	-0.11	1.06	0.66
	2	-0.38	.710	-0.11	1.22	0.73
	3	-1.83	.087	-0.71	1.61	0.39
1L	1	-0.05	.957	-0.01	0.89	0.68
	2	-0.22	.827	-0.06	1.09	0.77
	3	0.52	.610	0.14	1.14	0.68
LI5R	1	-1.37	.190	-0.49	1.48	0.37
	2	0.82	.423	0.20	0.99	0.77
	3	-0.52	.610	-0.13	1.00	0.76
LI5L	1	0.09	.930	0.02	0.95	0.75
	2	-0.90	.379	-0.25	1.13	0.70
	3	1.35	.197	0.28	0.86	0.83
PC6R	1	0.13	.901	0.04	1.15	0.75
	2	-0.64	.528	-0.19	1.24	0.73
	3	0.85	.407	0.20	0.95	0.78
PC6L	1	-1.10	.288	-0.30	1.14	0.82
	2	0.75	.464	0.21	1.13	0.78
	3	0.02	.981	0.01	0.98	0.87

Table 4.31: The results from paired samples t tests on PPT by measurement cycle at six regional PPT measurement sites.

4.30 Aim 29: To examine the coefficients of variation of PPT measures within and between devices

Research question: What was the extent of variations among PPT readings within and between the two PPT measurement devices?

The scale of differences in measurement of PPT within and between devices was examined based on the intra and inter-device coefficients of variation (CV). The intra-device CV was computed as (standard deviation of the PPT measures within device) / (mean of the PPT measures within device) x100%, and the inter-device CV was computed as (standard deviation of the PPT measures between devices) / (mean of the PPT measures between devices) x 100%. Table 4.32 gives the mean intra-device and mean inter-device coefficients of variation of PPT measures at six measurement sites. The mean intra-device coefficients varied from 19.3% (PC6R) to 23.1% (1R) for mechanical algometer and 10% (PC6L) to 15.3% (1R) for electronic algometer whilst the mean inter-device coefficients of variation varied from 14% (LI5L) to 16.9% (1R). This showed that the electronic algometer was relatively more precise in PPT measurement.

Mean of coefficient of variation			
Site	Intra-device		Inter-device
	Mechanical	Electronic	
1R	23.1	15.3	16.9
1L	20.2	12.5	14.2
LI5R	20.6	11.7	14.9
LI5L	19.9	14.6	14.0
PC6R	19.3	11.0	16.4
PC6L	22.9	10.0	15.5

Table 4.32: The mean intra-device and inter-device coefficients of variation at six measurement sites.

Chapter 5: Discussion and conclusion

I. Research Study One

Sections 5.1 to 5.6 discussed about the results as outlined in Research Study One in Chapter 4.

5.1 Gender based regional PPT comparisons independent of temporal variables

It was revealed statistically that the males demonstrated significantly higher mean PPT, median PPT, mean PPT_{mean} and mean PPT_{median}, than the females in all 17 PPT measurement sites (Figures 4.1 and 4.2, Tables 4.2 and 4.3). These result of significant differences in the means of PPT between genders were consistent with and generally reported in various studies (Buchanan et al 1987; Fischer et al 1987; Brennum et al 1989; Ohrbach et al 1989; Takala et al 1990; Vanderweeën et al 1996; Plesh et al 1998; Vatine et al 1998; Chesterton et al 2003; Rolke et al 2006) though at different anatomical sites. However, a few studies reported no significant differences in mean PPT between genders at certain measurement sites different from the present study (Isselée et al 1997, Ayesh et al 2007a). Overall, independent of temporal and regional site variables, the mean PPT_{mean} and mean PPT_{median} for males was 25% greater than for females and the median difference was 23%. Within the same gender for each regional site, since mean PPT_{mean} and mean PPT_{median} for overall visits were not significantly different, either PPT_{mean} or PPT_{median} was similarly appropriate for comparisons.

The significant differences in mean PPT_{mean} and mean PPT_{median} between genders supported by large sample sizes for PPT measurements at all 17 regional sites extended from head to four limbs had suggested separate analysis by gender, or restricted to single gender study (Murphy et al 1992; Kosek et al 1993; 1999; Farella et al 2000; Waling et al 2001; Shiau et al 2003; Persson et al 2004; Cairns et al 2006; Jones et al 2007; Ylinen et al 2007; Ge et al 2006, 2008; Fernández-de-las-Peñas et al 2009; Aldayel et al 2010) or alternatively a matched-pair study (Fischer et al 1986, 1987; Buchanan et al 1987; Tunks et al 1988; Brennum et al 1989; Delaney et al 1993; Vanderweeën et al 1996; Isselée et al 1997; Plesh et al 1998; Tanaka et al 2004; Barlas et al 2006; Ayesh et al 2007b; Anderson et al 2008; Li et al 2008; Walsh et al 2009). In whatever settings, unless focus is on single gender or the gender is not a factor for matched-pair, comparisons between genders would require a doubling up of the sample size ensuring power size was adequate. This would in turn incur more cost and additional time especially for a study that involves selection criteria to achieve

sufficient power. If only the inclusion of a single gender was undertaken due to cost and time constraints, this would leave the outcomes for the other gender unknown.

Pearson correlations were examined for the pattern of overall mean PPT and overall median PPT, and the PPT_{mean} and PPT_{median} at all 17 sites between genders (Appendix 12, A12.1). The results revealed highly significant correlation (p=0.000) for overall mean PPT and overall median PPT (r=0.998 for females, r = 0.993 for males), and PPT_{mean} and PPT_{median} (r=0.996 for both genders) for each gender. Relative difference with respect to females in overall mean PPT, overall median PPT, mean PPT_{mean} and mean PPT_{median} between genders among sites ranged from 17.8% (2R) to 34.1% (LI10L) for overall mean PPT and PPT_{mean}, from 10.7% (GB12R) to 32.3% (ST36L) for overall median , and from 17.8% (2R) to 34.5% (LI10L) for PPT_{median}. In general, the lowest PPT group comprised of facial sites LI20L and LI20R located at the bony region near the nostrils followed by GB12R at occiput behind the earlobe. The medium PPT group mainly represented by the sites at forearms (PC6L, PC6R, 1L, 1R, LI5L, LI5R, LI10L). This is consistent with findings from several studies that measured PPT on head and neck (Antonacci et al 1992, 1998; Chung et al 1992; Sand et al 1997) and reported PPT differences that were lower on the head compared to the arms (Buchanan et al 1987; Kosek et al 1993; Christidis et al 2005). The highest PPT sites were ST36L and ST36R (located on the tibialis anterior muscle) followed by the non-acupoints sites 3R (located on peroneus muscle region on the lateral aspect of the lower limb), 2R and 2L (located on the posterior region of the upper limb over the ulna) and then the acupoints KD3R and SP6R (located on the distal region of right leg) (Tunks et al 1988; Anderson et al 2008; Lacourt et al 2012). Though these previous studies examined sites that were not the exact points as used in the UTS studies, the measurement protocols such as models of algometers, size of measurement tip and the force application rate across studies were not standardized (Sand et al 1997).

It should be noted that the acupoints LI20L and LI20R were the only measurements sites that the subjects could observe PPT measurement. This may have affected the accuracy of the PPT measure. In addition, due to the relatively low PPT observed at these sites, the human response delay time, which is due to the subject's signal on perception of PPT with algometer operating at an application rate of 1kg/s, may cause further experimental error in addition to the reading error of ±0.05kg on the algometer dial scale. Hence, it is suggested that for future studies sites with low PPT, such as the acupoint LI20, should not be selected for measurement unless the site is an essential part of a clinically oriented assessment. In this case, it is preferable that the subject be draped directly below the eyes so the site cannot be observed allowing for better focus during data collection.

The current suite of UTS studies also used extensive training of the PPT operator as well as has standard verbal instructions for the participants. For reliability of PPT measures, training on the operation of algometer in taking PPT measurement has been demonstrated to be essential (Barlas et al 2006; Rolke et al 2006; Farasyn et al 2007; Vedolin et al 2009; Aldayel et al 2010). In addition providing standard instruction to subject about perception of PPT is also strongly recommended for future PPT studies (Chesterton et al 2007).

5.2 Stability of PPT among the measurement cycles

Another consistent finding was the repeatability or reproducibility of PPT readings within each session. For all 17 sites by gender, the mean PPT and median PPT for each of the three measurement cycles were stable and independent of temporal visits (Figures 4.3, 4.4, Table 4.4). Whilst this implied the practicality of employing PPT measures of either measurement cycle, some studies suggest omission of the first reading and averaging the successive readings (Nussbaum et al 1998; Farella et al 2000; Shiau et al 2003; Farasyn et al 2007; Meeus et al 2010) or taking the average of all repeated measures within session. The reproducibility of PPT readings among measurement cycles remained consistent even when treatment groups by gender were considered for mean PPT_{mean} and mean PPT_{median} (Figures 4.13 and 4.14). This consistency of PPT among measurement cycles was generally reported in Chesterton et al (2003) for within session measurements though different temporal intervals (an hour for 14 measurements) were used and in Jones et al (2007) of three trials at eight sites on same day across four consecutive days. Also, Buchanan et al (1987) included 18 subjects (genders were not reported) for assessment on PPT readings at five PPT measurement areas measured by same observer and found no significant differences in the two readings for the five points, either on the dominant or non-dominant side of the body with most sensitive point appearing at the forehead. Brennum et al (1989) recruited 30 healthy matched-pair adults and reported an intra-individual coefficient of variation (IntraCV) of 14% on five cycles of PPT measurements with one week interval over 12 locations across fingers and toes. Antonacci et al (1998) examined 21 healthy individuals at 14 sites and reported IntraCV of 10.9% to 18.6%. Alternatively, Tunk et al (1988) reported high generalization coefficients of 0.78 to 0.90 in test-retest on PPT at 10 locations for matched-pair of ten. In the present study (Appendix 12: A12.2), the average IntraCV of three reading cycles (two to three minutes between cycles) across four occasions with at least one week apart ranged from 9.6% (SP6R) to 12.8% (LI20L) for females and 9.2% (PC6L) to 11.5% (LI20L) for males. This demonstrated that the PPT

at SP6R or PC6L was the most stable as compared to LI20L the least stable in intra-individual variation. These results supported the stability and reproducibility of PPT among the reading cycles and accounted for some variations across longer temporal sessions of more than a week. The range of IntraCV indicated consistent finding from Brennum et al (1989) though this study reported different anatomical locations and session intervals. Despite these procedure variations, the UTS studies support the reliability and reproducibility of PPT in clinical and experimental research.

Several studies investigated the IntraCV in PPT over different occasions with various degrees of consistency. In this present study (Appendix 12: A12.2), the IntraCV among temporal sessions were relatively higher than the IntraCV among measurement cycles. For example, the females ranged from 18% (PC6R) to 22.4% (LI20L) and the males 15.9% (SP6R) to 21.6% (LI20L). These results supported the stability and reproducibility of PPT among the reading cycles and accounted for some variations across longer temporal sessions of more than a week which were consistent with other studies where different locations were examined (Brennum et al 1989; Takala et al 1990; Antonacci et al 1998; Chesterton et al 2003). Takala et al (1990) reported reliable day-to-day repeatability of PPT measures and recommended the use of mean scores of several measures to reduce reported intra and inter subject variation in PPT. It is unable to make comparisons about IntraCV with the other studies due to the different locations used for the PPT measures.

Some studies further examined the inter-individual coefficient of variation (InterCV) for PPT within and between occasions and generally reported higher InterCV than the IntraCV (Jensen et al 1986; Brennum et al 1989; Antonacci et al 1998). Jensen et al (1986) reported that the InterCV was approximately 3 times greater than the IntraCV whilst Brennum et al (1989) reported an InterCV of 28% for females and 33% for males which was about 2 times greater than the ICV. Antonacci et al (1998) reported 13% to 21.4%. In the UTS study (Appendix 12: A12.2), the InterCV among measurement cycles ranged from 33.3% (PC6R) to 46.7% (LI20L) for females and from 31.7% (PC6L) to 49.3% (LI10L) for males and were consistent with that of among occasions with 33% (PC6R) to 46.3% (LI20L) for females and 31.6% (PC6L) to 49.5% (LI20L) for males. This demonstrates that in general the PPT at PC6L/R was the most stable and LI20L or LI10L the least stable in InterCV. This higher InterCV could be attributed to various factors such as the anthropometric variables (age, BMI, muscle structure), psychosocial and physiological factors (break time intervals, learning experience, intervention effects), and psychometric parameters (learning experience, attitudes, personality).

However, it should be noted that there were no strong or noticeable effects of age or BMI on regional PPT at any of the measurement sites with the coefficients of determination (R^2 of Tables 4.7 and 4.8, Appendix 12: A12.3) for age not exceeding 0.06 (LI20R) for females or 0.12 (LI20L) for males, and for BMI no more than 0.08 (PC6L) for females or 0.09 (LI10L) for males. It should be noted that these groups comprised of individuals in the designated healthy weight range (70% of subjects) followed by the overweight range (18%) (NSW 2013).

5.3 Temporal stability of PPT across the four measurement sessions by regional site

While stability of PPT within session and low IntraCV supports reliability and reproducibility of PPT at all 17 measurement sites, the consistency of PPT varied by number of sites across different extended temporal periods of the four occasions. As shown in Figures 4.6 and 4.7, except one site (LI20R, females, Visit 2), there was a gradual increase in means of PPT_{mean} and PPT_{median} over delayed temporal sessions in which the significant effects were more frequent for males statistically. This temporal drift suggested both mean and median were equally representative of PPT in longitudinal comparisons.

While there were no significant changes in the means of PPT_{mean} and PPT_{median} for any site for both genders from Visit 1 to Visit 2, this was not the case in Visit 3 and Visit 4. For Visit 3, this effect involved 23.5% of sites for means of PPT_{mean} and PPT_{median} of males compared with 17.6% in means of PPT_{median} for females. By Visit 4, these effects were evident for high proportions of sites for both means of PPT_{mean} and PPT_{median} for females (29.4% in both means) and males (47.1% and 52.9% respectively). These findings indicate the importance of recognising the presence of temporal drift if PPT measurements are used in longitudinal clinical or research studies (Isselée et al 1997), as well as the need to evaluate findings for the genders separately. The presence of a significant decrease in mean PPT_{mean} for females in Visit 2 for LI20R may represent this situation which could be the result of issues discussed regarding low PPT, limitation of scale with reading error of ±0.05kg, delayed human response time and gender concerns regarding the use of PPT on a tender facial site (afraid of scars and bruise).

Some sites were more likely to show significant temporal changes than others, both within and between genders. For males, the number of sites with common significant increases in means of PPT_{mean} and PPT_{median} was four (2L, 2R, LI5L, 3R) for temporal sessions of Visit 1 to Visit 3 and

seven (GB12R, 2L, LI5L, LI5R, SL36L, ST36R, KD3R) for Visit 1 to Visit 4. For females, the number of sites reduced to four (GB12R, 2L, PC6R, LI5R) for Visit 1 to Visit 4 only. The most temporally stable sites were LI20L, LI20R, PC6L, PC6R, LI10L, 1R and SP6R for males, and LI20L, PC6L, LI10L, 1L, 1R, LI5L, ST36L, 3R, SP6R and KD3R for females which yielded five common sites (LI20L, PC6L, LI10L, 1R and SP6R) for both genders. Of interest are the sites less prone to temporal drift for choice as one or several control measurement sites in a different body region if, for example, effect of intervention were to be assessed which enable possible comparisons on regional PPT between the related intervention and control sites over various temporal sessions. In this study, though only the baseline PPT at each of the four occasions were extracted from the previous UTS studies that implemented various interventions, there was still potential presence of effect from interventions though an assumption was made that a one week "washout period" was adequate. This concern was clearly reflected in Figures 4.15 to 4.18 in which the Control had shown nil changes in both PPT_{mean} and PPT_{median} over temporal sessions whereas the intervention groups had significant temporal effect on PPT_{mean} and PPT_{median} with males demonstrated more frequent significant increase than females with some noise being largely reduced by a more conservative approach of Bonferroni corrections.

The higher percentages occurring in the Intervention groups after Visit 3 for both genders for both the PPT_{mean} and PPT_{median} could be accounted for by the potential effects of complex interventions involved in various studies in addition to the LI4 needling. Depending upon the clinical or experimental design in pain studies, an increase in PPT may potentially be due to the analgesic effects of an intervention such as acupuncture, TENS and medication (Ashton et al 1984; Ayesh et al 2007a,b;) or a decrease in PPT associated with clinically painful conditions (Delaney et al 1993; Farella et al 2000; Fernández-de-las-Peñas et al 2006b, 2009; Cathcart et al 2008). All these, in whatever ways, supported the gate control theory (Melzack and Wall, 1965, 1988, 1996; Melzack 1996; Wall 1996; Wolff 1996) and its improved version of neuromatrix theory (Melzack 1999, 2001; Lee et al 2013).

When PPT between Intervention and Control groups were explored, results from GLM revealed that five sites (LI20L, LI20R, GB12R, 2L, 2R) showed significant increase in each of the means of PPT_{mean} or PPT_{median} from Control to Intervention whilst three sites (LI20R, 2L, ST36R for PPT_{mean}; LI20L, LI20R, ST36R for PPT_{median}) had shown significant increase in Visit 1 for females. Interestingly, ten sites (LI20L, LI20R, GB12R, 2L, LI10L, 1L, 1R, LI5L, ST36L, 3R) showed significant increase in each of the mean of PPT_{mean} or PPT_{median} from Control to Intervention in

which six sites (LI20L, LI20R, GB12R, LI10L, 1L, ST36L) had shown significant increase in the means in Visit 1 for males. The presence of significant increases in Visit 1 implies the potential influence of other factors (e.g. psychosocial and physiological factors and psychometric parameters) besides age and BMI.

Besides, depending on the clinical and experimental criterion, the statistical significant differences in PPT with regard to 95% or 99% CI (α=0.05 or 0.01) may determine the number of regional sites to be included. Fischer et al (1987, 1990) reported that the PPT was lower by 1.5kg/cm^2 or 2kg/cm^2 than on the opposite normal sites in 97.8% or 87% of hypersensitive trigger points and developed an indicator for determining clinically significant tenderness and diagnosis of pathological symptom.

Several studies discussed the variation of PPT involving healthy subjects (Jensen et al 1986; Buchanan et al 1987; Fischer et al 1987; Brennum et al 1989; Kosek et al 1993; Antonacci et al 1998; Chesterton et al 2003, 2007; Jones et al 2007). In the UTS studies, drift values in PPT ranged in between -0.01kg/cm^2 and 0.95 kg/cm^2 and the maximum drift values (*increases*) were associated with sites with the highest difference in PPT values. For females, the maximum temporal drift across the four sessions was 0.60 kg/cm^2 at 2L (14.2% change from session one mean of 4.24kg/cm^2) and 0.60 kg/cm^2 at ST36R (13% change from session one median of 4.60 kg/cm^2) for comparisons using means and medians respectively. For males, the maximum temporal drift across the four sessions was 0.95kg/cm^2 at ST36L (14.7% change from session one mean of 6.47kg/cm^2) and 0.85 kg/cm^2 at ST36R (14.7% change from session one median of 5.80 kg/cm^2) for comparisons using means and medians respectively. However, the percentage change in PPT with respect to the session one mean PPT yielded a maximum of 14.2% (2L, mean 4.24kg/cm^2) for females and 19.2% (LI5L, mean 3.7kg/cm^2) for males and that with respect to the session one median PPT yielded a maximum of 19.2% (GB12R, median 2.60kg/cm^2) for females and 21.7% (LI5L, median 3.45kg/cm^2) for males. Note that the drift values of *decreases* were relatively low in magnitude with minimum of -0.31kg/cm^2 (PC6L, Visit 2, females, -8.4% from session one mean) for means and -0.1kg/cm^2 (2R, PC6L, LI5R, Visit 2, females, -2.2%, -3%, -3.2% from session one median) for medians. This implies practical applications of temporal drifts on *increases* for longitudinal clinical or experimental studies as suggested by several researchers (Fischer et al 1990; Chung et al 1992; Isselée et al 1997).

Fischer et al (1990) conducted an extensive study on the clinical application of pressure algometry which provides unique information by quantifying pain at pressure-sensitive points, trigger points

and fibromyalgia tender points and made comparisons with contralateral sites of the patients and pain free healthy control subjects. The deduced lower PPT by 1.5 to 2 kg/cm^2 at affected sites than the non-affected sites were far greater than that of the present study which did not involve pain sites and at different locations and temporal intervals. Both Fischer et al (1990) and Chung et al (1992) concluded that the effective application of algometry in experimental and clinical practices such as diagnosing the presence of abnormality that requires treatment and providing PPT reports can inform patients about the effectiveness of therapy.

5.4 Examination of PPT by age and BMI groups

Reported mean age in studies involving PPT spanned from 20 (Vedolin et al 2009) to 76 (Zhang et al 2011) years old for both genders. Some studies however had a mean age in younger group of <35 years (Buchanan et al 1987; Chung et al 1992; Kosek et al 1993; Isselée et al 1997; Plesh et al 1998; Brown et al 2000; Irnich et al 2001; Ogimoto et al 2002; Shiau et al 2003; Cairns et al 2006; Cathcart et al 2006; Ayesh et al 2007a,b; Chesterton et al 2007; Anderson et al 2008; Hübscher et al 2008; Xiong et al 2011) and a few in an elder age group of ≥35 years (Wessel et al 1995; Tanaka et al 2004; Zhang et al 2011). In Research Study One, the majority of subjects in Studies 1 to 6 were aged between 17 and 35 (115 for age<35; 35 for age≥35) whilst Study 7 mainly recruited healthy adults of age 35 years old and above (n=85). The results from a comparison of these two cohorts can be used as a reference though the experimental sites and temporal sessions were different. For studies that involved a wider range of age, no study was identified to compare the PPT among age groups (Jensen et al 1986; Brennum et al 1989; Antonaci et al 1992, 1998; Delaney et al 1993; McMillan et al 1994; Vanderweeën et al 1996; Kosek et al 1999; Smidt et al 2002; Defrin et al 2003; Persson et al 2004, 2008; Williams et al 2004; Slater et al 2005; Takahashi et al 2005; Barlas et al 2006; Fernández-de-las-Peñas et al 2006a,b, 2009 ; Cathcart et al 2008; Farasyn et al 2008; Walsh et al 2009; Meeus et al 2010).

In this study, the younger age-group comprised of mainly PPT measures from intervention group and the elder group represents PPT from intervention and non-intervention groups. This implies that the results from age groups can be derived from the intervention and non-intervention groups. This is possible since the relationships of age with PPT_{mean} and PPT_{median} separately were not statistically significant at all sites except two. These two sites (LI20L and LI20R) for both genders demonstrated age as significant factor for PPT_{mean} and PPT_{median} as generated by the stepwise regression models for relationship of PPT_{mean} and PPT_{median} with gender, age and BMI in Visit 1

(Table 4.9). With age as a covariate, the presence of significant decrease of mean PPT_{mean} in V2 and significant increase in mean PPT_{median} in V4 for LI20R were reduced to nil for the corresponding adjusted means. Further exploration by age groups was not conducted at these two sites due to the limitations (e.g. very low PPT) arising from these two sites as discussed earlier.

For treatment groups, the attempt to use age as covariate changed the means of PPT_{mean} and PPT_{median} in V4 of males and PPT_{median} in V3 of females at LI20L from significant to no significant difference from the corresponding means in V1. However, no effect of adjustments was seen for LI20R. As mentioned in Section 5.3, the results implied the influence of other potential factors (e.g. psychosocial and physiological factors and psychometric parameters) besides that of age and BMI.

Most studies reported weight and height instead of BMI. The reported mean weight ranged from 53kg (Shiau et al 2003) to 89kg (Nussbaum et al 1998), mean height in between 159cm (Zhang et al 2011) and 180cm (Nussbaum et al 1998) and mean BMI ranged between 20.4 (Xiong et al 2011) to 26 (Ylinen et al 2007). Anderson et al (2008) recruited younger adults (age: 22 to 33) with males having a BMI range between 20.5–29.3 (mean 24.1) and female 20.4–29 (mean 24.2). Defrin et al (2003) included healthy adults (BMI of 24.6±4 for males and 22.2±3 for females) by measuring PPT at various sites on hand, pain free back region and myofascial trigger points (MTPs) in the back of the subjects. However, no study was found to have compared PPT by BMI groups (Defrin et al 2003; Jones et al 2007; Anderson et al 2008; Farasyn et al 2008; Xiong et al 2011).

The stepwise regression models (Table 4.9) revealed that BMI was a significant factor for PPT at PC6L. With BMI as covariate, the multiple comparisons of Sidak for visits revealed no significant differences in the adjusted means of PPT_{mean} and PPT_{median} across temporal sessions of V1 to V2, V1 to V3 and V1 to V4 which were consistent with the results obtained before adjustment. Due to sample sizes, means of PPT_{mean} and PPT_{median} in Visit 1 were compared to selected BMI groups (HW, OW and OB of females, HW and OW of males) of PC6L which revealed that Healthy Weight had significantly lower means of PPT_{mean} and PPT_{median} than the Overweight and the Obese for females which implies the potential effect of fat tissue or thickness of flesh on the sensation of pain. However, these effects disappeared for adjusted means of PPT_{mean} and PPT_{median} with BMI as covariate. No significant differences in the means were found among the above BMI groups for both genders across temporal sessions with and without BMI as covariate.

For treatment groups, the adjustment using BMI as the covariate at α=0.05 reduced the number of significant increases from seven to four (excluded V4 of PPT_{mean} and PPT_{median} for females and V4 of PPT_{median} for males) in the Intervention group. However, when comparisons between Intervention and Control were made, there were no significant differences in the means of PPT_{mean} and PPT_{median} at PC6L for overall visits and Visit 1 for both genders (Section 4.15). For comparisons among BMI groups by treatment by gender, the Healthy Weight females demonstrated significantly lower mean PPT_{median} than the Overweight in Visit 1 only in all cases.

5.5 Examination of stability of PPT during LI4R intervention

In previous UTS PPT studies, the significant change in PPT over sessions were frequently assessed based on the percentage change of PPT from its baseline mean PPT (Yuan 2002; Li 2005; Zaslawski 2006; Szabo 2007; Li et al 2008). However, no study was found to have considered PPT_{median} in the comparisons. This has always been a concern of the researchers on the effect of median PPT on overall results since impact of outliers would be minimised by using median instead of mean. In the examination of stability of PPT during LI4R intervention, both PPT_{mean} and PPT_{median} were considered and the absolute and relative changes based on pre-intervention PPT_{mean} and PPT_{median} were computed.

In this study, Boneferroni corrections revealed that the effect of LI4R intervention was reflected in the significant absolute increase in mean PPT_{mean} from its pre-intervention at ten sites for females (except GB12R, 2L, PC6L, LI10L, KD3R) and nine sites (except 2L, PC6R, 1R, ST36L, ST36R, KD3R) for males (Table 4.19a) and in mean PPT_{median} at eight sites (LI20R, 2R, PC6R, 1L, 1R, LI5R, ST36R, 3R) for females and eight sites (LI20R, GB12R, 2L, LI10L, 1L, LI5L, LI5R, 3R) for males (Table 4.19b). This showed that the median approach (as compared with the mean approach) had reduced two sites each for both genders that had received positive significant response from needling LI4R. The mean absolute difference of PPT_{mean} after intervention varied from 0.24kg/cm^2 (LI20R) to 0.74kg/cm^2 (ST36R) for females and from 0.37kg/cm^2 (ST36R) to 1.01kg/cm^2 (2R) for males and that of PPT_{median} varied from 0.22kg/cm^2 (LI20R) to 0.70kg/cm^2 (ST36R) for females and from 0.25kg/cm^2 (ST36L) to 1.06kg/cm^2 (2R) for males in which there were a few swaps in the site order for scales of mean differences if compared with that of PPT_{mean}. The above mean differences were generally within the range as reported in other studies (Jensen et al 1986; Buchanan et al 1987; Fischer et al 1987, 1990; Brennum et al 1989; Kosek et al 1993; Antonacci et al 1998; Chesterton et al 2003, 2007; Jones et al 2007).

As different sites exhibited different ranges of PPT values, examination on the relative differences between post and pre-intervention PPT were important. The one-sample T-test revealed that the effect of LI4R intervention was evident by the significant relative increase in mean PPT_{mean} and mean PPT_{median} from its pre-intervention at 10 sites (except 2L, PC6L, LI10L, ST36L, KD3R) for females, and at 11 sites (except 2L, PC6R, 1R, ST36L) in mean PPT_{mean} and at 11 sites (except 2L, PC6L, LI10L, ST36L) for females and nine sites (except PC6L, PC6R, 1R, ST36L, ST36R, KD3R) in mean PPT_{median} for males (Tables 4.19c and 4.19d). This showed that the median approach (as compared with the mean approach) had reduced one site (PC6R) for males that had received significant positive response from needling LI4R for PPT_{mean}. The mean relative difference of PPT_{mean} after intervention varied from 8% (2L) to 20% (PC6R) for females and from 6% (ST36L and ST36R) to 20% (LI5R) for males while the PPT_{median} varied from 7% (2L, ST36L) to 20% (PC6R, LI10L) for females and from 4% (ST36L) to 21% (2R) for males. Again there were a few minor swaps in the sites order for scales of mean differences if compared with that of PPT_{mean}. Hence, various perspectives, in terms of raw PPT, mean PPT or median PPT, have to be taken into consideration in clinical or experimental studies as the extent of stability of PPT would vary slightly according to conditions.

5.6 Conclusion

Research Study One used PPT database from 17 sites of 235 healthy subjects (127 females, 108 males) collected over four occasions with three measurements per session. The regional sites comprised of 14 acupoints on the head, forearms and lower legs, and five non-acupoints on forearms and right leg. The reports on these regional PPT data were limited to UTS studies which were frequently reported elsewhere. This study analysed the combined data to extend the epidemiological profiles that assess the temporal stability of regional PPT and its relationships with gender, age and BMI. With large sample size over a wide range of ages and BMI, the results from this study should be a good reference for future PPT studies whereby the neuromatrix theory instead of the gate control theory or Descarte's linear causal model. This should be emphasized so as to provide a better understanding about human perception of pain. The recruitment of healthy adults provides a reliable set of PPT profiles for clinical and experimental studies that involve pain-free or disease states interventions or control. In addition the PPT profile allows quick referencing for the diagnosis of abnormal conditions of patients for clinicians and practitioners.

In agreement with most studies was the reproducibility of PPT in short term measurements which suggested that the first reading need not to be discarded. Genders were also found to have significant differences in PPT at all sites which suggested data analysis has to be completed separately by gender meaning that the combination of PPT data across both genders is not recommended though matched-pair by gender could be a choice depending on the needs of the study. However, time and financial costs are incurred for substantial larger sample sizes including both genders if comparison between genders is essential for the clinical and experimental studies.

Finally the stability of PPT was found to be consistent for both genders at some sites over certain temporal sessions. Whilst both genders showed significant increase in PPT over delayed periods, the males showed a higher percentage than the females. The regional PPT was not highly correlated with ages and BMI. However, grouping of age and BMI showed that both younger Healthy Weight females and males generally demonstrated higher PPT at some sites and the Overweight generally had higher PPT than the Healthy Weight. This would provide clinical implications for the analgesia dosage for practitioners on pain suffering patients of different genders, age and BMI groups.

The factors behind the differences in PPT for bilateral sites remain unknown as the dexterity of subjects (majority of subjects were right-handed) was not a factor of examination in this study. Furthermore, the effect of interventions across all previous studies seemed to continue playing a role in the stability of PPT. All these contradictions imply the need for a more well designed experimental PPT study which includes detailing dexterity, profession, daily activities involving the measurement sites, medication, health conditions, psycho-sociological factors in addition to age and BMI.

II. Research Study Two

5.7 Lateral epicondylitis: Acupuncture treatment?

Research Study Two was a pilot study with limited sample sizes of 11 females (age=45.8±6.8 years, BMI=23.6±3.1kg/m^2) and 9 males (age=46.6±5.7 years, BMI=24.6±3.1kg/m^2). Subgroups of five men, six women in the treatment group and four men, five women in the control group were randomised. Whilst many studies involved disease states, only two were found involving lateral epicondylitis with PPT measurements (Smidt et al 2002; Slater et al 2005) in which the mean ages were close to that of the present study. Smidt et al (2002) recruited 50 patients (20 females) aged

between 18 to 70 years (mean 47±11) with lateral epicondylitis to evaluate the interobserver reproducibility of pressure pain threshold at the most sensitive area in common extensor tendon and the uninvolved control site in opposite arm. The patients were in sitting position (arm in 30° of abduction; elbow in 90° of flexion; forearm, wrist, and hand supported) whereas in this trial study, the patients were in supine position. Slater et al (2005) involved 20 patients aged between 34 to 65 years (mean 48.2) and 20 pain-free subjects aged between 32 to 63 years (mean 47.4). It should be noted that compared to the sample sizes reported in the literature, the present trial had a small sample size thereby suggesting caution when interpreting the results. However, the results revealed some consistencies as found in other clinical PPT studies as described below.

Firstly, the males had displayed significantly higher mean PPT than the females at both affected and non-affected measurement sites of LI10 and LI11 (Table 4.20) which is consistent with the findings in Research Study One and many other studies as discussed previously in section 5.1. Due to small sample sizes, no obvious patterns were found for comparisons between PPT of pre and post interventions (Tables 4.21, 4.22), between PPT of affected and non-affected sites (Tables 4.23 and 4.24) and between PPT of Acupuncture and Sham Laser groups (Table 4.25) during the intervention weeks of Week 1, Week 5 and the follow-up in Week 9. Week 0 was a non-intervention occasion that showed generally unstable PPT measures for female patients.

Interestingly, when percentage changes from the baseline mean PPT (Week 1) were considered, there were some significant increases of PPT at all non-affected and affected sites in both sessions of Week 5 and Week 9 for males in Acupuncture group whilst the females in Acupuncture showed an increase in PPT at all sites in PRE session and at three sites (except LI10 Non-affected) in POST session of Week 9. In Sham Laser, the females showed an increase in PPT at three sites (except LI10 Affected) in PRE session of Week 9 whilst the males showed a decrease in PPT at LI10 (Affected side) in both sessions of Week 9 (Table 4.26, Figure 4.29). Further analysis revealed that the Acupuncture group for males showed significantly higher percentage change in PPT compared to Sham Laser on Week 5 and Week 9 for both PRE and POST sessions except LI10 Non-affected (pre-intervention) and LI11 Affected (post-intervention) on Week 5 (Table 4.27) whilst no obvious patterns were shown for comparisons of percentage changes between sessions (Table 4.28) or the affected and non-affected sites (Table 4.29). These results supported the potential efficacy of acupuncture treatment to lateral elbow pain for both genders while the females displayed positive psychological effects and the males had a negative effect from the Sham Laser. Percentage changes were more relevant when relative changes and comparisons between sites were of interest.

In conclusion, a larger sample size for improved statistical power is necessary. Caution has to be paid for familywise Bonferroni corrections. A practice session for patients is important in addition to the training of the examiner operating the algometer. It is also suggested that PPT measurements should be measured on every treatment occasion to capture the trends of changes in PPT readings.

III. Research Study Three

5.8 Electronic algometer versus mechanical algometer

With the same circular rubber measuring probe of $1cm^2$ and pressure application rate of $1kg/cm^2$, the algometry results obtained from the electronic and mechanical algometers did not differ statistically from each other at all six measurement sites. However, the significant correlations between PPT measures obtained by different devices ranged from 0.55 to 0.82 which implies some caution in measurement procedures such as training of examiner, practice cycles for subjects, positioning of force application. If these procedures are implemented this could improve the correlation range. The mean inter-device coefficients of variance varied from 14% (LI5L) to 16.9% (1R) and the mean intra-device coefficients varied from 19.3% (PC6R) to 23.1% (1R) for mechanical algometer and 10% (PC6L) to 15.3% (1R) for electronic algometer. This demonstrates that the electronic algometer was relatively more precise in PPT measurement with the aid of the rate display screen which allows the examiner to monitor the rate of application to ensure consistency (Kosek et al 1993 and 1999; Isselée et al 1997; Ogimoto et al 2002; Tanaka et al 2004). Although no literature was found to have compared types of algometers, Bernhardt et al (2007) conducted a reliability and validity comparison between a commercial Somedic digital algometer with a self-designed fingertip-shaped pressure algometer for palpation (PAP) for assessing PPT at 16 sites located in the temporomandibular joint, masticatory muscles and the frontalis muscle of 30 subjects. The concurrent validity was demonstrated by statistically significant correlations between the two devices at all 16 sites (14 highly significant and two significant) with values ranging between 0.38 and 0.66 which were lower than the present study.

In conclusion, both electronic and mechanical algometers are equally reliable for clinical and experimental studies. Results obtained from either type of algometers can be used for comparisons. Combining of PPT measures from these two different algometers is practical though not advisable due to some minor variations between the two apparatus.

IV. Implications for future research

While exploring the vast set of PPT in the UTS database, extracting data from the past UTS PPT studies with various intervention settings, has prompted some suggestions for future research directions especially related to Research Study One. Research Study Two and Research Study Three could be seen as an extension of the PPT study if disease states and various models of algometers were to be considered.

5.9 Implications derived from Research Study One

Owing to the amount of data in the PPT database which involves large participant numbers pooled from previous UTS PPT studies as well as additional data collected specifically for this current thesis there are some aspects that could be considered for future retrospective analysis of the UTS PPT database.

These include:

a. Scrutinizing the PPT database by Study (i.e. each minor PPT study), narrowing the scope of data analysis on PPT measures among studies
   i. for a more convincing representation of baseline/pre-intervention PPT;
   ii. for identifying the effect of interventions on pre-intervention PPT in each study.

b. Examination of the span of wash-out effect of PPT data by Study in terms of the interventions involved in each study
   i. if baseline or pre-intervention PPT were to be explored;
   ii. to minimise the complexity of multiple intervention effects in future studies.

c. Examination of the intra- and inter studies variation on PPT
   i. as an inclusion criteria for a more reliable set of PPT for pooling of PPT;
   ii. for identifying the factors that influence PPT as outcome measures.

d. Standardisation of cut-off values for PPT with respect to the capacity of the dial readout scale of the algometer used. This implies an alternative of using an algometer of larger capacity scale which would accommodate a greater PPT scores when referred to those obtained in the current study that incorporated a smaller scale range.

e. Recruit subjects aged below 35 for non-intervention PPT measures at all 17 measurement sites across four occasions with three PPT readings per occasion for comparisons with the PPT measures of the present non-intervention elder group aged 35 and above.

f. Recruit subjects aged 35 and above for LI4R intervention across four occasions with three PPT readings per occasion for comparisons with the PPT measures of the present intervention group.

5.10 Implications derived from Research Study Two

For Research Study Two, the selection of sites could be extended to a hypersensitive Ah Shi site (on affected arm) in addition to the acupoints LI10 or LI11. This inclusion of a hypersensitive site could provide a reference to the effectiveness of intervention if no clear results were obtained from the measures at the adjacent acupoints LI10 and LI11. As the scale of affected site may vary by individual, a Likert scale of pain assessment could be administered. A sufficient sample size should be considered for adequate statistical power.

5.11 Implications derived from Research Study Three

For Research Study Three, the inter-device reliability between algometers can be extended to study on intra and inter-reliability of PPT measures within and between examiners, with and without training in operation of algometer, as well as with crossed application of algometers as designed in the present study. Screening for subjects with reliable response to PPT is a key criterion to exclude subjects with high intra-individual variation. A selection of one measurement site would be sufficient to determine this.

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APPENDICES

Appendix 1: Characteristics of algometers

Characteristics of algometers used in various studies				
Reference	Type/Model	Tip size*	Rate in article	Rate Conversion in $kg/cm^2/s$
Fischer et al 1987	Pressure threshold meter (Pain Diagnostics and Thermography, I7 Wooley Lane East, Great Neck, NY 11021, U.S.A.)	$1cm^2$	100g/s	0.1
Jones et al 2007	Electronic pressure algometer (Somedic, Hörby, Sweden)	2cm	30kPa/s	0.1
Farella et al 2000	Electronic algometer (Somadic sales AB, Algometer Type II, Sweden)	$1cm^2$	20kPa/s	0.2
Walsh et al 2009	Electronic digital algometer (Somedic AB)	$2cm^2$	50kPa/s	0.25
Slater et al 2005	Algometer (Somedic AB, Sweden)	$1cm^2$	30kPa/s	0.3
Ge et al 2006	Electronic pressure algometer (Somedic Algometer type 2, Sollentuna, Sweden)	$1cm^2$	30kPa/s	0.3
Bernhardt et al 2007	Fingertip-shaped Pressure algometer for palpation & Somedic algometer	$1cm^2$	30kPa/s	0.3
Ge et al 2008	Somedic Algometer Type II, Solentuna, Sweden	$1cm^2$	30kPA/s	0.3
Fernández-de-las-Peñas et al 2009	Electronic pressure algometer (Somedic, Hörby, Sweden)	$1cm^2$	30kPa/s	0.3
Ayesh et al 2007b	Pressure algometer (Somedic Sales AB, Hörby, Sweden)	$10mm^2$	30kPa/s	0.3
Cairns et al 2006	Pressure algometer (Somedic, Sweden)	1cm	30kPa/s	0.38
Ayesh et al 2007a	Pressure algometer (Somedic, Sweden)	1cm	30kPa/s	0.38
Brennum et al 1989	Hand-held electronic pressure algometer (Somedic)	$0.28cm^2$	1.1N/s	0.39
Sterling et al 2002	Electronic digital algometer (Somedic AB, Sweden)	$1cm^2$	40kPa/s	0.4
Chung et al 1992	Pressure algometer-Electronic Algometer Type I, Sometic, Stockholm. Sweden.	-	40kPa/s	0.4
Isselée et al 1997	Electronic algometer (Somedic, Stockham, Sweden)	1.1cm	40kPa/s	0.42
Persson et al 2004	Electronic pressure algometer (Somedic , Sweden)	1.1cm	40kPa/s	0.42
Plesh et al 1998	Mechanical algometer (Model PTH-AF2)	$1cm^2$	$1lb/cm^2/s$	0.45
Murphy et al 1992	Pressure threshold meter (Pain Diagnostics and Thermography,Great Neck, NY 11023, U.S.A.)	$1cm^2$	$1lb/cm^2/s$	0.45
McMillan et al 1994	Model PTH-AF2, Pain disgnostics and thermography Corp	1cm	$0.5kg/cm^2/s$	0.5
Nordahl et al 2003	Electronic algometer (Somedic)	$1cm^2$	50kPa/s	0.5
Barlas et al 2006	Type II Somedic algometer (Somedic,Sweden)	$1cm^2$	50kPa/s	0.5
Rolke et al 2006	Algometer (FDN200, Wagner Instruments, USA)	$1cm^2$	$0.5kg/cm^2/s$ or 50kPa/s	0.5
Gomes et al 2008	Mechanical algometer	$1cm^2$	$0.5kg/cm^2/s$	0.5

Persson et al 2008	Electronic pressure algometer (Somedic Sweden)	1cm	40kPa/s	0.5
Vedolin et al 2009	Electronic algometer (KRATOS)	$1cm^2$	$0.5kg/cm^2/s$	0.5
Pfau et al 2009	Electronic pressure algometer (Somedic, Sweden)	$1cm^2$	50kPa/s	0.5
Frank et al 2013	Electronic pressure algometer(Somedic Algometer Type II,Sweden)	1cm	40kPa/s	0.51
Chesterton et al 2003	Pressure algometer (Salter Abbey Weighing Machine Ltd England)	1.1cm	5N/s	0.53
Anderson et al 2008	Computer-controlled pressure algometer (Aalborg University, Aalborg, Denmark)	$1cm^2$	0.6kg/s	0.6
Kosek et al 1993	Electronic(Somedic AB, Farsta, Sweden)	1cm	50-60kPa/s	0.64
Möller et al 1998	Pressure algometer (type 739, SOMEDIC Sales AB, Sweden)	1mm	0.05N/s	0.64
Christidis et al 2005	Electronic algometer (Somedic Sales AB, Hörby, Sweden)	1cm	50kPa/s	0.64
Chesterton et al 2007	pressure algometer (Salter Abbey Weighing Machines Ltd, England)	1cm	$5N/cm^2/s$	0.64
Williams et al 2004	Nail-bed pressure algometer	1.5cm by 1mm	100g/s	0.67
Kinser et al 2009	Force plate & mechanical algometer(Wagner Force One Model FDIX 50TM, Wagner Instruments, Greenwich, Conn)	$1cm^2$	6.8N/s	0.68
Kosek et al 1999	Electronic (Somedic Sales AB, Farsta, Sweden)	1cm	50-60kPa/s	0.76
Isselée et al 2001	Electronic algometer Somedic algometer Type II (Solentuna,Sweden)	$0.5cm^2$	40kPa/s	0.8
Lacourt et al 2012	Digital algometer (FDX 50; Wagner Instruments)	$1cm^2$	98kPa/s	0.98
Fischer et al 1986, 1990	Pressure threshold meter (Pain Diagnostics and Thermography, Great Neck, NY)	$1cm^2$	1kg/s	1
Reeves et al 1986	Pressure algometer (Pain Diagnostics and Thermography Corporation, Pain Threshold Meter, Model PTH-AF2)	1cm	$1\ kg/cm^2/s$	1
Fernández-de-las-Peñas et al 2006a, b	Pressure threshold meter (Pain Diagnosis and Rehabilitation, Great Neck, New York)	1cm	$1\ kg/cm^2/s$	1
Tunks et al 1988	Hand held pressure Algometer	$2cm^2$	1kg/s	1
Delaney et al 1993	Mechanical pressure algometer (Pain Diagnostics and Thermography Corporation, Pain Threshold Meter, Model PTH-AF2)	$1cm^2$	1kg/s	1
Wessel 1995	Dolorimeter (Pain Threshold Meter, Pain Diagnostics and Thermography)	-	1kg/s	1
Nussbaum et al 1998	Fisher algometer	$1cm^2$	$1kg/cm^2/s$	1
Waling et al 2001	Electronic (Somedic Production AB, Sollentuna, Sweden)	$10mm^2$	10kPa/s	1
Zaslawski et al 2003	Mechanical algometer (Activator Methods, Phoenix, USA)	$1cm^2$	1kg/s	1
Potter et al 2006	Pain threshold meter, model PTH-AF 2 (Pain Diagnostic and Treatment Corporation)	$1cm^2$	1kg/s	1
Farasyn et al 2007	Fischer pressure algometer (Pain Diagnostics & Thermography, Great Neck, NY, USA)	$1cm^2$	1kg/s	1
Ylinen et al 2007	Hand-held digital pressure algometer (Force fiveTM, Wagner Instruments, Box 1217, Greenwich, CT 06836)	$1\ cm^2$	10N/s	1
Farasyn et al 2008	Fischer pressure algometer (Pain Diagnostics & Thermography, Great Neck, NY, USA)	$1cm^2$	1kg/s	1

Li et al 2008	Mechanical algometer (Activator Methods Phoenix USA)	1cm^2	1kg/s	1
Meeus et al 2010	Fisher algometer (Force Dial model FDK 40, Wagner Instruments, Greenwich)	-	1kg/s	1
Takala et al 1990	Mechanical algometer (Ametek LN50)	0.95cm^2	10N/s	1.05
Taimela et al 2000	Mechanical algometer (Ametek LN50)	0.95cm^2	10N/s	1.05
Cathcart et al 2008	Mechanical algometer constructed in-house.	0.4cm^2	0.5kg/s	1.25
Vanderweeën et al 1996	Pressure algometer (Pain Diagnostics and Thermography Corporation, Pain Threshold Meter, Model PTH-AF2)	1cm	1kg/s	1.27
Hübscher et al 2008	Handheld mechanical pressure algometer (pdt, Rome, Italy)	1cm	1kg/cm^2/s	1.27
Ogimoto et al 2002	Handheld electronic algometer	2mm	50g/s	1.59
Tanaka et al 2004	Electronic controlled pressure algometer for oral mucosa	2mm	50g/s	1.59
Ohrbach et al 1989, 1998	Mechanical algometer (Pain Diagnostics and Thermography, Great Neck, NY)	0.5cm^2	1kg/cm^2/s	2
Antonaci et al 1992, 1998	Mechanical pressure algometer (Pain Diagnostics and Thermography Corporation, Pain Threshold Meter, Model PTH-AF2)	1cm^2	2kg/cm^2/s	2
Visscher et al 2004	Pressure algometer (Pain Diagnostics and Thermography)	1cm^2	2kg/cm^2/s	2
Cathcart et al 2006	Analogue pressure algometer constructed in-house	0.39cm^2	1.2kg/s	3.08
Vatine et al 1998	Algometer (Modified: Model FT 10; Grass Medical Instruments, Quincy, MA)	0.25cm^2	1kg/0.25cm^2 /s	4
Vaughan et al 2007	Electronic pressure algometer (Somedic Algometer Type II, Sweden)	1cm^2	10, 20, 30, 40, 50kPa/s	0.1, 0.2, 0.3, 0.4, 0.5
Jensen et al 1986	Pressure algometer	0.5cm^2 from 0.13, 1.13cm^2	0.68N/s from 1.4, 3, 7, 13.5, 27kPa/s	0.14, 0.01, 0.03, 0.07, 0.27
Aldayel et al 2010	Electronic algometer: Type II, Somedic Production AB, Sollentuna, Sweden	1cm^2	50-60kPa/s	0.5-0.6
Defrin et al 2003	Hand-held pressure algometer (Somedic Sales AB, Algometer type II, Sweden)	0.5, 1, 2cm^2	30kPa/s	0.6,0.3,0.15
Takahashi et al 2005	Electronic pressure algometer (CPU gauge model 9500, Aikoh Engineering, Tokyo, Japan)	1, 1.6, 15mm	1.47N/s	18.7, 7.3, 0.08
Zhang et al 2011	Electronic algometer (Somedic, Sweden)	1cm^2	-	-
Buchanan et al 1987	Hand-operated Preston dolorimeter	-	-	-
Smidt et al 2002	Algometer (Pain Diagnostics and Thermography, 17 Wooley Ln E, Great Neck, NY 11021)	1cm^2	-	-
Shiau et al 2003	Electronic (Somedic Sales / AB Hörby, Sweden)	6mm	-	-
Sayed-Noor et al 2008	Hand-held electronic algometer (Somedic, Sweden)	-	40-50kPa/s	-
Xiong et al 2011	Indentation apparatus	0.5, 1, 2, 4 cm^2	0.5, 1, 2, 4 mm/s	-

Table A1: Characteristics of algometers used in various studies in ascending order of rates of force. The asterisk * indicates tip size reported in terms of diameter or area.

Appendix 2: Specificity of measurement cycles and temporal sessions

Specificity of measurement cycles and temporal sessions in PPT studies				
Reference	**No. Sites**	**Measures/site**	**Rest time***	**Occasions**
Aldayel et al 2010	4	3	30s	0, 1, 24, 72, 96 hours
Anderson et al 2008	7	3		Days 0, 1, 4, 7 and 21
Antonaci et al 1992	12	3	15min	At least 2-days apart
Antonaci et al 1998	26	3	2-3min	3
Ayesh et al 2007a	11x2	3	1 min	0, 20, 35 min
Ayesh et al 2007b	11x2	3		0, 30min, 1hr, 2hr
Barlas et al 2006	2	2 (10 - 20s between trials)	10 min	0, 10, 20, 30, 40, 50, 60min
Bernhardt et al 2007	16	6	15 min	
Brennum et al 1989	12	5	5min	2 (one week apart)
Brown et al 2000	1	3		2 visits: 3-8 days apart
Buchanan et al 1987	5 areas	2	5 min	1 (12am - 2pm)
Cairns et al 2006	4		5 min	10, 15, 20, 25, 30min, 60min, 1week
Cathcart et al 2006	3x2	2	10min	5 visits: Mon to Fri
Cathcart et al 2008		2	10s	
Chesterton et al 2003	1		10-15s; 10 min	1 hour (7 time points)
Chesterton et al 2007		3	15 min	5
Christidis et al 2005	5	3	2 min	
Chung et al 1992	13x2	2	5 min	3 consecutive days
Defrin et al 2003	3	3	45s	
Delaney et al 1993	2	2	5 min	1
Farasyn et al 2007	5	3 (1st discarded)	10s	
Farasyn et al 2008	both sides	2	10s; 5min	1
Farella et al 2000	2x2	4 each site:1st discarded	5s; 2 min	
Fernández-de-las-Peñas et al 2006a	2	3		2
Fernández-de-las-Peñas et al 2006b	8	3	30s	
Fernández-de-las-Peñas et al 2009	12	3	15s; 2.5min	
Fischer et al 1987	9	1		1 (8am-4:30pm)
Frank et al 2013		3	10s	0,1,2 days
Ge et al 2006	3	3	10s between measures; 5 min	
Ge et al 2008	10x2	3	40s	
Gomes et al 2008	6	2	10s	
Hübscher et al 2008	7	3	10s (2 min per cycle)	Immediate, 1 day, 2 day, 3 day
Irnich et al 2001	6	2		6
Isselée et al 1997			5 min: 2 trials per session	A single day and between 2 days, 4 sessions: Day1: 8am-10am and 4pm-5pm; Day 3: morning and afternoon sessions.
Isselée et al 2001	10	4	A few sec; 5 min	Females: 3 phases for 10 months Men: weekly for 2 mths, then fortnight for 10 months
Jacobs et al 1995	17			2 visits: 1 week apart
Jensen et al 1986		5		varies
Jones et al 2007	8	3		4 consecutive days
Kinser et al 2009	10 sets	5 (per force)	10s (2 min)	
Kosek et al 1993	30	2; 3	3s-10s	Day 1, One week, 10-13 weeks later

Kosek et al 1999	3	5	1 hr	2 sessions same day
Lacourt et al 2012	6	3	30-40s	
McMillan et al 1994	10	2	30s	
Meeus et al 2010	7x2	3 (1st discarded)	10s	
Murphy et al 1992	6	2		2: 14 days apart
Nordahl et al 2003	8	3	2min per cycle	
Nussbaum et al 1998		3 (2 taken)	10s; 20min	3 occasions: 1 day apart
Ogimoto et al 2002	2	3	1 min	4 occasions: 1 week apart
Ohrbach et al 1989	4	1		2
Ohrbach et al 1998	Phase I: 2x2 Phase II	2 (Phase I); 1 (Phase II)	3-5s	
Persson et al 2004	14	4 (0, 10, 20, 30 min)	10 min	Days 1, 3, 28, 30
Persson et al 2008	14	5	10 min	
Plesh et al 1998	3x2			2 pre-exercise sessions: 1 day apart
Potter et al 2006	8	2	5 min	3 (at least one week apart)
Reeves et al 1986	Study 1/2: 6; Study 3: 12	4 (2 per examiner); Study 2: 2 (1 for each examiner); Study 3=Study 1: + 1 non-trigger site each		2
Reid et al 1994	4x2	3	30 min	2x2 occasions (one week apart)
Rolke et al 2006	3	3		
Sayed-Noor et al 2008	4	1		1
Shen et al 2007	4		30s	
Shiau et al 2003	2x2	4 (1st discarded)	3min	
Slater et al 2005	3	3	30s	
Smidt et al 2002	2	3	20s	2
Sterling et al 2002	6x2	3		2 visits: 1 week apart
Taimela et al 2000				Baseline, 3 months, 12 months
Takahashi et al 2005		3	1 min	
Takala et al 1990			women: 30 min; men: 30-45min	one to two days
Tanaka et al 2004	9	2	3min	
Tunks et al 1988	20		15 min	
Vanderweeën et al 1996	14	2	5 min	1
Vatine et al 1998	2	2 but 2nd one taken		
Vaughan et al 2007		30 at 5 discrete rates		2
Vedolin et al 2009	5x2	2	4 min	
Waling et al 2001	2	3		2 days per week on week 1, week 5, week 10
Walsh et al 2009	6	3	10s	
Wessel 1995	6			3 occasions (5-10 days apart)
Williams et al 2004	1	2		
Xiong et al 2011	13	2	45s	2 (plantar surface 1 day, dorsum another)
Ylinen et al 2007	7	1	30s	2 days(1 day apart)
Zaslawski et al 2003	10	3		8 (at least 2 days between sessions)
Zhang et al 2011	2	3		1 day for 10 days in 2 weeks; 1 month

Table A2: Specificity of measurement cycles and temporal sessions in PPT studies. Rest time * refers to between trials/sites or between identical location.

Appendix 3: Health status and study regions

Health status and study regions in PPT studies		
Reference	**Health status**	**Regions/sites**
Aldayel et al 2010	Healthy	Quadriceps femoris muscle: the middle point of the rectus femoris, the proximal of rectus femoris, vastus medialis and vastus lateralis
Anderson et al 2008	Healthy	Muscle hyperalgesia; tibialis anterior
Antonaci et al 1992	Healthy (Right-handed)	Deltoid; Head
Antonaci et al 1998	Healthy (Right-handed)	Head,neck,deltoid, median finger
Ayesh et al 2007a, b	Healthy	Temporomandibular joint
Barlas et al 2006	Healthy	First dorsal interosseous muscle of the dominant and non-dominant hands; needling at LI10, TH5, GB34, ST38
Bernhardt et al 2007	Temporomandibular disorder; healthy	Masticatory;temporomandibular;frontalis
Brennum et al 1989	Healthy	Center of the pulpa and center of the dorsal side of the medial phalanx of the second and fifth fingers and of the second toe on both the right and the left side.
Brown et al 2000	Healthy	Temporomandibular
Buchanan et al 1987	Healthy	a) Medial aspect of calcaneum; b) Medial aspect of upper tibia; c) Dorsal surface between thumb and forefinger; d) Lateral aspect of midpoint of forearm, and e) Lower forehead.
Cairns et al 2006	Healthy	Masseter muscles and temporalis muscle
Cathcart et al 2006	Healthy	(1) The dorsal surface of the middle segment of the 1st phalange; (2) the central fibres of the temporalis muscle, identified by palpation above the superior margin of the ear; and (3) an adjacent parietal location without overlying muscle.
Cathcart et al 2008	Chronic tension-type headache (CTH)	Dorsal surface of the medial segment of the first phalange
Chesterton et al 2003, 2007	Healthy	First dorsal interosseous muscle
Christidis et al 2005	Healthy	Superficial masseter muscles, anterior temporalis muscles, trapezius muscles, and anterior tibialis muscles as well as over the muscles over glabella on the forehead
Chung et al 1992	Healthy	Head & neck
Defrin et al 2003	Healthy	Hand, painfree back and myofascial trigger points (MTPs) in the back
Delaney et al 1993	Healthy	Trapezius muscles
Farasyn et al 2007	Healthy	Lower thoraco-lumbo-pelvic region
Farasyn et al 2008	Low back pain	Gluteus medius
Farella et al 2000	Healthy	Massete and anterior temporalis muscles
Fernández-de-las-Peñas et al 2006a	Healthy	Masseter muscle
Fernández-de-las-Peñas et al 2006b	Nummular headache	Cranial area, temporal muscle, upper trapezius muscle, second finger
Fernández-de-las-Peñas et al 2009	Healthy and patients with strictly unilateral migraine compared	Nine points of the temporalis muscle: three points in the anterior, medial and posterior parts
Fischer et al 1986	Healthy pain free	Supraspinatus and deltoid, thumb and shin
Fischer et al 1987	Healthy	M. teres major, upper trapezius, levator scapulae, supraspinatus, infraspinatus, pectoralis, gluteus medius and paraspinals at the L4 level, 2 and 4 cm from the midline, middle deltoid
Fischer et al 1990	Lumbosacral and cervical pain patients	M. teres major, upper trapezius, levator scapulae, supraspinatus, infraspinatus, pectoralis, gluteus medius and paraspinals

Frank et al 2013	Asymptomatic	Three spinal segments (C6, T6 and L4)
Ge et al 2006	Chronic unilateral myofascial shoulder pain	Infraspinatus; tibialis anterior muscle
Ge et al 2008	Healthy	Infraspinatus
Gomes et al 2008	Temporomandibular disorders (TMD)	Masseter, temporalis
Hübscher et al 2008	Healthy: Delayed onset muscle soreness	
Irnich et al 2001	Chronic neck pain	levator scapulae, trapezius descendens, paravertebral of the 6th cervical spine
Isselée et al 1997	Symptom free.	Masseter and temporalis muscles
Isselée et al 2001	Symptom free.	Masster, temporalis and thumb muscles
Jacobs et al 1995	Fibromyalgia patients	Interspinous C4-6;, trapezius, costochondral, lateral epicondyle, knee, supraspinatus, interspinous L4-S1, buttock, forehead, thumbnail
Jensen et al 1986	Healthy	Temporal region
Jones et al 2007	Healthy (right-handed)	Upper extremity; torso
Kosek et al 1993	Healthy, right-handed	Nape, shoulder and lower back
Kosek et al 1999	Healthy	Epicondylus lateralis humeri; at the belly of m exterior carpi ulnaris and at m. brachioradialis
Lacourt et al 2012	Healthy	Left and right calf, lower back, and forearm
Li et al 2008	Healthy	Acupoints: GB20R, KD3L, KD3R, LI20R, LI5L, LI5R, ST36L, ST36R; nonacupoints: 1L, 1R
McMillan et al 1994	Jaw muscle pain of myogeneous origin	Masseter, temporal muscles
Meeus et al 2010	Chronic fatigue syndrome (CFS)	Deltoid, hand, lumbar, calf, thoracal, tibia, forearm
Murphy et al 1992	Healthy	Anterior temporalis muscles, the masseter muscles, and the lateral capsules of the temporomandibular joints.
Nordahl et al 2003	Healthy	Temporomandibular
Nussbaum et al 1998	Healthy	Biceps brachii
Ogimoto et al 2002	Dentulous ; oral mucosa	Bilateral buccal and the palatal sites
Ohrbach et al 1989	Patients having active myofascial trigger points contributing to head and neck pain	Myogenous temporomandibular disorder
Ohrbach et al 1998	Facial and temporal pain	
Persson et al 2004	Healthy	Trapezius;deltoid
Persson et al 2008	Healthy	Trapezius muscle; deltoid muscle
Pfau et al 2009	Masseter muscle, trapezius muscle, thenar eminence	Myogenic temporomandibular disorders (TMD)
Plesh et al 1998	Masseter. Normal subjects	Bilateral masseter
Potter et al 2006	Healthy	Iliocostalis, Multifidus, Gluteus maximus, Trapezius
Reeves et al 1986	Patients having active myofascial trigger points contributing to head and neck pain	Myofascial trigger points: superficial portion of the masseter, the anterior fibers of the temporalis, splenius capitis, trapezius, and semispinalis capitis muscles, and a non-myofascial boney point
Reid et al 1994	Bilateral myogenous temporomandibular disorder	Masseter and temporalis

Rolke et al 2006	Healthy	M. masseter, thenar eminence, instep
Sand et al 1997	Tension-type headache, migraine, cervicogenic headache, controls	Head bilateral sides
Sayed-Noor et al 2008	Greater trochanteric pain	Greater trochanter
Shen et al 2007	Chronic myofascial pain	Masseter muscle
Shiau et al 2003	Healthy	Masseter and sternocleidomastoid muscles
Slater et al 2005	Lateral epicondylalgia	Lateral epicondyle, the belly of the extensor carpi radialis brevis muscle, radial head laterally
Smidt et al 2002	Lateral epicondylitis	Lateral epicondylitis
Sterling et al 2002	Healthy; chronic neck pain	
Taimela et al 2000	Chronic, non-specific neck pain	Upper trapezius and levator scapulas muscles
Takahashi et al 2005	Healthy	
Takala et al 1990	Working population	Upper trapezius; levator scapulae
Tanaka et al 2004	Denture and edentulous patients	Upper anterior alveolus, upper lateral alveolus, mid palate, lower anterior alveolus and lower lateral alveolus
Tunks et al 1988	Fibromyalgia; normal	Tender & non-tender points
Vanderweeën et al 1996	Shoulder and arm pain	Paravertebral;shoulder;arm
Vatine et al 1998	Sternum: Reflex sympathetic dystrophy	Manubrium of the sternum
Vedolin et al 2009	Masticatory myofascial pain; 127symptomatic controls	Right masseter, right temporalis (anterior, medium and posterior), Achilles' tendon, left masseter and left temporalis (anterior, medium and posterior)
Visscher et al 2004	Healthy	Temporomandibular; masseter;temporalis
Waling et al 2001	Trapezius myalgia: neck-shoulder pain	Trapezius
Walsh et al 2009	Low-back related leg pain	Sciatic, tibial peroneal nerves
Wessel 1995	Osteoarthritis, healthy	Anteromedial and anterolateral joint lines
Williams et al 2004	Healthy	Finger nail: lunula
Xiong et al 2011	Healthy	
Ylinen et al 2007	Chronic non-specific neck pain	Levator scapulae, trapezius muscles, sternum
Zaslawski et al 2003	Healthy	Acupoints: CV12, LI10R, LI20R, LI5R, PC6R. SI3R, ST36R; Nonacupoint: 1R, 2R, 3R
Zhang et al 2011	Plantar fasciitis	Medial tubercle of calcaneum: normal foot, affected foot

Table A3: Health status and study regions in various PPT studies.

Appendix 4: Comparisons of PPT between genders

Reference	PPT (M) > PPT (F)	M:F	Mean (Age range) in years
Antonaci et al 1992	p>0.12	16:24	36.5±13.9 (20 to 73)
Ayesh et al 2007a	p> 0.162	24:19	M:23.4±0.6 (19 to 31); F: 25.9±0.6 (22 to 32)
Buchanan et al 1987	p<0.05	95:95	18.3 (17 to 19)
Chesterton et al 2003	p< 0.0005 (Study 1) p<0.01 (Study 2).	120:120 (Study 1) 15:15 (Study 2)	25 (28 for Study 2)
Christidis et al 2005	p<0.001 baseline all five sites	10:10	M:37±10; F:36±10
Fischer et al 1987	p<0.05 nine sites except gluteus medius	24:26	M:35.9(22-63); F:28.6(21-57)
Isselee et al 1997	p<0.05 right temporal muscles	11:11	M:27(21 to 35); F:24(21 to 34)
Ohrbach et al 1989	p<0.003	5:40	38.6
Plesh et al 1998	p < 0·05	7:7	25±3(22 to 28)
Rolke et al 2006	p < 0.01	70:110	M:37.5±13.0 (17 to 75); F:38.9 ±13.0 (17 to 75)
Takala et al 1990	p<0.05	93:70	
Vanderweeën et al 1996	p<0.05	30	
Vatine et al 1998	p<0.05	11:6 (Patients); 7:6 (Other chronic pain); 14:10 (Pain-free)	M:37.3 (11 Patients); 40.0 (7 Other chronic pain); 40.0 (24 Pain-free); F:56.7 (6 Patients); 46.2 (6 Other chronic pain); 36.9 (10 Pain-free)

Table A4: Studies that had made comparisons at study sites regarding PPT between genders.

Appendix 5: Characteristics of subjects in terms of age, weight, height and BMI

Reference	Subject	M:F	Age, Weight (W), Height (H), Body Mass Index (BMI)
Aldayel et al 2010	9	9:0	Age:31.3±4.7; W:76.3±11.2 kg; H:173.2±4.2cm
Anderson et al 2008	20	10:10	Age(M):25.6 (22 to 33); Age(F): 25.5 (23 to 27); BMI(M):20.5–29.3 (24.1); BMI(F):20.4–29 (24.2)
Antonaci et al 1992	40	16:24	Age:36.5±13.9(20 to 73)
Antonaci et al 1998	21	15:6	Age:29.1±12.4(20 to 67)
Ayesh et al 2007a	43	24:19	Age(M):23.4±0.6(19 to 31); Age(F):25.9±0.6(22 to 32)
Ayesh et al 2007b	28	14:14	Age:27.4 ± 6.2
Barlas et al 2006	48	24:24	Age:23 (18 to 41)
Bernhardt et al 2007	15 (TMD*); 15 (Control)	1:14 (TMD); 1:14 (Control)	Age:33±11.3(TMD); 38±10.8(Control)
Brennum et al 1989	30	15:15	Age: 20 to 40
Brown et al 2000	65	34:31	Age:25.7±8.3
Buchanan et al 1987	190	95:95	Age:18.3(17-19)
Cairns et al 2006	18	18:0	Age:27±1
Cathcart et al 2006	10	4:6	Age:21±2.6(18 to 25)
Cathcart et al 2008	16 (CTH*); 15 (Control)	8:8 (CTH); 8:7 (Control)	Age:18 to 65
Chesterton et al 2007	13	1:12	Age:22(20-29)
Chung et al 1992	40	19:21	Age(M):23.8(21 to 27); Age(F):22.9(20 to 25)
Defrin et al 2003	26	10:16	Age:31.9(22 to 51); BMI(M):24.6±4; BMI(F):22.2±3
Delaney et al 1993	50	25:25	Age:20 to 51
Farasyn et al 2008	42	26:16	Age: 43±16(20 to 75); BMI: 22±3
Farella et al 2000	40 (TMD); 40 (Control)	0:40 (TMD); 0:40 (Control)	
Fernández-de-las-Peñas et al 2006a	25(Treatment) 25 (Control)	15:10(Treatment) 16:9(Control)	Age:28±10(Treatment); 27±8(Control)
Fernández-de-las-Peñas et al 2006b	12 (NH)	3:9	Age:21 to 67
Fernández-de-las-Peñas et al 2009	15 (Migraine); 15 (Control)	0:15 (Migraine); 0:15 (Control)	Age(F):36±10 (25 to 59) (Migraine); Age(F):37±6 (26 to 58) (Control)
Fischer et al 1986	50	24:26	Age(M):39±13; Age(F):26±3.5

Fischer et al 1987	50	24:26	Age(M):35.9(22-63); Age(F):28.6(21-57)
Ge et al 2006	21	0:21	Age:45.6±3.16 (24 to 60); W: 63.5±2.31
Ge et al 2008	21	0:21	Age:46.3±4.2(25 to 63); W: 62.8±3.4
Hübscher et al 2008	22	10:12	Age:20 to 30
Irnich et al 2001	56(Acupuncture); 60(Massage); 61(Sham laser)	17:39(Acu); 22:38(Massage); 21:40(Sham)	Age: 52.3±13.3(Acu); 52.7±11.5(Massage); 52.2±13.2(Sham)
Isselée et al 1997	22	11:11	Age(M):27(21 to 35); Age(F):24(21 to 34)
Jensen et al 1986	57	25:32	Age:33(19-69)
Jones et al 2007	19	0:19	Age:23.9± 5.2(20 to 39); BMI: 23.6±3.5
Kosek et al 1993	12	0:12	Age:28(15 to 33)
Kosek et al 1999	15 (10 for both sessions)	0:15 (10 for both sessions)	Age(F):36.8 (20 to 54); 50.6 (28 to 63) for separate sessions
Li et al 2008	22	11:11	Age(M): 28.6±10.8; Age(F): 29.6±8.7
McMillan et al 1994	20	10 patients; 10 controls	Age:21 to 54
Meeus et al 2010	30 (CFS*); 30 (Control)		Age:18 to 65
Murphy et al 1992	20	0:20	Age:24.8(18 to 42)
Nordahl et al 2003	31	10:21	Age(M): 50±15; Age(F): 45±19
Nussbaum et al 1998	35	5:30	Age(M):36.4; Age(F):29.2; W(M):89kg; W(F):59kg; H(M):180; H(F): 160 ;
Ogimoto et al 2002	10	8:2	Age:26.5(20 to 29)
Persson et al 2004	24	0:24	Age:42(24 to 59); H:167(151 to 174); W:65(52 to 90)
Persson et al 2008	14		Age:47±14.8; H:162±7.2; W:61±12.0
Pfau et al 2009	23	3:20	Age:46.8±13.1
Plesh et al 1998	14	7:7	Age: 25±3(22 to 28)
Rolke et al 2006	180	70:110	Age(M): 37.5±13; Age(F): 38.9±13
Shen et al 2007	15	1:14	Age(Acupuncture):45.2±12.3; Age(Sham): 41.8±14.9
Shiau et al 2003		0:20 (Patient); 0:20 (Control)	Age(P):26.5 (20 to 30); Age(C):25.5 (20 to 30); H(P):161.2±1.7; W(P): 52.9±1.1; H(C): 160.1±1.1; W(C):49.7±1.1
Slater et al 2005	20 (Patients); 20 (Control)		Age(P):48.2(34 to 65); Age(C):47.4 (32 to 63)
Smidt et al 2002	50	30:20	Age:47±11(18 to 70)
Sterling et al 2002	19(CNP*); 19(Control)	6:13 (CNP); 7:12 (Control)	Age(P):31.6±11.5; Age(C):30.1±11.47
Taimela et al 2000	76	22:54	
Takahashi et al 2005	34	21:13	Age:22 to 57
Tanaka et al 2004	35	10:10 (Dentate); 8:7 (Edentulous)	Age(Dentate):67.8±5.7(60 to 80); Age(Edentulous):74.9±9.8(60 to 82)
Tunks et al 1988	20	10:10	
Vanderweeën et al 1996	30	15:15	Age:15 to 75
Vatine et al 1998	54	11:6 (Patients); 7:6 (Other chronic pain); 14:10 (Pain-free)	M: 37.3±14.5 (11 Patients); 40.0±17.8 (7 Other chronic pain); 40.0±11.2 (14 Pain-free); F: 56.7±14.5 (6 Patients); 46.2±26.6 (6 Other chronic pain); 36.9±12.7 (10 Pain-free)
Vedolin et al 2009	45	29 (Patients); 16 (Control)	Age(F):19.8
Visscher et al 2004	250	71:179	Age:34±13.3 (TMJ 118F 30M, 33.8±12.5; Control: 61F, 41M 35.2±14.4)
Waling et al 2001	24	0:24	Age:40
Walsh et al 2009	45	22:23	Age: 46±11(26 to 70)
Wasner et al 2008	20	5:5(A);5:5(B)	Age(A): 36.7±15; Age(B): 34±9.4
Wessel et al 1995	36	18 OA;18 healthy	Age: OA: 60.9±7.7; C: 64.3±8.04; H:OA: 160.7±6.08cm; C: 160.4±4.76; W:OA: 78.1±15.4kg; C: 64.4±11.4kg
Williams et al 2004	61	20:41	Age:29.1 (19 to 50)
Xiong et al 2011	20	10:10	Age(M): 21.5±1.43(20 to 24); Age(F): 21.9±1.1(20 to 24); W(M): 65.5±8.59kg; BMI(M):22.2±3.02 (18.6 to 27); W(F): 54.7±8.8kg; BMI(F):20.4±1.9 (23.8 to 17.7)
Ylinen et al 2007	20	0:20	Age: 47±5(25 to 53); W:69±13kg; H:163±5kg; BMI:26±5
Zhang et al 2011	53 (51; 2 withdrew)	8:20 (PC7); 6:9(LI4)	Age(PC7):47±2.2; Age(LI4):50.0±2.0; Age(M): 71.4 (PC7); 76 (LI4); Age(F): 28.6 (PC7); 24 (LI4); H(PC7): 161.4±1.8; H(LI4):159.2±2.3; W(PC7):64.8±2.3; W(LI4):66.7±2.6

Table A5: Characteristics of subjects in PPT studies. *CFS = Chronic fatigue syndrome; CNP = Chronic Neck Pain; CTH = Chronic tension-type headache; NH=Nummular headache;TMD = Temporomandibular disorder.

Appendix 6: Information poster (Research Studies One & Three)

UNIVERSITY OF TECHNOLOGY SYDNEY

UTS:SCIENCE

Be part of a survey of Pressure Pain Threshold in healthy adults

At TCM Clinic, Building 4, Broadway Campus

Are you interested in participating?

The research team needs volunteers for a comprehensive survey of pressure pain threshold (PPT) in healthy adults aged between 35 and 65.

If you are:

- Aged between 35 and 65 years old

And don't suffer from:

- Chronic musculoskeletal disorder

You are eligible to take part in this research project.

What is involved?
You will need to participate in four measurement sessions. These take 20-30 minutes and are at least a week apart. PPT readings will be measured at a variety of sites on forearms, lower legs and head. Pressure pain threshold is when the pressure applied begins to be experienced as discomfort. An algometer is used to produce this pressure. An algometer is a spring loaded pressure gauge that is attached to a rubber plunger with a flat circular area of 1 cm^2 at its tip. It does not puncture the skin.

Location:
The UTS Traditional Chinese Medicine Clinic, Building 4, Corner Harris and Thomas Streets, Ultimo.

To register or for more information, please contact Seong L Cheah at email: SeongLeang.Cheah@student.uts.edu.au

*Ethics approval for this study has been granted by the UTS Human Research Ethics Committee (UTS HREC 2010-367)

Appendix 7: Information sheet (Research Studies One & Three)

UNIVERSITY OF TECHNOLOGY SYDNEY

UNIVERSITY OF TECHNOLOGY, SYDNEY
PARTICIPANT INFORMATION SHEET- STUDENT RESEARCH

The aim of this project is to conduct a comprehensive examination of the pressure pain threshold (PPT) database collected by UTS PPT studies by site and gender in relation to variables such as age, body mass index, within session order of remeasurement and order of session. Pressure pain threshold refers to the lowest stimulus value at which the person reports that the stimulus feels painful. An algometer is used to produce this pressure. An algometer is a spring loaded pressure gauge that is attached to a rubber plunger with a flat circular area of 1 cm^2 at its tip. It does not puncture the skin.

You will be required to attend four sessions with one week apart where each session will take approximately 30 minutes. Each session will involve PPT measurement on 17 sites across the head, forearms and lower legs (Figure 2). At the end of the fourth occasion, you may be approached to participate in a set of PPT measurements on 6 sites (PC6L, PC6R, 1L, 1R, LI5L and LI5R) by using both mechanical and electronic algometers (Figures 1a and 1b) for reliability test between algometers.

If at any stage you feel discomfort or pain and wish to withdraw from the experiment, please inform the researcher immediately and the procedure will be terminated. You will be asked whether you want to continue the experiment or withdraw completely from the project.

Your identity will be kept confidential.

Figure 1a: A mechanical algometer

Figure 1b: An electronic algometer

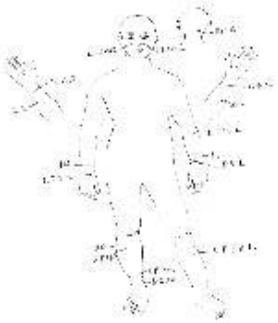

Figure 2: Sites where PPT will be measured.

Appendix 8: Consent form (Research Studies One & Three)

UNIVERSITY OF TECHNOLOGY SYDNEY

UNIVERSITY OF TECHNOLOGY, SYDNEY
CONSENT FORM - STUDENT RESEARCH

I _____ *(participant's name)* agree to participate in the research project "An examination of subject variables that influence pressure pain threshold" being conducted by PhD student, Mr Seong Leang Cheah, Room 3.44 Building 4 Broadway Campus of the University of Technology, Sydney.

I understand that the purpose of this study is to evaluate whether gender, age, height, and weight will affect the pressure pain threshold across some acupuncture and non-acupuncture points on head, forearms and lower legs.

I understand that my participation in this research will involve approximately 30 minutes of my time in each session for four consecutive occasions with one week apart. I have read the participant information sheet and understand that there may be some risks associated with the procedure such as a slight discomfort/pain at the measuring site. If at any time during the procedure should I wish to discontinue the procedure the process will be stopped immediately. At the end of the fourth occasion, I may be approached to participate in a set of PPT measurements on 6 sites (PC6L, PC6R, 1L, 1R, LI5L and LI5R) by using both mechanical and electronic algometers for reliability test between algometers.

I am aware that I can contact Mr Seong Leang Cheah or his supervisor Dr Deirdre Cobbin (ph: 9514-2231), if I have any concerns about the research. I also understand that I am free to withdraw my participation from this research project at any time I wish and without giving a reason. I understand that if I am currently a UTS student the withdrawal from the research will not prejudice my academic progress.

I have read the participant information sheet and I agree that Mr Seong Leang Cheah has answered all my questions fully and clearly.

I agree that the research data gathered from this project may be published in a form that does not identify me in any way.

_____ ___/___/___
Signed by

_____ ___/___/___
Witnessed by

NOTE:
This study has been approved by the University of Technology, Sydney Human Research Ethics Committee (UTS HREC 2010-367A). If you have any complaints or reservations about any aspect of your participation in this research which you cannot resolve with the researcher, you may contact the Ethics Secretariat (ph:9514 9772). Any complaint you make will be treated in confidence and investigated fully and you will be informed of the outcome.

Appendix 9: Information letter (Research Study Two)

UNIVERSITY OF TECHNOLOGY SYDNEY

INFORMATION LETTER

THE EFFECT OF ACUPUNCTURE TREATMENT COMPARED TO LASER FOR LATERAL ELBOW PAIN: A RANDOMISED CONTROLLED PILOT STUDY.

(UTS HREC REF NO. 2009-274A)

WHO IS DOING THE RESEARCH?

My name is Christine Berle and I am a research assistant involved in the acupuncture study being conducted by Drs Chris, Zaslawski, Peter Meier, Deirdre Cobbin and Sean Walsh in the Faculty of Science at UTS.

WHAT IS THIS RESEARCH ABOUT?

This research is to find out whether there are any health benefits using acupuncture or low level laser for people with lateral elbow pain.

IF I SAY YES, WHAT WILL IT INVOLVE?

You will be randomly allocated to one of two groups; either acupuncture or laser treatment twice weekly for five weeks (approximately 45 minutes per session) to be conducted at the city campus of the University of Technology, Sydney. The acupuncture will involve insertion of sterile single use needles into six acupoints on the affected arm and one around the knee. Those receiving the laser will have low level laser light applied to the same acupoints as the acupuncture recipients. As the laser light is low intensity it is a thermal (meaning no heat will be generated) and you may not experience any sensory feeling associated with its application.

An algometer will be used to measure pressure pain threshold (PPT) (the first sign of discomfort not how much pain you can tolerate) one week prior to commencing treatment, pre and post first treatment, on completion and at one month follow-up (6 assessments). The algometer has a 0.5 cm diameter spring loaded rubber plunger which is incrementally pressed onto the skin or muscle measuring the pressure on the gauge (see photograph). PPT measurements will be taken at two acupoints on the forearm twenty minutes after treatment. The algometer does not puncture the skin.

Algometer

Participants will be asked to maintain a diary (monitoring medication, remedial exercise frequency and days off work due to the condition) and complete three different questionnaires at specially nominated times (McGill pain questionnaire, Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire and a sensation scale) during the study and at one month follow-up.

ARE THERE ANY RISKS?

Yes, there are some minor risks. If I am randomised into the group receiving acupuncture, I am aware that acupuncture involves the insertion of fine needles into the skin. Side effects in acupuncture are infrequent and generally limited to bruising and spot bleeding. On rare occasions patients may feel faint and nauseous. A 2001 study (MacPherson et al, 2001) reported on adverse events and transient reactions associated with 34,407 prospective acupuncture treatments. No serious adverse events were reported, where these were defined as requiring hospital admission, prolonging hospital stays, permanently disabling, or resulting in death (95% CI: 0 to 1.1 per 10,000 treatments). A total of 43 significant minor adverse events were reported, a rate of 1.3 per 1,000 treatments (95% CI: 0.9 to 1.7). These included severe nausea and actual fainting (12), unexpected, severe and prolonged aggravation of symptoms (7), prolonged and unacceptable pain and bruising (5) and psychological and emotional reactions (4). There were three avoidable events: two patients had needles left in by mistake, and one patient had moxa burns to the skin, also caused by practitioner error. The acupuncturists also recorded 10,920 mild transient reactions occurring in 5136 treatments, 15% (95% CI: 14.6 to 15.3) of the 34,407 total. In terms of local reactions, there were reports of mild bruising (1.7%), pain (1.2%) and bleeding (0.4%). The most common mild transient reactions to treatment were feeling relaxed (11.9%) and feeling energised (6.6%). To reiterate in this prospective survey of 34,407 treatments, practitioners reported no serious adverse events. In the unlikely event that a serious or minor event occurs, the treatment session will be terminated, first aid applied or if necessary medical help sought. No adverse events have been published in the scientific literature associated with humans receiving low level laser treatment.

Reference: MacPherson H, Thomas K, Walters S, Fitter M.(2001) A prospective survey of adverse events and treatment reactions following 34,000 consultations with professional acupuncturists. Acupuncture in Medicine, 19, 2, p.93-101.

WHY HAVE I BEEN ASKED?

You have been asked through a recruitment campaign because you:-

- Have chronic lateral elbow pain for a period greater than 3 months.
- The pain occurs on only one side of your body and on the lateral (outside) of your elbow
- You are between 35-55 years of age

Unfortunately you will be excluded from the research project if you have:-

- Diseases of the central or peripheral nervous system

- Radial nerve entrapment
- Inflammatory rheumatic diseases
- Gout
- Radioulnar or radiohumeral osteoarthritis
- Or have experienced a previous episode of lateral elbow pain that was treated surgically or with acupuncture

DO I HAVE TO SAY YES?

You don't have to say yes.

WHAT WILL HAPPEN IF I SAY NO?

Nothing. I will thank you for your time so far and won't contact you about this research again.

IF I SAY YES, CAN I CHANGE MY MIND LATER?

You can change your mind at any time and you don't have to say why. I will thank you for your time so far and won't contact you about this research again.

WHAT IF I HAVE CONCERNS OR A COMPLAINT?

If you have concerns about the research that you think I can help you with, please feel free to contact me, Christine Berle on 0418 447 911 email; Christine.Berle@uts.edu.au or Chris Zaslawski on (9514 7856).

If you would like to talk to someone who is not connected with the research, you may contact the Research Ethics Officer on 02 9514 9615, and quote this number (UTS HREC REF NO. 2009-274A).

Appendix 10: Trial entry assessment form (Research Study Two)

Trial entry assessment form

	Yes	No
Do you have pain on the outside of your elbow (lateral)?	☐	☐
Have you had this pain over 3 months?	☐	☐
Do you have the pain only one side of your body?	☐	☐
Do you perform work which has frequent repetitive motion?	☐	☐
Do you undertake:		
a) heavy physical work - large expenditure of energy (e.g. labourer, bricklayer)	☐	
b) light physical work - medium expenditure of energy (e.g. process worker)	☐	
c) sedentary work - minimum expenditure of energy (e.g. office worker)	☐	
Please indicate your age:		
Younger than 35 years of age ☐		
Between 35 – 55 years of age ☐		
Older than 55 years of age ☐		
Do you currently have any of the following?		
Neck pain/problems	☐	☐
Shoulder problems	☐	☐
Radial nerve entrapment (pinched nerve)	☐	☐
Inflammatory rheumatic diseases	☐	☐
Gout	☐	☐
Arthritis in your wrist or elbow joint	☐	☐
Have you had any operations on your elbow, wrist or forearm?	☐	☐
Have you previously had acupuncture for your elbow pain?	☐	☐
Do you have a current WorkCover claim associated with the elbow pain?	☐	☐

Appendix 11: Consent form (Research Study Two)

CONSENT FORM

I _____ agree to participate in the research project "The effect of acupuncture treatment compared to laser for lateral elbow pain: A randomised controlled pilot study" (UTS HREC REF NO. 2009-274A) being conducted by Drs Chris Zaslawski, Peter Meier, Deirdre Cobbin, Sean Walsh, Christine Berle and PhD student Seong Leang Cheah at the University of Technology, Sydney (UTS), Broadway (ph;.0418 447 911). All researchers do not have a conflict of interest. Funding for this research has been provided by National Institute of Complementary Medicine (NICM).

I understand that the purpose of this study is to identify if there are any health benefits using acupuncture or laser for people with lateral elbow pain. I understand that my participation in this research will involve me receiving either acupuncture or laser treatment twice weekly for five weeks (approximately 45 minutes per session at the city campus of the University of Technology, Sydney). An algometer (a device for measuring pressure pain threshold) will be used at two acupoints on the forearm pre and post your treatment one week prior to commencing treatment, as well as at first treatment, on completion of the intervention phase and at one month follow-up (6 assessments). Participants are expected to maintain a diary and complete three different questionnaires at specially nominated points in time (pain questionnaire, Disabilities of the Arm, Shoulder and Hand (DASH) and a sensation scale).

I am aware that I will be randomised into one of two groups; one group receiving acupuncture and the other receiving low level laser acupuncture. I am aware that acupuncture involves the insertion of fine needles into the skin. Due to the design of the study we cannot give you any information on the specific goals of the interventions. Side effects from acupuncture are infrequent and generally limited to bruising and spot bleeding (see information sheet). On rare occasions patients may feel faint and nauseous. In the unlikely event that this occurs, the treatment session will be terminated, first aid applied or medical help sought. Prior to the first treatment session a brief medical history of overall health will be taken (age, gender, duration of elbow condition, occupation and any individual factors which may possibly impact on results).

I am aware that I can contact Dr Chris Zaslawski if I have any concerns about the research. I also understand that I am free to withdraw my participation from this research project at any time I wish, without consequences, and without giving a reason.

I agree that Christine Berle has answered all my questions fully and clearly.

I agree that the research data gathered from this project may be published in a form that does not identify me in any way.

_____ ____/____/____

Signature (participant)

_____ ____/____/____

Signature (researcher or delegate)

NOTE:

This study has been approved by the University of Technology, Sydney Human Research Ethics Committee. If you have any complaints or reservations about any aspect of your participation in this research which you cannot resolve with the researcher, you may contact the Ethics Committee through the Research Ethics Officer (ph: 02 - 9514 9615, Research.Ethics@uts.edu.au), and quote the UTS HREC reference number. Any complaint you make will be treated in confidence and investigated fully and you will be informed of the outcome.

Appendix 12: Supplementary results I

This appendix contains materials that were useful and handy in Discussion and for publications in the future. These reports are pulled out from Research Study One in Chapter Four so as not to impede the smooth flow of the overall presentation and hence to avoid unnecessary confusion.

A12.1: The Pearson correlation coefficients between a) overall mean PPT and overall median PPT, and b) between PPT_{mean} and PPT_{median}

Pearson Correlation		
Parameters	Female	Male
Overall mean & overall median	0.998	0.993
PPT_{mean} & PPT_{median}	0.996	0.996

Table A12.1: The Pearson correlation coefficients between overall mean PPT and overall median PPT, and between PPT_{mean} and PPT_{median} by gender.

A12.2: The intra- and inter-individual variations of regional PPT

The intra- and inter-individual coefficients of variations were computed based on the percentage of the standard deviation (SD) with respect to the mean of PPT values collected by reading cycles (R1, R2, R3) and temporal visits (V1, V2, V3, V4) within and between subjects. That is,

a. intra-individual coefficients of variation (IntraCV) across readings

$$= \frac{\text{SD of three PPT readings at each visit within individual}}{\text{mean of the three PPT readings at each visit within individual}} \times 100\%$$

b. intra-individual coefficients of variation (IntraCV) across visits

$$= \frac{\text{SD of four PPT readings across visits by reading cycle within individual}}{\text{mean of the four PPT readings across visits by reading cycle within individual}} \times 100\%$$

c. inter-individual coefficients of variation (InterCV) across readings

$$= \frac{\text{SD of three PPT readings at each visit among subjects}}{\text{mean of the three PPT readings at each visit among subjects}} \times 100\%$$

d. inter-individual coefficients of variation (InterCV) across visits

$$= \frac{\text{SD of four PPT readings across visits by reading cycle among subjects}}{\text{mean of the four PPT readings across visits by reading cycle among subjects}} \times 100\%$$

The average IntraCV of reading cycles (females: 9.6% to 12.8%; males: 9.2% to 11.5%) were much lower than of the temporal sessions (females: 18% to 22.4%; males: 15.9% to 21.6%) for both genders (Table A12.5). These results supported the stability and reproducibility of PPT among the reading cycles (Figure 4.3) and accounted for some variations across longer temporal sessions of more than a week (Figures 4.5 and 4.6). When InterCV were considered (Table A12.8), the ranges for reading cycles (females: 33.3% to 46.7%; males: 31.7% to 49.3%) were consistent with that of the temporal sessions (females: 33% to 46.3%; males: 31.6% to 49.5%) which indicated the presence of some influences that had contributed to PPT measurements. These could include various parameters such as age, BMI, break time intervals, learning experience or even the presence of LI4m^{+}21 intervention effects (Figures 4.15 to 4.16).

Site	Intra-individual coefficients of variation across three readings									
	IntraCV across readings: Female					IntraCV across readings: Male				
	V1	V2	V3	V4	Average	V1	V2	V3	V4	Average
LI20L	15.00	12.63	11.42	12.26	12.83	12.38	12.10	11.21	10.19	11.47
LI20R	12.89	13.82	10.77	10.76	12.06	11.69	9.31	10.08	11.01	10.52
GB12R	12.32	11.08	10.81	11.55	11.44	10.84	9.50	10.29	10.76	10.35
2L	13.15	12.64	11.15	11.22	12.04	12.13	11.43	10.48	10.54	11.15
2R	12.73	12.73	10.43	10.83	11.68	12.19	9.47	9.51	9.02	10.05
PC6L	12.17	11.42	9.62	10.64	10.96	8.63	9.21	9.47	9.66	9.24
PC6R	10.23	10.50	10.55	8.99	10.07	10.43	9.29	8.46	8.99	9.29
LI10L	11.99	12.21	13.61	12.15	12.49	9.99	9.60	8.79	10.73	9.78
1L	12.35	10.93	11.66	11.94	11.72	11.51	10.44	9.62	11.24	10.70
1R	11.81	11.55	12.39	12.26	12.00	11.50	11.10	10.13	11.42	11.04
LI5L	11.19	10.90	12.38	12.06	11.63	11.30	10.28	11.09	9.37	10.51
LI5R	12.71	11.93	10.24	10.95	11.46	11.73	10.82	10.24	10.40	10.80
ST36L	11.37	10.15	9.88	8.73	10.04	11.14	9.10	9.42	7.14	9.20
ST36R	11.51	9.59	9.60	9.77	10.12	10.86	9.58	8.77	8.72	9.48
3R	11.02	10.15	9.79	9.59	10.14	10.83	10.08	8.78	9.56	9.81
SP6R	10.09	10.38	9.75	8.00	9.56	10.22	8.79	9.47	8.75	9.31
KD3R	11.67	11.32	11.48	9.64	11.03	11.19	9.66	9.07	9.81	9.93

Table A12.3: Intra-individual coefficients of variations of three PPT readings in each visit.

Site	Intra-individual coefficients of Variation across four visits							
	IntraCV across visits : Female				IntraCV across visits : Male			
	R1	R2	R3	Average	R1	R2	R3	Average
LI20L	24.65	21.85	20.85	22.45	22.19	22.03	20.59	21.60
LI20R	19.62	19.93	19.16	19.57	20.63	20.16	18.68	19.82
GB12R	19.64	21.28	20.53	20.48	19.82	20.12	20.58	20.17
2L	21.80	20.46	21.40	21.22	20.61	20.45	21.60	20.89
2R	20.36	19.83	18.86	19.68	20.32	20.04	20.91	20.42
PC6L	18.79	18.66	18.57	18.67	17.24	17.55	16.74	17.18
PC6R	17.78	17.89	18.39	18.02	16.33	18.07	18.47	17.62
LI10L	22.22	21.28	22.01	21.84	19.47	22.03	20.44	20.64
1L	20.69	19.90	20.04	20.21	19.67	20.36	19.65	19.89
1R	20.81	19.10	18.76	19.56	20.76	19.17	18.53	19.49
LI5L	20.24	20.28	20.11	20.21	19.87	19.07	19.13	19.36
LI5R	20.34	19.52	19.64	19.83	20.19	20.01	19.09	19.76
ST36L	20.76	20.80	19.56	20.37	18.85	19.45	18.56	18.95
ST36R	19.69	20.15	18.75	19.53	19.34	19.22	18.82	19.13
3R	19.22	20.43	18.57	19.40	19.48	19.00	19.27	19.25
SP6R	19.12	18.74	17.72	18.52	16.35	16.47	14.96	15.93
KD3R	20.95	21.33	20.18	20.82	19.16	19.19	19.11	19.15

Table A12.4: Intra-individual coefficients of variations of PPT readings across four visits.

Average Intra-individual coefficient of variation				
Site	Female		Male	
	R	V	R	V
LI20L	12.8	22.4	11.5	21.6
LI20R	12.1	19.6	10.5	19.8
GB12R	11.4	20.5	10.3	20.2
2L	12.0	21.2	11.1	20.9
2R	11.7	19.7	10.0	20.4
PC6L	11.0	18.7	9.2	17.2
PC6R	10.1	18.0	9.3	17.6
LI10L	12.5	21.8	9.8	20.6
1L	11.7	20.2	10.7	19.9
1R	12.0	19.6	11.0	19.5
LI5L	11.6	20.2	10.5	19.4
LI5R	11.5	19.8	10.8	19.8
ST36L	10.0	20.4	9.2	19.0
ST36R	10.1	19.5	9.5	19.1
3R	10.1	19.4	9.8	19.2
SP6R	9.6	18.5	9.3	15.9
KD3R	11.0	20.8	9.9	19.2
Min	**9.6**	**18.0**	**9.2**	**15.9**
Max	**12.8**	**22.4**	**11.5**	**21.6**

Table A12.5: The average intra-individual coefficients of variation for reading cycle R and for visit V.

Site	Inter-individual coefficients of variation across readings									
	Female					Male				
	V1	V2	V3	V4	Average	V1	V2	V3	V4	Average
LI20L	49.1	44.4	44.5	47.3	46.3	45.4	45.7	49.4	53.6	48.50
LI20R	44.7	41.5	40.0	42.5	42.2	38.9	39.2	44.4	45.1	41.90
GB12R	46.2	40.1	41.4	40.1	42.0	40.1	42.8	47.2	52.5	45.65
2L	44.7	40.4	39.1	42.3	41.6	40.3	39.6	40.4	43.0	40.81
2R	38.0	37.5	34.6	38.2	37.1	36.6	35.2	34.4	37.0	35.78
PC6L	43.8	33.2	33.9	36.6	36.9	33.6	31.1	30.4	31.3	31.62
PC6R	33.3	32.5	33.5	32.7	33.0	33.5	35.6	37.2	39.3	36.39
LI10L	48.4	43.4	40.8	39.7	43.1	47.3	43.7	46.7	56.1	48.45
1L	40.7	34.2	33.8	37.0	36.4	42.0	43.4	47.4	52.0	46.22
1R	40.4	38.7	38.9	41.1	39.8	36.1	36.5	40.9	42.3	38.98
LI5L	45.7	39.6	38.8	37.0	40.3	31.4	32.5	36.5	37.8	34.55
LI5R	37.9	37.8	38.7	38.3	38.2	38.6	37.8	38.2	40.7	38.82
ST36L	39.4	36.4	36.0	37.8	37.4	32.9	36.3	38.2	40.5	37.00
ST36R	38.0	36.0	37.1	37.1	37.0	33.2	34.0	35.7	34.5	34.34
3R	41.4	38.7	39.1	36.6	38.9	33.0	31.4	37.6	38.3	35.08
SP6R	33.7	34.5	38.4	34.7	35.3	37.3	35.4	30.2	37.8	35.18
KD3R	41.3	38.2	35.0	34.9	37.3	39.0	37.3	37.1	42.5	38.98

Table A12.6: Inter-individual coefficients of variations of three PPT readings in each visit.

Inter-individual coefficients of variation across visits							
Female				Male			
R1	R2	R3	Average	R1	R2	R3	Average
47.8	46.7	45.4	46.7	48.3	48.7	49.2	48.8
43.3	42.5	41.9	42.6	41.9	42.4	42.7	42.3
40.4	42.3	43.7	42.1	46.5	46.5	47.7	46.9
41.9	41.2	42.9	42.0	40.3	41.6	41.9	41.3
37.2	36.3	38.2	37.2	35.5	36.5	36.1	36.0
36.0	37.7	38.7	37.5	31.2	31.9	32.1	31.7
33.3	33.3	33.1	33.3	35.9	37.7	37.0	36.8
42.7	42.6	44.2	43.2	48.4	49.1	50.5	49.3
37.2	36.4	36.1	36.6	44.8	48.6	48.0	47.1
39.2	39.9	40.6	39.9	39.2	39.5	39.7	39.5
39.7	39.6	41.6	40.3	33.5	36.3	36.9	35.6
38.3	38.0	39.2	38.5	38.3	39.0	40.3	39.2
37.3	38.2	37.1	37.5	36.8	37.5	38.8	37.7
37.2	37.4	37.2	37.3	34.4	34.2	35.6	34.7
39.5	39.7	37.7	39.0	36.6	35.6	35.3	35.8
34.9	35.8	36.1	35.6	36.7	35.6	33.8	35.3
37.5	37.8	37.0	37.4	39.2	39.2	40.2	39.6

Table A12.7: Inter-individual coefficients of variations of PPT readings across four visits.

Average Inter-individual coefficient of variation				
Site	Female		Male	
	R	V	R	V
LI20L	46.7	46.3	48.8	49.5
LI20R	42.6	42.2	42.3	41.9
GB12R	42.1	42.0	46.9	45.7
2L	42.0	41.6	41.3	40.8
2R	37.2	37.1	36.0	35.8
PC6L	37.5	36.9	31.7	31.6
PC6R	33.3	33.0	36.8	36.5
LI10L	43.2	44.2	49.3	48.5
1L	36.6	36.4	47.1	46.3
1R	39.9	39.9	39.5	39.1
LI5L	40.3	41.0	35.6	34.7
LI5R	38.5	38.4	39.2	38.8
ST36L	37.5	37.4	37.7	37.0
ST36R	37.3	37.1	34.7	34.3
3R	39.0	38.9	35.8	35.4
SP6R	35.6	35.3	35.3	35.2
KD3R	37.4	37.4	39.6	39.0
Min	**33.3**	**33.0**	**31.7**	**31.6**
Max	**46.7**	**46.3**	**49.3**	**49.5**

Table A12.8: The average inter-individual coefficients of variation for reading cycle R and for visit V.

A12.3 The coefficients of determination for the relationship between regional PPT_{mean} and PPT_{median} in Visit 1 (pre-intervention) with age or BMI

Coefficients of determination were often used in discussion in articles. For convenience of references in Discussion (Chapter 5), Tables A12.9 and A12.10 calculated the coefficients of determination (R^2) for the Pearson coefficients (R) as shown in Tables 4.7 and 4.8. However, the disadvantage of this attempt was that the signs of Person correlation would vanish after the R was squared.

Site	Coefficients of determination between PPT_{mean} and age, PPT_{mean} and BMI, age and BMI								
	En Bloc			Female			Male		
	PPT_{mean} & age	PPT_{mean} & BMI	BMI & age	PPT_{mean} & age	PPT_{mean} & BMI	BMI & age	PPT_{mean} & age	PPT_{mean} & BMI	BMI & age
LI20L	5.48%	0.04%	0.04%	1.30%	1.08%	1.54%	11.09%	4.75%	6.20%
LI20R	6.71%	0.02%	4.33%	7.18%	0.29%	3.03%	6.97%	1.51%	7.78%
GB12R	0.79%	0.00%	0.79%	0.10%	0.52%	0.18%	1.54%	1.88%	9.18%
2L	2.62%	0.44%	1.80%	1.44%	2.89%	0.14%	3.50%	1.56%	9.30%
2R	1.12%	2.37%	2.66%	3.42%	2.16%	1.10%	0.03%	1.56%	6.86%
PC6L	1.96%	5.71%	0.37%	2.37%	11.42%	0.01%	2.25%	0.07%	3.61%
PC6R	0.06%	0.17%	0.88%	0.98%	3.92%	0.00%	0.20%	5.02%	6.81%
LI10L	0.13%	0.02%	0.79%	1.06%	2.16%	0.18%	1.72%	6.25%	9.18%
1L	0.11%	0.35%	2.59%	1.80%	1.66%	0.98%	1.82%	10.89%	7.73%
1R	0.38%	0.07%	3.17%	0.18%	1.14%	1.93%	3.80%	2.37%	6.66%
LI5L	0.00%	1.69%	4.00%	1.64%	4.84%	2.59%	3.53%	1.00%	8.07%
LI5R	0.77%	0.83%	3.13%	1.08%	3.50%	1.35%	0.85%	0.53%	8.64%
ST36L	0.34%	0.12%	3.31%	2.50%	2.31%	1.39%	7.08%	3.28%	8.82%
ST36R	0.49%	0.30%	4.71%	2.76%	3.46%	3.24%	0.10%	4.28%	8.47%
3R	0.11%	0.22%	3.17%	0.35%	0.02%	1.12%	0.01%	2.79%	9.18%
SP6R	0.04%	0.56%	0.58%	0.18%	0.14%	2.53%	0.14%	8.29%	0.58%
KD3R	0.85%	0.18%	2.07%	2.28%	0.16%	0.45%	0.83%	3.69%	8.18%

Table A12.9: The coefficients of determination (R^2) between the PPT_{mean} and age, PPT_{mean} and BMI, age and BMI. Only PPT_{mean} of Visit 1 was considered. Highlighted in red are the highest coefficients among all sites.

Site	Coefficients of determination between PPT_{median} and age, PPT_{median} and BMI, age and BMI								
	En Bloc			Female			Male		
	PPT_{median} & age	PPT_{median} & BMI	BMI & age	PPT_{median} & age	PPT_{median} & BMI	BMI & age	PPT_{median} & age	PPT_{median} & BMI	BMI & age
LI20L	5.15%	0.10%	0.04%	1.23%	0.85%	1.54%	10.18%	5.15%	6.20%
LI20R	7.18%	0.00%	4.33%	7.73%	0.26%	3.03%	7.34%	2.34%	7.78%
GB12R	1.00%	0.00%	0.79%	0.21%	0.59%	0.18%	1.64%	1.90%	9.18%
2L	2.40%	0.28%	1.80%	0.88%	2.96%	0.14%	4.16%	2.53%	9.30%
2R	0.88%	2.56%	2.66%	3.31%	1.74%	1.10%	0.02%	2.56%	6.86%
PC6L	1.82%	6.10%	0.37%	2.46%	11.29%	0.01%	1.80%	0.30%	3.61%
PC6R	0.05%	0.20%	0.88%	0.85%	4.24%	0.00%	0.19%	4.71%	6.81%
LI10L	0.10%	0.00%	0.79%	1.02%	2.53%	0.18%	1.44%	6.35%	9.18%
1L	0.06%	0.49%	2.59%	1.80%	1.46%	0.98%	1.39%	12.11%	7.73%
1R	0.28%	0.07%	3.17%	0.26%	0.98%	1.93%	3.50%	2.13%	6.66%
LI5L	0.00%	1.39%	4.00%	1.54%	4.62%	2.59%	2.96%	1.59%	8.07%
LI5R	0.62%	0.81%	3.13%	1.25%	3.50%	1.35%	0.40%	0.52%	8.64%
ST36L	0.52%	0.06%	3.31%	1.51%	1.90%	1.39%	6.71%	3.31%	8.82%
ST36R	0.50%	0.32%	4.71%	2.79%	3.50%	3.24%	0.12%	4.12%	8.47%
3R	0.02%	0.23%	3.17%	0.25%	0.00%	1.12%	0.29%	3.57%	9.18%
SP6R	0.07%	0.66%	0.58%	0.25%	0.07%	2.53%	0.36%	8.47%	0.58%
KD3R	0.69%	0.25%	2.07%	2.19%	0.12%	0.45%	0.67%	4.12%	8.18%

Table A12.10: The coefficients of determination (R^2) between the PPT_{median} and age, PPT_{median} and BMI, age and BMI. Only PPT_{median} of Visit 1 was considered. Highlighted in red are the coefficients of highest correlation among all sites.

A12.4: Descriptive statistics of PPT, PPT_{mean} and PPT_{median}

Descriptive statistics of PPT_{mean} for Female													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.66	1.57	1.75	1.64	1.60	0.57	0.76	0.15	4.15	4.00	1.07	0.30	-0.18
LI20R	1.82	1.75	1.90	1.81	1.75	0.57	0.76	0.17	4.53	4.37	1.00	0.27	0.04
GB12R	2.94	2.81	3.07	2.90	2.83	1.44	1.20	0.50	7.52	7.02	1.65	0.46	0.17
2L	4.50	4.30	4.70	4.42	4.23	3.36	1.83	1.08	9.68	8.60	2.36	0.66	-0.11
2R	4.72	4.53	4.91	4.66	4.53	2.86	1.69	1.25	10.23	8.98	2.32	0.51	0.07
PC6L	3.61	3.44	3.77	3.52	3.43	1.71	1.31	1.40	9.23	7.83	1.67	1.05	1.72
PC6R	3.94	3.81	4.07	3.90	3.81	1.59	1.26	0.57	7.72	7.15	1.65	0.49	0.12
LI10L	3.23	3.08	3.38	3.12	2.97	1.93	1.39	0.98	12.15	11.17	1.67	1.66	5.82
1L	3.37	3.24	3.50	3.32	3.27	1.38	1.17	0.87	7.20	6.33	1.60	0.60	0.11
1R	3.68	3.55	3.82	3.58	3.41	2.03	1.42	0.70	10.98	10.28	1.91	1.14	2.03
LI5L	3.34	3.20	3.48	3.23	3.00	1.76	1.33	0.85	8.63	7.78	1.53	1.42	2.56
LI5R	3.46	3.34	3.57	3.36	3.16	1.64	1.28	0.97	9.17	8.20	1.55	1.23	2.00
ST36L	5.21	5.00	5.42	5.12	5.00	3.61	1.90	1.48	11.67	10.18	2.32	0.82	0.85
ST36R	5.07	4.89	5.25	4.96	4.75	3.36	1.83	1.40	12.27	10.87	2.22	0.92	1.31
3R	4.81	4.62	5.00	4.69	4.51	3.32	1.82	1.38	11.33	9.95	2.20	1.01	1.18
SP6R	4.36	4.17	4.55	4.28	3.98	2.26	1.50	1.50	9.35	7.85	1.91	0.83	0.67
KD3R	4.28	4.12	4.44	4.20	4.13	2.39	1.55	1.27	9.78	8.52	1.93	0.74	0.49

Descriptive statistics of PPT_{mean} for Male													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.14	2.01	2.28	2.08	1.98	1.08	1.04	0.27	6.60	6.33	1.33	1.00	1.77
LI20R	2.38	2.28	2.48	2.35	2.30	0.96	0.98	0.27	5.52	5.25	1.22	0.49	0.21
GB12R	3.54	3.35	3.73	3.41	3.03	2.65	1.63	0.92	9.10	8.18	1.89	1.20	1.33
2L	5.53	5.26	5.80	5.43	5.18	4.90	2.21	1.20	14.13	12.93	2.93	0.73	0.41
2R	5.56	5.32	5.81	5.50	5.47	3.73	1.93	1.50	12.65	11.15	2.80	0.52	0.42
PC6L	4.30	4.12	4.49	4.24	4.02	1.72	1.31	2.12	7.85	5.73	1.95	0.72	-0.18
PC6R	4.85	4.66	5.05	4.70	4.48	3.01	1.73	1.97	12.45	10.48	2.02	1.42	2.53
LI10L	4.33	4.09	4.58	4.15	3.71	4.40	2.10	1.43	13.37	11.93	2.25	1.52	2.55
1L	4.43	4.19	4.68	4.25	3.84	4.18	2.05	1.75	11.98	10.23	2.33	1.38	1.73
1R	4.55	4.37	4.74	4.44	4.23	3.03	1.74	1.22	10.97	9.75	2.17	1.03	0.88
LI5L	4.09	3.92	4.26	4.00	3.82	1.97	1.41	1.75	9.55	7.80	1.81	0.95	0.92
LI5R	4.22	4.06	4.38	4.09	3.83	2.55	1.60	1.30	11.57	10.27	1.86	1.30	1.82
ST36L	6.97	6.66	7.29	6.82	6.53	6.56	2.56	2.73	15.87	13.13	3.46	0.89	0.64
ST36R	6.60	6.36	6.84	6.51	6.19	4.88	2.21	2.40	13.13	10.73	2.96	0.63	-0.18
3R	5.99	5.74	6.23	5.84	5.52	4.39	2.10	2.42	15.27	12.85	2.65	1.17	1.98
SP6R	5.33	5.07	5.60	5.23	5.12	3.36	1.83	2.40	12.27	9.87	2.78	0.79	0.74
KD3R	5.55	5.32	5.79	5.44	5.33	4.55	2.13	1.77	12.18	10.42	3.04	0.69	0.11

Descriptive statistics of PPT_{median} for Female													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.66	1.57	1.74	1.64	1.60	0.57	0.75	0.15	4.10	3.95	1.09	0.27	-0.23
LI20R	1.82	1.75	1.89	1.81	1.80	0.59	0.76	0.15	4.50	4.35	1.00	0.25	0.01
GB12R	2.93	2.80	3.06	2.89	2.80	1.47	1.21	0.45	7.15	6.70	1.63	0.47	0.09
2L	4.51	4.30	4.71	4.43	4.20	3.45	1.86	0.80	9.60	8.80	2.49	0.63	-0.12
2R	4.72	4.53	4.90	4.66	4.55	2.96	1.72	1.10	10.50	9.40	2.30	0.52	0.10
PC6L	3.60	3.43	3.76	3.51	3.45	1.74	1.32	1.20	9.10	7.90	1.68	1.04	1.65
PC6R	3.94	3.81	4.07	3.90	3.80	1.65	1.28	0.50	7.90	7.40	1.70	0.52	0.22
LI10L	3.22	3.07	3.37	3.11	3.00	1.92	1.39	0.90	12.05	11.15	1.70	1.60	5.48
1L	3.37	3.24	3.50	3.31	3.20	1.44	1.20	0.70	7.05	6.35	1.68	0.61	0.21
1R	3.68	3.54	3.81	3.58	3.43	2.06	1.44	0.70	10.90	10.20	1.90	1.13	1.91
LI5L	3.34	3.19	3.48	3.22	3.00	1.76	1.33	0.85	8.50	7.65	1.60	1.42	2.53
LI5R	3.45	3.33	3.57	3.36	3.10	1.69	1.30	0.90	9.50	8.60	1.60	1.23	2.04
ST36L	5.21	5.00	5.42	5.11	4.98	3.63	1.90	1.40	12.20	10.80	2.39	0.82	0.91
ST36R	5.07	4.89	5.25	4.96	4.80	3.48	1.87	1.40	12.30	10.90	2.23	0.92	1.23
3R	4.81	4.62	5.00	4.69	4.50	3.42	1.85	1.35	11.40	10.05	2.24	0.98	1.08
SP6R	4.34	4.15	4.53	4.26	4.00	2.27	1.51	1.40	9.60	8.20	1.80	0.85	0.84
KD3R	4.29	4.13	4.45	4.21	4.10	2.42	1.56	1.20	9.90	8.70	2.04	0.73	0.47

Descriptive statistics of PPT_{median} for Male													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.14	2.00	2.27	2.08	2.00	1.08	1.04	0.30	6.80	6.50	1.30	0.97	1.64
LI20R	2.38	2.27	2.48	2.35	2.30	0.97	0.99	0.20	5.50	5.30	1.25	0.44	0.13
GB12R	3.54	3.34	3.73	3.41	3.10	2.70	1.64	0.90	9.00	8.10	1.98	1.20	1.31
2L	5.51	5.23	5.78	5.41	5.10	4.95	2.22	1.30	14.00	12.70	3.08	0.71	0.30
2R	5.56	5.31	5.81	5.49	5.40	3.86	1.96	1.50	12.70	11.20	2.79	0.58	0.41
PC6L	4.31	4.12	4.49	4.25	4.00	1.74	1.32	2.00	7.85	5.85	2.00	0.69	-0.28
PC6R	4.84	4.64	5.04	4.69	4.43	3.11	1.76	1.95	12.90	10.95	1.89	1.50	2.91
LI10L	4.33	4.09	4.58	4.14	3.68	4.47	2.12	1.35	13.50	12.15	2.20	1.52	2.55
1L	4.44	4.19	4.68	4.24	3.90	4.32	2.08	1.65	12.05	10.40	2.25	1.41	1.86
1R	4.57	4.38	4.76	4.44	4.20	3.14	1.77	1.15	10.90	9.75	2.24	1.04	0.88
LI5L	4.07	3.90	4.24	3.98	3.80	2.01	1.42	1.70	9.50	7.80	1.80	1.03	1.24
LI5R	4.22	4.06	4.39	4.09	3.85	2.67	1.63	1.40	11.90	10.50	1.95	1.32	1.91
ST36L	7.00	6.68	7.33	6.84	6.58	6.91	2.63	2.90	16.20	13.30	3.43	0.91	0.65
ST36R	6.58	6.34	6.83	6.48	6.25	5.04	2.25	2.20	13.20	11.00	3.10	0.63	-0.13
3R	5.96	5.72	6.21	5.82	5.50	4.47	2.11	2.30	15.60	13.30	2.64	1.20	2.15
SP6R	5.35	5.09	5.61	5.25	5.20	3.42	1.85	2.20	12.50	10.30	2.60	0.82	0.94
KD3R	5.54	5.31	5.78	5.44	5.40	4.60	2.14	1.60	12.35	10.75	3.05	0.66	0.07

Descriptive statistics of PPT_{mean} for Female in Visit 1													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.66	1.48	1.85	1.63	1.60	0.63	0.80	0.15	4.15	4.00	0.92	0.68	1.01
LI20R	1.81	1.66	1.96	1.78	1.70	0.62	0.79	0.33	4.23	3.90	1.03	0.55	0.26
GB12R	2.77	2.50	3.04	2.69	2.57	1.55	1.24	0.50	7.52	7.02	1.67	1.01	1.86
2L	4.24	3.84	4.64	4.15	4.07	3.39	1.84	1.65	9.17	7.52	2.67	0.65	-0.26
2R	4.56	4.19	4.93	4.51	4.33	2.79	1.67	1.58	8.60	7.02	2.55	0.33	-0.41
PC6L	3.69	3.29	4.09	3.56	3.38	2.48	1.58	1.58	9.23	7.65	2.08	1.26	2.00
PC6R	3.77	3.53	4.02	3.73	3.58	1.45	1.21	1.15	7.33	6.18	1.43	0.69	0.48
LI10L	3.22	2.86	3.57	3.07	2.90	2.61	1.62	0.98	12.15	11.17	2.05	2.36	10.32
1L	3.34	3.06	3.63	3.24	3.31	1.70	1.30	1.55	7.20	5.65	1.75	1.07	0.94
1R	3.63	3.35	3.90	3.50	3.40	2.05	1.43	1.33	10.98	9.65	1.67	1.84	6.19
LI5L	3.23	2.91	3.55	3.08	2.83	2.17	1.47	0.85	8.63	7.78	1.62	1.66	3.05
LI5R	3.34	3.12	3.57	3.25	3.10	1.47	1.21	1.43	9.07	7.63	1.18	1.48	3.66
ST36L	5.11	4.68	5.54	5.00	4.79	3.75	1.94	1.48	11.67	10.18	2.31	1.00	1.45
ST36R	4.87	4.52	5.22	4.75	4.64	3.17	1.78	1.65	11.83	10.18	2.05	1.08	2.17
3R	4.75	4.35	5.15	4.61	4.33	3.66	1.91	1.48	10.85	9.37	2.72	1.00	1.09
SP6R	4.21	3.86	4.56	4.17	3.83	1.85	1.36	1.50	8.00	6.50	1.92	0.52	0.01
KD3R	4.24	3.89	4.59	4.12	3.90	2.88	1.70	1.27	9.78	8.52	1.92	1.12	1.40

Descriptive statistics of PPT_{mean} for Female in Visit 2													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.55	1.39	1.70	1.54	1.55	0.45	0.67	0.20	2.83	2.63	1.13	0.01	-0.91
LI20R	1.69	1.56	1.83	1.69	1.63	0.47	0.68	0.23	3.20	2.97	0.90	-0.04	-0.35
GB12R	2.83	2.58	3.07	2.80	2.70	1.22	1.10	0.53	5.52	4.98	1.50	0.33	-0.32
2L	4.27	3.90	4.63	4.18	4.18	2.75	1.66	1.45	9.40	7.95	2.22	0.79	0.46
2R	4.59	4.22	4.95	4.54	4.43	2.72	1.65	1.25	9.40	8.15	2.21	0.52	0.03
PC6L	3.38	3.10	3.65	3.33	3.28	1.14	1.07	1.40	6.75	5.35	1.21	0.72	0.69
PC6R	3.83	3.59	4.08	3.81	3.78	1.44	1.20	0.57	7.63	7.07	1.35	0.39	0.65
LI10L	3.15	2.84	3.45	3.01	2.82	1.93	1.39	1.23	8.97	7.73	1.53	1.84	4.87
1L	3.27	3.04	3.51	3.22	3.26	1.15	1.07	1.48	6.12	4.63	1.68	0.57	0.25
1R	3.50	3.25	3.75	3.39	3.30	1.71	1.31	1.23	8.25	7.02	1.72	1.26	2.13
LI5L	3.29	3.00	3.58	3.17	2.92	1.76	1.33	1.23	8.40	7.17	1.30	1.71	3.67
LI5R	3.31	3.08	3.53	3.20	2.97	1.48	1.22	0.97	7.78	6.82	1.42	1.39	2.28
ST36L	5.04	4.64	5.44	4.95	4.79	3.20	1.79	1.78	11.53	9.75	2.03	0.93	1.51
ST36R	4.90	4.57	5.24	4.81	4.56	2.94	1.71	1.53	10.37	8.83	1.91	0.87	0.94
3R	4.66	4.29	5.02	4.53	4.40	3.07	1.75	1.65	10.28	8.63	1.87	1.12	1.55
SP6R	4.19	3.83	4.55	4.11	3.92	1.95	1.40	1.90	8.67	6.77	1.35	0.98	1.23
KD3R	4.16	3.84	4.47	4.07	3.99	2.34	1.53	1.38	8.95	7.57	1.79	0.91	0.79

Descriptive statistics of PPT_{mean} for Female in Visit 3													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.68	1.51	1.86	1.67	1.60	0.55	0.74	0.17	3.37	3.20	1.02	0.19	-0.45
LI20R	1.84	1.70	1.98	1.84	1.88	0.52	0.72	0.17	3.90	3.73	1.05	-0.02	-0.29
GB12R	3.04	2.78	3.31	3.01	2.95	1.52	1.23	0.55	6.57	6.02	1.68	0.33	0.12
2L	4.65	4.26	5.04	4.61	4.22	3.14	1.77	1.08	8.68	7.60	2.08	0.56	-0.29
2R	4.78	4.42	5.13	4.73	4.66	2.54	1.59	1.63	10.00	8.37	2.13	0.43	0.60
PC6L	3.60	3.30	3.91	3.54	3.50	1.41	1.19	1.72	7.43	5.72	1.69	0.70	0.55
PC6R	3.95	3.69	4.21	3.90	3.93	1.63	1.28	1.15	7.72	6.57	1.96	0.48	0.13
LI10L	3.18	2.91	3.45	3.10	2.87	1.53	1.24	1.33	7.13	5.80	1.52	0.98	1.06
1L	3.41	3.17	3.65	3.40	3.27	1.20	1.09	0.87	5.75	4.88	1.57	0.18	-0.60
1R	3.74	3.47	4.01	3.67	3.50	1.96	1.40	0.72	8.42	7.70	2.01	0.76	0.78
LI5L	3.35	3.08	3.63	3.26	3.03	1.57	1.25	1.28	7.65	6.37	1.57	1.19	1.55
LI5R	3.47	3.23	3.71	3.38	3.23	1.69	1.30	1.02	8.17	7.15	1.48	1.13	1.51
ST36L	5.25	4.84	5.66	5.18	5.08	3.40	1.84	2.07	9.93	7.87	2.35	0.60	0.10
ST36R	5.09	4.73	5.45	5.01	4.68	3.38	1.84	1.40	9.97	8.57	2.41	0.66	0.23
3R	4.81	4.43	5.19	4.70	4.60	3.39	1.84	1.38	11.00	9.62	2.20	0.99	1.10
SP6R	4.40	3.97	4.82	4.29	3.95	2.76	1.66	1.55	9.35	7.80	2.01	0.97	1.00
KD3R	4.24	3.95	4.53	4.21	4.13	2.03	1.43	1.72	7.77	6.05	1.90	0.31	-0.41

Descriptive statistics of PPT_{mean} for Female in Visit 4													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.74	1.55	1.93	1.73	1.67	0.66	0.81	0.28	3.48	3.20	1.37	0.11	-0.83
LI20R	1.96	1.80	2.11	1.94	1.97	0.66	0.82	0.32	4.53	4.22	1.09	0.28	0.03
GB12R	3.10	2.84	3.37	3.09	3.05	1.46	1.21	0.60	5.67	5.07	1.87	0.12	-0.64
2L	4.84	4.40	5.28	4.77	4.55	4.02	2.01	1.08	9.68	8.60	2.85	0.60	-0.27
2R	4.96	4.55	5.37	4.89	4.73	3.41	1.85	1.73	10.23	8.50	2.40	0.65	-0.01
PC6L	3.75	3.41	4.09	3.67	3.52	1.79	1.34	1.58	7.95	6.37	1.78	0.88	0.96
PC6R	4.20	3.92	4.47	4.17	3.97	1.79	1.34	1.02	7.65	6.63	1.90	0.36	-0.33
LI10L	3.40	3.11	3.68	3.32	3.35	1.69	1.30	1.07	7.18	6.12	1.65	0.78	0.81
1L	3.47	3.20	3.74	3.44	3.24	1.51	1.23	0.95	6.63	5.68	1.93	0.33	-0.50
1R	3.86	3.56	4.16	3.78	3.42	2.37	1.54	0.70	8.17	7.47	2.01	0.76	0.11
LI5L	3.49	3.22	3.76	3.40	3.25	1.56	1.25	1.42	8.52	7.10	1.73	1.15	2.44
LI5R	3.70	3.45	3.96	3.62	3.42	1.88	1.37	1.03	9.17	8.13	1.92	1.01	1.53
ST36L	5.45	5.00	5.90	5.34	5.12	4.11	2.03	1.80	11.28	9.48	2.38	0.74	0.72
ST36R	5.42	5.04	5.81	5.30	5.18	3.85	1.96	1.95	12.27	10.32	2.30	1.03	1.79
3R	5.02	4.65	5.39	4.91	4.83	3.19	1.79	1.77	11.33	9.57	1.93	1.02	1.54
SP6R	4.63	4.23	5.03	4.58	4.27	2.47	1.57	1.67	9.12	7.45	2.15	0.70	0.20
KD3R	4.48	4.17	4.80	4.44	4.24	2.31	1.52	1.78	8.73	6.95	2.03	0.44	-0.18

Descriptive statistics of PPT_{mean} for Male in Visit 1													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.09	1.85	2.33	2.07	1.94	0.86	0.93	0.27	4.10	3.83	1.28	0.43	-0.31
LI20R	2.30	2.11	2.48	2.29	2.16	0.74	0.86	0.27	4.40	4.13	1.19	0.23	-0.21
GB12R	3.26	2.96	3.57	3.18	2.78	1.63	1.28	1.28	7.22	5.93	1.72	1.05	0.93
2L	5.04	4.56	5.53	4.94	4.85	3.83	1.96	2.13	9.73	7.60	2.92	0.65	-0.15
2R	5.22	4.75	5.69	5.16	5.23	3.31	1.82	1.50	11.57	10.07	2.72	0.64	1.21
PC6L	4.11	3.72	4.50	4.03	3.69	1.79	1.34	2.13	7.68	5.55	1.90	0.82	0.03
PC6R	4.60	4.26	4.95	4.48	4.39	2.27	1.51	2.50	9.70	7.20	2.00	1.18	1.75
LI10L	4.15	3.69	4.61	3.99	3.61	3.74	1.94	1.62	11.87	10.25	2.33	1.41	2.88
1L	4.11	3.71	4.51	4.01	3.65	2.80	1.67	1.75	8.83	7.08	2.42	0.86	0.00
1R	4.36	4.04	4.68	4.27	4.12	2.25	1.50	2.25	8.43	6.18	2.31	0.82	0.21
LI5L	3.70	3.44	3.97	3.67	3.49	1.22	1.11	1.75	6.40	4.65	1.64	0.55	-0.40
LI5R	4.00	3.70	4.30	3.85	3.65	2.20	1.48	2.17	9.63	7.47	1.80	1.60	3.27
ST36L	6.47	5.97	6.98	6.38	6.25	4.16	2.04	3.00	12.00	9.00	2.68	0.66	0.25
ST36R	6.18	5.74	6.61	6.13	5.95	3.85	1.96	2.53	12.00	9.47	2.54	0.48	-0.04
3R	5.57	5.16	5.98	5.47	5.27	2.97	1.72	2.90	10.30	7.40	2.40	0.80	0.22
SP6R	5.21	4.66	5.76	5.10	5.03	3.58	1.89	2.40	11.53	9.13	3.05	0.83	1.14
KD3R	5.14	4.71	5.57	5.06	5.20	3.76	1.94	1.77	10.05	8.28	2.68	0.51	-0.19

Descriptive statistics of PPT_{mean} for Male in Visit 2													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.11	1.85	2.37	2.06	1.96	0.97	0.99	0.30	6.15	5.85	1.26	1.23	3.72
LI20R	2.30	2.11	2.49	2.28	2.20	0.79	0.89	0.30	4.68	4.38	1.15	0.46	0.12
GB12R	3.42	3.08	3.77	3.32	3.03	2.07	1.44	1.12	7.95	6.83	1.68	1.01	1.04
2L	5.52	4.99	6.04	5.43	5.35	4.49	2.12	1.83	10.77	8.93	2.89	0.66	-0.08
2R	5.46	4.98	5.94	5.43	5.48	3.48	1.87	1.68	10.10	8.42	3.10	0.20	-0.51
PC6L	4.33	3.95	4.70	4.26	4.09	1.69	1.30	2.38	7.72	5.33	1.90	0.84	0.09
PC6R	4.74	4.37	5.11	4.61	4.48	2.60	1.61	1.97	11.30	9.33	1.85	1.42	3.13
LI10L	4.14	3.72	4.56	3.98	3.62	3.16	1.78	1.87	9.43	7.57	1.58	1.46	1.66
1L	4.30	3.87	4.74	4.13	3.98	3.33	1.82	2.08	10.70	8.62	2.24	1.37	2.29
1R	4.42	4.08	4.75	4.34	4.23	2.41	1.55	1.72	9.35	7.63	1.93	0.79	0.39
LI5L	3.98	3.68	4.28	3.93	3.85	1.52	1.23	1.85	7.30	5.45	1.94	0.55	-0.13
LI5R	4.08	3.78	4.38	3.95	3.57	2.20	1.48	1.93	9.10	7.17	1.97	1.25	1.38
ST36L	6.94	6.33	7.55	6.79	6.57	6.05	2.46	3.48	15.47	11.98	3.84	0.86	1.01
ST36R	6.54	6.07	7.01	6.45	6.47	4.58	2.14	3.25	11.50	8.25	2.82	0.60	-0.34
3R	5.81	5.40	6.22	5.75	5.63	3.05	1.75	2.95	10.83	7.88	2.57	0.59	-0.21
SP6R	5.29	4.75	5.82	5.23	5.08	3.38	1.84	2.63	9.93	7.30	3.60	0.38	-0.78
KD3R	5.44	5.00	5.88	5.35	5.40	3.89	1.97	2.48	11.30	8.82	3.00	0.63	-0.07

Descriptive statistics of PPT_{mean} for Male in Visit 3													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.16	1.88	2.45	2.10	2.15	1.19	1.09	0.57	6.60	6.03	1.46	1.28	3.43
LI20R	2.44	2.21	2.66	2.40	2.32	1.11	1.05	0.63	5.52	4.88	1.31	0.49	0.03
GB12R	3.65	3.25	4.06	3.53	3.12	2.89	1.70	1.43	8.65	7.22	2.18	1.10	0.75
2L	5.80	5.23	6.37	5.73	5.65	5.29	2.30	1.20	12.70	11.50	3.11	0.57	0.18
2R	5.78	5.28	6.27	5.72	5.60	3.67	1.91	2.40	12.65	10.25	3.06	0.71	1.29
PC6L	4.30	3.94	4.67	4.23	3.98	1.61	1.27	2.57	7.85	5.28	1.94	0.87	0.18
PC6R	4.99	4.58	5.41	4.83	4.51	3.33	1.82	2.67	12.45	9.78	1.83	1.65	3.50
LI10L	4.40	3.92	4.89	4.25	3.72	4.13	2.03	1.70	9.90	8.20	2.38	1.20	0.63
1L	4.57	4.05	5.09	4.37	3.97	4.63	2.15	2.17	11.98	9.82	2.25	1.55	1.96
1R	4.62	4.22	5.02	4.49	4.13	3.46	1.86	1.53	10.07	8.53	2.20	1.11	0.70
LI5L	4.26	3.90	4.63	4.15	3.94	2.28	1.51	1.88	9.55	7.67	1.89	1.17	1.80
LI5R	4.31	3.99	4.63	4.21	3.92	2.53	1.59	1.30	9.18	7.88	1.98	1.03	0.80
ST36L	7.06	6.40	7.71	6.93	6.58	6.96	2.64	2.73	14.30	11.57	3.63	0.72	0.11
ST36R	6.67	6.16	7.18	6.55	6.00	5.37	2.32	2.40	13.13	10.73	3.38	0.78	-0.16
3R	6.35	5.79	6.92	6.19	5.67	5.62	2.37	2.60	14.20	11.60	3.30	1.15	1.27
SP6R	5.33	4.88	5.78	5.25	5.15	2.41	1.55	3.08	9.80	6.72	2.35	0.75	0.30
KD3R	5.67	5.21	6.12	5.59	5.30	4.22	2.06	2.27	10.60	8.33	3.52	0.44	-0.65

Descriptive statistics of PPT_{mean} for Male in Visit 4													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.20	1.89	2.51	2.13	1.98	1.37	1.17	0.62	5.43	4.82	1.44	0.88	0.36
LI20R	2.48	2.24	2.71	2.44	2.43	1.20	1.10	0.50	5.52	5.02	1.41	0.49	0.17
GB12R	3.82	3.35	4.30	3.70	3.37	3.96	1.99	0.92	9.10	8.18	2.35	1.07	0.67
2L	5.75	5.15	6.35	5.62	5.22	5.85	2.42	1.98	14.13	12.15	3.39	0.86	0.97
2R	5.79	5.24	6.33	5.71	5.57	4.41	2.10	1.78	11.30	9.52	3.03	0.49	0.02
PC6L	4.48	4.08	4.87	4.43	4.43	1.83	1.35	2.12	7.58	5.47	2.16	0.49	-0.47
PC6R	5.07	4.62	5.51	4.93	4.58	3.82	1.95	2.35	11.67	9.32	2.41	1.23	1.36
LI10L	4.64	4.03	5.26	4.39	3.76	6.58	2.57	1.43	13.37	11.93	2.56	1.56	2.44
1L	4.75	4.17	5.34	4.57	4.05	5.91	2.43	1.75	11.30	9.55	2.49	1.20	0.79
1R	4.82	4.39	5.25	4.69	4.29	3.97	1.99	1.22	10.97	9.75	2.50	0.99	0.71
LI5L	4.41	4.02	4.81	4.35	4.23	2.66	1.63	1.82	8.37	6.55	2.25	0.74	-0.21
LI5R	4.50	4.14	4.87	4.38	4.11	3.18	1.78	1.90	11.57	9.67	1.99	1.28	1.84
ST36L	7.42	6.68	8.16	7.26	6.80	8.92	2.99	3.12	15.87	12.75	3.96	0.87	0.16
ST36R	7.01	6.49	7.53	6.93	6.67	5.54	2.35	2.67	12.82	10.15	3.36	0.49	-0.39
3R	6.21	5.64	6.77	6.04	5.72	5.71	2.39	2.42	15.27	12.85	2.87	1.24	2.37
SP6R	5.51	4.91	6.10	5.36	5.28	4.23	2.06	2.58	12.27	9.68	2.60	1.07	1.43
KD3R	5.97	5.42	6.51	5.84	5.53	6.13	2.48	2.13	12.18	10.05	3.15	0.80	0.09

Descriptive statistics of PPT_{median} for Female in Visit 1													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.64	1.46	1.83	1.61	1.60	0.61	0.78	0.15	4.10	3.95	1.00	0.64	1.02
LI20R	1.79	1.64	1.95	1.77	1.70	0.64	0.80	0.15	4.15	4.00	1.08	0.47	0.05
GB12R	2.75	2.48	3.01	2.67	2.50	1.51	1.23	0.45	7.15	6.70	1.80	0.95	1.52
2L	4.21	3.80	4.62	4.11	4.00	3.48	1.87	1.55	9.20	7.65	2.85	0.63	-0.33
2R	4.51	4.13	4.90	4.47	4.40	3.02	1.74	1.35	8.65	7.30	2.48	0.31	-0.51
PC6L	3.67	3.26	4.08	3.55	3.30	2.55	1.60	1.50	9.10	7.60	2.20	1.22	1.79
PC6R	3.78	3.53	4.03	3.73	3.75	1.48	1.22	1.05	7.15	6.10	1.40	0.67	0.51
LI10L	3.21	2.86	3.56	3.07	2.85	2.60	1.61	0.90	12.05	11.15	2.00	2.30	9.94
1L	3.33	3.04	3.62	3.23	3.28	1.79	1.34	1.40	7.05	5.65	1.66	1.06	0.90
1R	3.61	3.33	3.90	3.49	3.40	2.16	1.47	1.30	10.90	9.60	1.78	1.70	5.12
LI5L	3.21	2.89	3.53	3.06	2.80	2.15	1.47	0.85	8.50	7.65	1.60	1.62	2.94
LI5R	3.32	3.09	3.55	3.22	3.10	1.55	1.24	1.30	9.50	8.20	1.30	1.64	4.63
ST36L	5.10	4.66	5.53	4.98	4.70	3.83	1.96	1.40	12.20	10.80	2.31	1.03	1.65
ST36R	4.88	4.53	5.24	4.77	4.65	3.29	1.81	1.70	11.60	9.90	2.11	0.98	1.72
3R	4.73	4.32	5.14	4.60	4.30	3.83	1.96	1.35	10.90	9.55	2.80	0.95	0.88
SP6R	4.19	3.84	4.54	4.14	3.85	1.88	1.37	1.40	8.90	7.50	1.98	0.74	1.23
KD3R	4.20	3.86	4.55	4.08	3.90	2.85	1.69	1.20	9.90	8.70	1.95	1.14	1.52

Descriptive statistics of PPT_{median} for Female in Visit 2													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.54	1.38	1.70	1.54	1.50	0.45	0.67	0.20	2.80	2.60	1.15	-0.04	-0.89
LI20R	1.69	1.56	1.82	1.69	1.65	0.46	0.68	0.20	3.10	2.90	0.93	-0.09	-0.42
GB12R	2.80	2.56	3.04	2.78	2.70	1.24	1.11	0.50	5.50	5.00	1.55	0.31	-0.35
2L	4.30	3.93	4.68	4.22	4.20	2.90	1.70	1.35	9.50	8.15	2.25	0.80	0.59
2R	4.58	4.21	4.95	4.54	4.35	2.74	1.66	1.10	9.20	8.10	2.29	0.49	-0.10
PC6L	3.34	3.06	3.62	3.30	3.20	1.19	1.09	1.20	7.20	6.00	1.33	0.84	1.58
PC6R	3.84	3.59	4.09	3.82	3.80	1.50	1.22	0.50	7.70	7.20	1.35	0.35	0.77
LI10L	3.12	2.83	3.42	3.00	2.85	1.84	1.36	1.10	8.80	7.70	1.65	1.66	3.96
1L	3.26	3.02	3.49	3.20	3.20	1.13	1.06	1.40	6.15	4.75	1.53	0.56	0.25
1R	3.50	3.25	3.76	3.39	3.40	1.73	1.31	1.40	8.25	6.85	1.50	1.30	2.13
LI5L	3.30	3.01	3.59	3.18	2.90	1.77	1.33	1.25	8.40	7.15	1.40	1.72	3.68
LI5R	3.32	3.08	3.56	3.20	2.90	1.70	1.30	0.90	8.45	7.55	1.40	1.53	2.92
ST36L	5.04	4.64	5.44	4.95	4.78	3.23	1.80	1.75	11.70	9.95	2.04	0.95	1.69
ST36R	4.89	4.55	5.24	4.80	4.43	3.09	1.76	1.50	10.70	9.20	2.01	0.92	1.08
3R	4.65	4.28	5.02	4.52	4.20	3.16	1.78	1.70	10.00	8.30	2.10	1.10	1.40
SP6R	4.17	3.81	4.53	4.10	3.95	1.97	1.40	1.65	8.60	6.95	1.50	0.92	1.31
KD3R	4.21	3.88	4.53	4.11	3.98	2.49	1.58	1.35	9.10	7.75	1.84	0.89	0.68

Descriptive statistics of PPT_{median} for Female in Visit 3													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.69	1.52	1.87	1.68	1.60	0.55	0.74	0.20	3.40	3.20	1.05	0.18	-0.49
LI20R	1.84	1.70	1.99	1.85	1.90	0.54	0.73	0.20	3.80	3.60	1.05	-0.08	-0.36
GB12R	3.04	2.77	3.32	3.01	3.00	1.55	1.25	0.55	6.80	6.25	1.75	0.41	0.22
2L	4.66	4.27	5.06	4.62	4.30	3.25	1.80	1.10	8.75	7.65	2.05	0.54	-0.21
2R	4.78	4.42	5.14	4.73	4.70	2.55	1.60	1.65	10.00	8.35	2.08	0.51	0.73
PC6L	3.62	3.31	3.94	3.56	3.50	1.48	1.22	1.70	7.50	5.80	1.70	0.71	0.56
PC6R	3.94	3.67	4.21	3.89	3.90	1.68	1.30	1.35	7.70	6.35	1.83	0.51	0.00
LI10L	3.16	2.89	3.43	3.08	3.00	1.52	1.23	1.20	7.10	5.90	1.65	0.92	1.04
1L	3.39	3.15	3.64	3.38	3.23	1.25	1.12	0.70	6.00	5.30	1.58	0.18	-0.51
1R	3.73	3.46	4.01	3.66	3.50	1.99	1.41	0.80	8.50	7.70	2.05	0.81	0.92
LI5L	3.35	3.07	3.63	3.25	3.10	1.61	1.27	1.30	7.70	6.40	1.60	1.22	1.75
LI5R	3.47	3.23	3.71	3.39	3.10	1.69	1.30	0.95	7.40	6.45	1.55	1.01	1.01
ST36L	5.23	4.83	5.64	5.15	5.10	3.32	1.82	2.00	10.00	8.00	2.31	0.63	0.12
ST36R	5.11	4.74	5.48	5.01	4.78	3.60	1.90	1.40	10.80	9.40	2.46	0.79	0.56
3R	4.83	4.45	5.22	4.73	4.70	3.43	1.85	1.35	11.00	9.65	2.45	0.91	0.94
SP6R	4.37	3.95	4.79	4.27	4.00	2.65	1.63	1.70	9.15	7.45	2.18	0.92	0.75
KD3R	4.25	3.96	4.54	4.22	4.08	1.97	1.40	1.70	7.70	6.00	2.03	0.31	-0.42

Descriptive statistics of PPT_{median} for Female in Visit 4													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.75	1.55	1.94	1.74	1.60	0.66	0.81	0.25	3.50	3.25	1.40	0.09	-0.86
LI20R	1.96	1.80	2.12	1.94	2.00	0.69	0.83	0.30	4.50	4.20	1.10	0.33	0.12
GB12R	3.11	2.85	3.38	3.10	3.05	1.52	1.23	0.60	5.65	5.05	1.85	0.17	-0.64
2L	4.85	4.41	5.28	4.77	4.60	4.02	2.01	0.80	9.60	8.80	2.70	0.57	-0.28
2R	4.99	4.57	5.40	4.91	4.70	3.50	1.87	1.75	10.50	8.75	2.38	0.70	0.12
PC6L	3.74	3.40	4.08	3.66	3.55	1.76	1.33	1.70	7.95	6.25	1.63	0.86	0.91
PC6R	4.20	3.92	4.48	4.16	4.00	1.87	1.37	1.00	7.90	6.90	2.00	0.47	-0.12
LI10L	3.38	3.10	3.67	3.31	3.30	1.76	1.33	1.00	7.30	6.30	1.55	0.85	1.06
1L	3.49	3.21	3.77	3.46	3.20	1.60	1.26	0.80	7.00	6.20	1.88	0.38	-0.25
1R	3.86	3.56	4.16	3.78	3.50	2.34	1.53	0.70	8.30	7.60	2.18	0.76	0.23
LI5L	3.48	3.20	3.75	3.39	3.30	1.55	1.24	1.55	8.45	6.90	1.70	1.15	2.36
LI5R	3.70	3.45	3.94	3.63	3.40	1.78	1.34	1.10	8.80	7.70	1.85	0.93	1.12
ST36L	5.46	5.00	5.91	5.36	5.13	4.15	2.04	1.80	11.30	9.50	2.48	0.68	0.57
ST36R	5.38	5.00	5.77	5.26	5.13	3.89	1.97	2.00	12.30	10.30	2.45	0.98	1.63
3R	5.02	4.64	5.40	4.90	4.85	3.31	1.82	1.70	11.40	9.70	1.90	1.05	1.62
SP6R	4.63	4.22	5.04	4.58	4.20	2.54	1.59	1.50	9.60	8.10	2.20	0.72	0.49
KD3R	4.50	4.19	4.82	4.45	4.35	2.39	1.55	1.60	8.60	7.00	2.06	0.43	-0.24

Descriptive statistics of PPT_{median} for Male in Visit 1													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.08	1.83	2.32	2.05	1.95	0.85	0.92	0.30	4.10	3.80	1.21	0.51	-0.22
LI20R	2.29	2.11	2.47	2.29	2.18	0.74	0.86	0.20	4.35	4.15	1.21	0.13	-0.27
GB12R	3.26	2.95	3.57	3.18	2.83	1.67	1.29	1.25	7.40	6.15	1.65	1.07	1.07
2L	5.06	4.57	5.56	4.97	4.90	4.06	2.02	2.10	10.00	7.90	3.25	0.53	-0.44
2R	5.18	4.70	5.67	5.10	4.90	3.52	1.88	1.50	11.70	10.20	2.80	0.75	1.18
PC6L	4.11	3.71	4.51	4.03	3.68	1.89	1.37	2.20	7.85	5.65	1.95	0.81	-0.01
PC6R	4.57	4.21	4.92	4.44	4.35	2.39	1.55	2.50	9.80	7.30	1.98	1.24	1.92
LI10L	4.16	3.70	4.62	4.01	3.63	3.75	1.94	1.60	11.70	10.10	2.23	1.35	2.51
1L	4.11	3.70	4.52	3.99	3.55	2.97	1.72	1.65	9.20	7.55	2.25	0.97	0.39
1R	4.38	4.05	4.71	4.27	4.10	2.35	1.53	2.25	8.60	6.35	2.16	0.90	0.36
LI5L	3.68	3.41	3.95	3.65	3.48	1.23	1.11	1.70	6.30	4.60	1.59	0.47	-0.60
LI5R	4.00	3.69	4.31	3.84	3.63	2.30	1.52	2.15	9.60	7.45	1.86	1.64	3.18
ST36L	6.46	5.94	6.97	6.36	6.30	4.33	2.08	2.90	12.00	9.10	2.63	0.69	0.33
ST36R	6.14	5.70	6.57	6.09	5.90	3.90	1.97	2.50	12.00	9.50	2.48	0.47	-0.02
3R	5.49	5.11	5.88	5.40	5.30	2.69	1.64	2.90	10.30	7.40	2.20	0.76	0.39
SP6R	5.24	4.68	5.80	5.14	4.88	3.69	1.92	2.20	12.00	9.80	3.00	0.93	1.66
KD3R	5.18	4.74	5.61	5.10	5.30	3.90	1.97	1.60	9.75	8.15	2.83	0.45	-0.34

Descriptive statistics of PPT_{median} for Male in Visit 2													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.09	1.84	2.34	2.05	1.95	0.90	0.95	0.30	5.55	5.25	1.25	0.88	1.88
LI20R	2.30	2.11	2.50	2.28	2.15	0.79	0.89	0.30	4.75	4.45	1.10	0.45	0.14
GB12R	3.43	3.08	3.77	3.33	3.10	2.04	1.43	1.15	7.80	6.65	1.70	1.01	1.02
2L	5.46	4.94	5.98	5.37	5.15	4.46	2.11	1.95	10.40	8.45	2.93	0.70	-0.15
2R	5.44	4.95	5.92	5.40	5.50	3.52	1.88	1.65	9.80	8.15	2.90	0.25	-0.45
PC6L	4.36	3.99	4.73	4.29	4.05	1.61	1.27	2.55	7.40	4.85	1.76	0.82	-0.10
PC6R	4.72	4.35	5.08	4.59	4.43	2.52	1.59	1.95	11.40	9.45	1.80	1.48	3.55
LI10L	4.14	3.72	4.57	3.99	3.60	3.20	1.79	1.90	9.30	7.40	1.73	1.36	1.26
1L	4.29	3.86	4.73	4.13	4.00	3.31	1.82	2.10	10.50	8.40	2.28	1.32	1.95
1R	4.41	4.07	4.74	4.32	4.25	2.43	1.56	1.70	9.60	7.90	1.99	0.85	0.69
LI5L	3.96	3.66	4.25	3.90	3.90	1.48	1.22	1.80	7.30	5.50	1.65	0.66	0.17
LI5R	4.09	3.78	4.39	3.96	3.63	2.22	1.49	1.90	9.40	7.50	2.00	1.22	1.37
ST36L	7.01	6.39	7.63	6.86	6.65	6.27	2.50	3.25	15.70	12.45	3.83	0.86	1.03
ST36R	6.53	6.05	7.02	6.42	6.40	4.85	2.20	3.20	12.50	9.30	2.65	0.67	-0.05
3R	5.79	5.37	6.22	5.72	5.60	3.24	1.80	2.95	11.20	8.25	2.60	0.64	-0.02
SP6R	5.31	4.77	5.85	5.25	5.30	3.47	1.86	2.70	10.00	7.30	3.53	0.37	-0.76
KD3R	5.43	4.99	5.88	5.33	5.40	4.02	2.00	2.50	11.20	8.70	2.98	0.64	-0.09

Descriptive statistics of PPT_{median} for Male in Visit 3													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.17	1.87	2.46	2.09	2.18	1.24	1.12	0.60	6.80	6.20	1.40	1.36	3.82
LI20R	2.43	2.21	2.66	2.40	2.33	1.11	1.05	0.70	5.40	4.70	1.41	0.44	-0.11
GB12R	3.64	3.23	4.06	3.52	3.23	3.00	1.73	1.30	9.00	7.70	2.06	1.13	0.85
2L	5.78	5.21	6.35	5.70	5.60	5.27	2.30	1.30	12.80	11.50	3.13	0.59	0.23
2R	5.83	5.32	6.33	5.75	5.58	3.85	1.96	2.40	12.70	10.30	3.06	0.76	1.09
PC6L	4.27	3.91	4.64	4.20	4.00	1.57	1.25	2.50	7.60	5.10	2.05	0.80	-0.03
PC6R	5.02	4.59	5.44	4.83	4.45	3.51	1.87	2.70	12.90	10.20	1.88	1.79	4.11
LI10L	4.41	3.92	4.90	4.26	3.80	4.24	2.06	1.70	9.90	8.20	2.46	1.22	0.71
1L	4.58	4.05	5.10	4.37	3.90	4.82	2.19	2.20	12.00	9.80	2.23	1.56	1.93
1R	4.65	4.24	5.06	4.51	4.05	3.65	1.91	1.50	10.50	9.00	2.21	1.15	0.86
LI5L	4.27	3.89	4.64	4.14	3.95	2.44	1.56	1.90	9.50	7.60	2.04	1.28	2.22
LI5R	4.30	3.97	4.63	4.19	3.95	2.63	1.62	1.40	9.45	8.05	1.98	1.07	1.05
ST36L	7.09	6.42	7.76	6.95	6.60	7.36	2.71	3.00	14.50	11.50	3.78	0.75	0.06
ST36R	6.63	6.12	7.14	6.52	5.90	5.32	2.31	2.20	13.20	11.00	3.45	0.76	-0.11
3R	6.37	5.80	6.93	6.21	5.70	5.64	2.38	2.70	14.20	11.50	3.25	1.13	1.18
SP6R	5.36	4.90	5.82	5.28	5.18	2.46	1.57	3.00	9.70	6.70	2.45	0.64	0.01
KD3R	5.64	5.19	6.10	5.59	5.30	4.18	2.04	2.20	10.70	8.50	3.43	0.38	-0.76

Descriptive statistics of PPT_{median} for Male in Visit 4													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.21	1.90	2.52	2.14	2.00	1.35	1.16	0.60	5.50	4.90	1.40	0.84	0.24
LI20R	2.48	2.24	2.72	2.44	2.48	1.24	1.11	0.40	5.50	5.10	1.36	0.43	0.08
GB12R	3.81	3.34	4.29	3.69	3.33	4.01	2.00	0.90	9.00	8.10	2.24	1.05	0.57
2L	5.72	5.12	6.32	5.59	5.00	5.92	2.43	1.75	14.00	12.25	3.30	0.83	0.78
2R	5.79	5.24	6.33	5.71	5.43	4.46	2.11	1.85	11.40	9.55	3.09	0.55	0.08
PC6L	4.49	4.09	4.89	4.45	4.43	1.90	1.38	2.00	7.55	5.55	2.04	0.49	-0.53
PC6R	5.07	4.62	5.53	4.91	4.68	3.97	1.99	2.40	11.50	9.10	2.35	1.28	1.50
LI10L	4.62	4.00	5.24	4.36	3.68	6.75	2.60	1.35	13.50	12.15	2.59	1.61	2.58
1L	4.77	4.17	5.36	4.56	4.20	6.13	2.47	1.80	12.05	10.25	2.68	1.27	1.07
1R	4.83	4.40	5.27	4.71	4.38	4.09	2.02	1.15	10.90	9.75	2.73	0.93	0.46
LI5L	4.38	3.99	4.78	4.32	4.20	2.69	1.64	1.90	8.20	6.30	2.24	0.78	-0.18
LI5R	4.51	4.13	4.88	4.38	4.03	3.44	1.86	1.90	11.90	10.00	2.18	1.27	1.79
ST36L	7.46	6.70	8.22	7.28	6.60	9.48	3.08	3.00	16.20	13.20	3.93	0.89	0.17
ST36R	7.03	6.49	7.57	6.96	6.80	5.89	2.43	2.45	13.00	10.55	3.88	0.46	-0.47
3R	6.21	5.63	6.79	6.03	5.80	6.01	2.45	2.30	15.60	13.30	2.80	1.27	2.46
SP6R	5.50	4.90	6.09	5.35	5.23	4.24	2.06	2.60	12.50	9.90	2.38	1.16	1.79
KD3R	5.91	5.37	6.46	5.78	5.50	6.16	2.48	2.20	12.35	10.15	3.05	0.81	0.17

Descriptive statistics of PPT_{mean} for Control of Female													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.44	1.33	1.54	1.39	1.35	0.56	0.75	0.15	4.15	4.00	0.88	0.84	0.91
LI20R	1.50	1.39	1.61	1.47	1.43	0.60	0.78	0.17	4.02	3.85	1.09	0.60	-0.05
GB12R	2.65	2.47	2.82	2.58	2.48	1.62	1.27	0.50	7.52	7.02	1.75	0.85	0.78
2L	3.98	3.74	4.22	3.88	3.68	2.87	1.70	1.08	9.17	8.08	2.20	0.88	0.50
2R	4.39	4.16	4.63	4.33	4.24	2.80	1.67	1.25	9.08	7.83	2.30	0.55	-0.12
PC6L	3.69	3.50	3.89	3.61	3.50	1.87	1.37	1.40	9.23	7.83	1.76	0.97	1.44
PC6R	3.79	3.60	3.98	3.74	3.63	1.83	1.35	0.57	7.72	7.15	1.75	0.63	0.51
LI10L	3.04	2.84	3.24	2.91	2.78	2.07	1.44	0.98	12.15	11.17	1.54	2.23	9.29
1L	3.30	3.13	3.47	3.24	3.24	1.44	1.20	0.87	7.20	6.33	1.61	0.67	0.47
1R	3.45	3.25	3.64	3.36	3.27	1.91	1.38	0.70	10.98	10.28	1.73	1.31	3.92
LI5L	3.48	3.28	3.68	3.38	3.10	1.99	1.41	0.85	8.63	7.78	1.88	1.09	1.34
LI5R	3.39	3.22	3.57	3.32	3.13	1.55	1.25	0.97	9.07	8.10	1.61	1.16	2.15
ST36L	5.38	5.09	5.66	5.26	5.01	4.05	2.01	1.48	11.67	10.18	2.33	0.89	0.80
ST36R	5.34	5.07	5.61	5.23	5.03	3.60	1.90	1.53	12.27	10.73	2.22	1.00	1.67
3R	4.88	4.61	5.14	4.74	4.53	3.57	1.89	1.48	11.33	9.85	2.25	1.08	1.40
SP6R	4.43	4.22	4.65	4.36	4.11	2.30	1.52	1.50	9.35	7.85	1.91	0.74	0.58
KD3R	4.49	4.26	4.73	4.42	4.33	2.79	1.67	1.27	9.78	8.52	2.10	0.63	0.30

Descriptive statistics of PPT_{mean} for Intervention of Female													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.16	2.05	2.26	2.15	2.14	0.25	0.50	1.13	3.48	2.35	0.78	0.15	-0.54
LI20R	2.11	2.02	2.19	2.07	2.09	0.38	0.62	1.05	4.53	3.48	0.90	0.72	0.79
GB12R	3.35	3.19	3.51	3.33	3.36	0.90	0.95	1.45	5.78	4.33	1.31	0.37	-0.24
2L	5.24	4.94	5.55	5.18	4.85	3.14	1.77	2.20	9.68	7.48	2.70	0.54	-0.45
2R	5.24	4.96	5.52	5.17	4.95	2.55	1.60	2.15	10.23	8.08	2.09	0.67	0.51
PC6L	3.24	2.97	3.52	3.18	3.16	0.89	0.94	1.78	6.12	4.33	1.09	0.91	1.08
PC6R	4.10	3.93	4.27	4.07	3.97	1.29	1.13	2.00	7.25	5.25	1.65	0.44	-0.60
LI10L	3.51	3.30	3.73	3.43	3.32	1.62	1.27	1.33	7.58	6.25	1.74	0.88	0.74
1L	3.48	3.28	3.67	3.42	3.27	1.28	1.13	1.83	6.38	4.55	1.71	0.53	-0.43
1R	3.89	3.70	4.08	3.78	3.57	2.04	1.43	1.75	8.42	6.67	1.86	1.05	0.90
LI5L	3.14	2.94	3.34	3.02	2.87	1.37	1.17	1.60	8.52	6.92	1.13	2.11	6.34
LI5R	3.50	3.34	3.66	3.40	3.22	1.71	1.31	1.55	9.17	7.62	1.50	1.27	1.92
ST36L	4.95	4.66	5.25	4.90	4.98	2.83	1.68	1.78	9.93	8.15	2.28	0.44	0.09
ST36R	4.82	4.58	5.05	4.72	4.62	3.01	1.74	1.40	10.73	9.33	2.28	0.81	0.66
3R	4.73	4.47	5.00	4.63	4.48	3.03	1.74	1.38	10.27	8.88	2.17	0.89	0.76
SP6R	4.04	3.63	4.45	3.94	3.61	2.01	1.42	1.93	8.62	6.68	1.35	1.32	1.86
KD3R	4.05	3.85	4.25	3.98	3.87	1.86	1.36	1.72	8.93	7.22	1.90	0.74	0.37

Descriptive statistics of PPT_{mean} for Control of Male													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.76	1.63	1.89	1.73	1.67	0.63	0.80	0.27	3.82	3.55	1.11	0.46	-0.40
LI20R	1.84	1.70	1.97	1.80	1.75	0.68	0.83	0.27	4.08	3.82	1.07	0.53	-0.06
GB12R	2.82	2.65	3.00	2.78	2.68	1.13	1.07	0.92	5.93	5.02	1.60	0.69	-0.07
2L	4.79	4.49	5.08	4.71	4.68	3.20	1.79	1.20	9.73	8.53	2.70	0.50	-0.19
2R	5.26	4.93	5.59	5.18	5.06	3.99	2.00	1.50	12.65	11.15	2.90	0.75	0.90
PC6L	4.35	4.14	4.56	4.27	4.08	1.61	1.27	2.53	7.85	5.32	1.90	0.80	-0.07
PC6R	4.53	4.33	4.73	4.48	4.47	1.45	1.20	2.35	8.55	6.20	1.81	0.64	0.29
LI10L	3.48	3.29	3.68	3.40	3.21	1.38	1.17	1.43	8.38	6.95	1.35	1.18	2.13
1L	3.65	3.44	3.87	3.57	3.30	1.71	1.31	1.75	9.57	7.82	1.84	1.20	2.09
1R	3.94	3.69	4.18	3.83	3.39	2.24	1.50	1.22	10.07	8.85	2.15	1.16	1.51
LI5L	3.70	3.49	3.90	3.61	3.59	1.53	1.24	1.75	9.55	7.80	1.60	1.28	3.31
LI5R	3.90	3.70	4.10	3.82	3.76	1.47	1.21	1.93	8.93	7.00	1.58	1.22	2.52
ST36L	6.18	5.84	6.52	6.03	5.97	4.32	2.08	3.00	14.63	11.63	2.67	1.21	2.41
ST36R	6.33	5.98	6.68	6.23	5.94	4.56	2.14	2.67	13.13	10.47	3.01	0.73	-0.03
3R	5.47	5.15	5.78	5.30	5.26	3.66	1.91	2.42	15.27	12.85	2.04	1.89	6.67
SP6R	5.31	5.02	5.60	5.22	5.16	3.02	1.74	2.40	12.27	9.87	2.40	0.88	1.69
KD3R	5.37	5.07	5.67	5.28	5.28	3.28	1.81	1.77	11.40	9.63	2.30	0.69	0.63

Descriptive statistics of PPT_{mean} for Intervention of Male													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.77	2.54	3.00	2.69	2.58	1.20	1.10	1.07	6.60	5.53	1.42	1.07	1.47
LI20R	2.77	2.65	2.89	2.73	2.65	0.79	0.89	0.98	5.52	4.53	1.18	0.72	0.32
GB12R	4.30	4.00	4.60	4.19	4.00	3.15	1.77	1.70	9.10	7.40	2.44	0.93	0.08
2L	6.45	6.01	6.88	6.36	5.89	5.52	2.35	2.52	14.13	11.62	3.47	0.59	-0.06
2R	6.01	5.66	6.36	5.97	5.99	3.02	1.74	2.40	11.30	8.90	2.38	0.34	0.04
PC6L	4.17	3.75	4.59	4.11	3.78	2.09	1.45	2.12	7.58	5.47	2.17	0.63	-0.40
PC6R	5.14	4.82	5.46	4.98	4.53	4.26	2.06	1.97	12.45	10.48	2.62	1.22	1.20
LI10L	5.24	4.82	5.65	5.08	4.67	6.04	2.46	1.78	13.37	11.58	3.27	0.97	0.58
1L	5.29	4.88	5.69	5.15	4.68	5.51	2.35	2.03	11.98	9.95	2.93	0.93	0.10
1R	5.00	4.75	5.25	4.89	4.53	3.13	1.77	1.53	10.97	9.43	2.11	0.98	0.57
LI5L	4.53	4.28	4.79	4.46	4.38	2.12	1.46	1.88	8.37	6.48	2.08	0.69	-0.16
LI5R	4.41	4.19	4.64	4.29	3.88	3.10	1.76	1.30	11.57	10.27	2.16	1.15	1.04
ST36L	7.96	7.45	8.47	7.85	7.72	7.65	2.77	2.73	15.87	13.13	3.81	0.48	-0.15
ST36R	6.81	6.48	7.15	6.73	6.37	5.06	2.25	2.40	12.82	10.42	3.03	0.55	-0.25
3R	6.52	6.16	6.88	6.42	5.89	4.61	2.15	2.60	13.20	10.60	3.25	0.69	0.05
SP6R	5.41	4.80	6.02	5.30	4.83	4.44	2.11	2.87	10.08	7.22	3.58	0.61	-0.83
KD3R	5.70	5.35	6.05	5.58	5.44	5.55	2.36	2.13	12.18	10.05	3.66	0.60	-0.32

Descriptive statistics of PPT_{mean} for Control of Female in Visit 1													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.54	1.29	1.80	1.49	1.50	0.80	0.90	0.15	4.15	4.00	0.92	1.03	1.10
LI20R	1.55	1.31	1.79	1.50	1.55	0.71	0.84	0.33	4.02	3.68	1.05	0.91	0.72
GB12R	2.59	2.19	2.98	2.48	2.37	1.89	1.38	0.50	7.52	7.02	1.81	1.31	2.46
2L	3.89	3.36	4.41	3.75	3.62	3.33	1.83	1.65	9.17	7.52	2.68	0.91	0.51
2R	4.30	3.80	4.81	4.23	4.20	3.13	1.77	1.58	8.60	7.02	2.92	0.50	-0.37
PC6L	3.86	3.39	4.33	3.74	3.45	2.68	1.64	1.58	9.23	7.65	2.22	1.18	1.71
PC6R	3.76	3.36	4.15	3.71	3.53	1.90	1.38	1.15	7.33	6.18	1.77	0.73	0.18
LI10L	3.15	2.63	3.67	2.96	2.57	3.31	1.82	0.98	12.15	11.17	2.30	2.68	11.50
1L	3.35	2.97	3.74	3.25	3.35	1.82	1.35	1.55	7.20	5.65	1.76	1.16	1.36
1R	3.57	3.10	4.03	3.40	2.97	2.63	1.62	1.33	10.98	9.65	1.83	2.26	8.12
LI5L	3.46	2.98	3.94	3.32	2.93	2.84	1.68	0.85	8.63	7.78	2.24	1.36	1.77
LI5R	3.36	2.95	3.77	3.24	3.07	2.03	1.42	1.43	9.07	7.63	1.64	1.76	4.35
ST36L	5.35	4.76	5.94	5.23	4.88	4.24	2.06	1.48	11.67	10.18	2.09	1.07	1.66
ST36R	5.31	4.74	5.87	5.17	5.07	3.83	1.96	1.65	11.83	10.18	2.45	1.17	2.25
3R	4.87	4.29	5.45	4.74	4.42	4.08	2.02	1.48	10.85	9.37	2.46	1.10	1.18
SP6R	4.31	3.90	4.71	4.27	3.98	1.99	1.41	1.50	8.00	6.50	2.03	0.48	-0.11
KD3R	4.53	4.00	5.07	4.44	4.33	3.49	1.87	1.27	9.78	8.52	1.85	0.93	0.90

Descriptive statistics of PPT_{mean} for Control of Female in Visit 2													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.34	1.15	1.52	1.32	1.35	0.42	0.65	0.20	2.83	2.63	0.96	0.39	-0.67
LI20R	1.38	1.17	1.59	1.35	1.43	0.53	0.73	0.23	3.10	2.87	1.01	0.47	-0.26
GB12R	2.62	2.28	2.97	2.58	2.48	1.48	1.22	0.53	5.52	4.98	1.75	0.63	-0.11
2L	3.79	3.36	4.23	3.70	3.33	2.28	1.51	1.45	8.55	7.10	1.94	0.94	0.96
2R	4.25	3.80	4.71	4.21	4.12	2.53	1.59	1.25	7.82	6.57	1.85	0.59	0.02
PC6L	3.48	3.17	3.80	3.44	3.42	1.22	1.10	1.40	6.75	5.35	1.29	0.62	0.61
PC6R	3.75	3.37	4.12	3.72	3.62	1.70	1.30	0.57	7.63	7.07	1.55	0.43	1.12
LI10L	3.02	2.61	3.43	2.85	2.80	2.04	1.43	1.23	8.97	7.73	1.08	2.39	7.70
1L	3.27	2.95	3.59	3.22	3.27	1.23	1.11	1.48	6.10	4.62	1.53	0.54	0.35
1R	3.33	2.97	3.69	3.25	3.38	1.56	1.25	1.23	6.97	5.73	1.62	0.93	0.89
LI5L	3.46	3.05	3.86	3.36	3.00	1.97	1.40	1.23	8.40	7.17	1.53	1.24	1.90
LI5R	3.34	2.99	3.70	3.27	3.08	1.54	1.24	0.97	7.33	6.37	1.73	1.01	1.09
ST36L	5.20	4.65	5.75	5.10	5.02	3.65	1.91	1.95	11.53	9.58	2.19	0.93	1.46
ST36R	5.21	4.70	5.72	5.14	4.73	3.19	1.78	1.53	10.37	8.83	2.09	0.74	0.79
3R	4.75	4.24	5.26	4.63	4.22	3.15	1.77	1.65	10.28	8.63	1.87	1.16	1.97
SP6R	4.31	3.90	4.72	4.24	4.08	2.03	1.43	1.90	8.67	6.77	1.43	0.97	1.19
KD3R	4.42	3.91	4.92	4.34	4.33	3.06	1.75	1.38	8.95	7.57	1.82	0.75	0.31

Descriptive statistics of PPT_{mean} for Control of Female in Visit 3													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.45	1.24	1.66	1.42	1.35	0.52	0.72	0.17	3.37	3.20	0.94	0.74	0.57
LI20R	1.54	1.32	1.76	1.53	1.42	0.60	0.77	0.17	3.00	2.83	1.20	0.32	-0.78
GB12R	2.73	2.35	3.12	2.66	2.62	1.79	1.34	0.55	6.57	6.02	1.76	0.73	0.50
2L	4.03	3.57	4.49	3.95	3.75	2.54	1.59	1.08	8.65	7.57	1.53	0.91	1.13
2R	4.43	3.98	4.88	4.38	4.43	2.49	1.58	1.63	8.52	6.88	2.09	0.39	0.09
PC6L	3.64	3.29	4.00	3.59	3.70	1.52	1.23	1.72	7.43	5.72	1.73	0.56	0.36
PC6R	3.78	3.38	4.17	3.71	3.77	1.90	1.38	1.15	7.72	6.57	1.88	0.72	0.84
LI10L	2.95	2.61	3.30	2.86	2.77	1.45	1.20	1.33	7.13	5.80	1.53	1.18	1.99
1L	3.34	3.02	3.66	3.34	3.27	1.22	1.11	0.87	5.65	4.78	1.61	0.08	-0.44
1R	3.51	3.14	3.88	3.49	3.42	1.67	1.29	0.72	6.80	6.08	1.88	0.34	-0.07
LI5L	3.49	3.12	3.87	3.43	3.28	1.68	1.30	1.28	7.07	5.78	1.78	0.83	0.42
LI5R	3.39	3.06	3.72	3.33	3.12	1.34	1.16	1.02	6.85	5.83	1.59	0.77	1.06
ST36L	5.41	4.85	5.97	5.34	5.00	3.80	1.95	2.28	9.83	7.55	2.58	0.53	-0.43
ST36R	5.21	4.73	5.70	5.15	4.88	2.83	1.68	1.97	9.73	7.77	2.03	0.53	0.29
3R	4.89	4.34	5.45	4.76	4.65	3.72	1.93	2.05	11.00	8.95	2.78	0.97	1.23
SP6R	4.46	3.98	4.94	4.37	3.97	2.80	1.67	1.55	9.35	7.80	2.08	0.77	0.79
KD3R	4.42	4.00	4.84	4.40	4.50	2.10	1.45	1.78	7.77	5.98	2.13	0.11	-0.46

Descriptive statistics of PPT_{mean} for Control of Female in Visit 4													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.41	1.21	1.62	1.38	1.35	0.50	0.71	0.28	3.40	3.12	0.72	0.62	0.32
LI20R	1.54	1.32	1.76	1.51	1.50	0.59	0.77	0.32	3.65	3.33	1.13	0.57	-0.18
GB12R	2.64	2.30	2.98	2.59	2.45	1.41	1.19	0.60	5.45	4.85	1.72	0.63	-0.12
2L	4.22	3.69	4.75	4.13	3.92	3.42	1.85	1.08	8.83	7.75	2.42	0.78	0.00
2R	4.58	4.07	5.09	4.50	4.32	3.15	1.78	1.73	9.08	7.35	2.28	0.68	-0.03
PC6L	3.79	3.37	4.21	3.71	3.52	2.10	1.45	1.58	7.95	6.37	1.85	0.79	0.48
PC6R	3.89	3.49	4.29	3.83	3.63	1.91	1.38	1.02	7.65	6.63	1.82	0.66	0.48
LI10L	3.04	2.68	3.40	2.96	2.80	1.57	1.25	1.07	6.97	5.90	1.55	0.97	1.29
1L	3.24	2.88	3.60	3.20	2.95	1.58	1.26	0.95	6.63	5.68	1.88	0.56	-0.11
1R	3.38	2.99	3.77	3.31	3.00	1.86	1.36	0.70	6.97	6.27	1.85	0.79	0.35
LI5L	3.51	3.15	3.87	3.45	3.27	1.59	1.26	1.42	6.83	5.42	1.97	0.60	0.01
LI5R	3.48	3.14	3.82	3.43	3.22	1.39	1.18	1.03	7.18	6.15	1.58	0.77	0.78
ST36L	5.55	4.93	6.17	5.42	5.08	4.69	2.17	2.33	11.28	8.95	2.09	0.99	0.83
ST36R	5.64	5.02	6.26	5.48	5.33	4.66	2.16	1.95	12.27	10.32	2.68	1.17	1.92
3R	4.99	4.45	5.53	4.85	4.83	3.54	1.88	1.77	11.33	9.57	2.00	1.17	2.12
SP6R	4.65	4.20	5.10	4.59	4.30	2.44	1.56	1.67	9.12	7.45	2.06	0.70	0.48
KD3R	4.59	4.12	5.06	4.55	4.23	2.67	1.63	1.78	8.73	6.95	2.09	0.42	-0.31

Descriptive statistics of PPT_{mean} for Intervention of Female in Visit 1													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.93	1.75	2.12	1.93	1.88	0.17	0.42	1.18	2.68	1.50	0.68	0.14	-0.79
LI20R	2.03	1.85	2.21	2.00	1.92	0.45	0.67	1.05	4.23	3.18	1.06	0.77	0.61
GB12R	3.04	2.69	3.38	2.98	3.00	0.97	0.98	1.45	5.68	4.23	1.12	0.77	0.86
2L	4.75	4.13	5.36	4.69	4.27	3.12	1.77	2.20	8.80	6.60	3.05	0.45	-0.76
2R	4.96	4.43	5.49	4.94	4.83	2.07	1.44	2.15	7.98	5.83	1.60	0.36	-0.16
PC6L	2.99	2.29	3.69	2.92	2.78	1.21	1.10	1.78	5.57	3.78	1.56	1.16	1.37
PC6R	3.79	3.49	4.09	3.75	3.74	0.99	0.99	2.00	6.38	4.38	1.22	0.60	0.60
LI10L	3.32	2.87	3.76	3.22	3.28	1.65	1.29	1.65	6.80	5.15	1.63	1.01	0.88
1L	3.32	2.88	3.77	3.24	3.27	1.56	1.25	1.92	6.38	4.47	1.66	0.96	0.32
1R	3.68	3.34	4.01	3.60	3.58	1.57	1.25	1.82	8.00	6.18	1.60	1.10	1.56
LI5L	2.90	2.54	3.27	2.79	2.70	1.08	1.04	1.73	6.82	5.08	1.05	1.96	5.23
LI5R	3.33	3.08	3.59	3.28	3.23	1.08	1.04	1.77	6.50	4.73	1.03	0.83	0.38
ST36L	4.73	4.11	5.35	4.68	4.23	2.85	1.69	2.08	8.60	6.52	2.30	0.57	-0.50
ST36R	4.46	4.04	4.87	4.38	4.22	2.27	1.51	2.28	8.65	6.37	2.31	0.60	0.03
3R	4.60	4.04	5.16	4.50	4.29	3.23	1.80	1.80	10.27	8.47	2.90	0.82	0.87
SP6R	3.80	3.11	4.49	3.80	3.52	1.17	1.08	1.93	5.58	3.65	1.81	0.21	-0.60
KD3R	3.93	3.49	4.36	3.81	3.47	2.09	1.45	1.97	8.93	6.97	1.93	1.28	2.09

Descriptive statistics of PPT_{mean} for Intervention of Female in Visit 2													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.01	1.81	2.22	2.02	1.96	0.21	0.46	1.13	2.80	1.67	0.69	0.02	-0.69
LI20R	1.97	1.83	2.10	1.95	2.05	0.26	0.51	1.17	3.20	2.03	0.78	0.41	-0.39
GB12R	3.12	2.82	3.41	3.11	2.95	0.72	0.85	1.60	4.68	3.08	1.55	0.26	-0.92
2L	4.95	4.38	5.52	4.86	4.64	2.69	1.64	2.45	9.40	6.95	2.18	0.79	0.31
2R	5.11	4.52	5.71	5.06	4.72	2.65	1.63	2.15	9.40	7.25	1.87	0.52	0.31
PC6L	2.94	2.43	3.46	2.91	2.83	0.66	0.81	1.90	4.63	2.73	1.11	0.89	0.39
PC6R	3.93	3.60	4.26	3.90	3.86	1.16	1.08	2.25	6.23	3.98	1.31	0.46	-0.44
LI10L	3.32	2.86	3.79	3.24	3.12	1.77	1.33	1.33	7.58	6.25	1.99	1.06	1.60
1L	3.27	2.91	3.64	3.22	3.25	1.06	1.03	1.83	6.12	4.28	1.75	0.67	0.27
1R	3.65	3.29	4.01	3.52	3.28	1.83	1.35	1.92	8.25	6.33	1.71	1.52	2.85
LI5L	3.05	2.64	3.46	2.90	2.83	1.40	1.18	1.77	8.23	6.47	1.12	2.86	10.85
LI5R	3.28	2.98	3.57	3.15	2.95	1.45	1.21	1.87	7.78	5.92	1.40	1.73	3.59
ST36L	4.79	4.21	5.36	4.71	4.53	2.48	1.57	1.78	9.15	7.37	2.07	0.75	1.17
ST36R	4.62	4.18	5.06	4.52	4.28	2.59	1.61	1.95	9.55	7.60	1.93	1.01	1.45
3R	4.56	4.01	5.10	4.42	4.43	3.03	1.74	1.93	9.60	7.67	2.07	1.11	1.35
SP6R	3.69	2.93	4.44	3.63	3.32	1.42	1.19	2.03	6.38	4.35	1.22	0.92	1.33
KD3R	3.88	3.52	4.24	3.81	3.43	1.44	1.20	2.23	6.87	4.63	1.61	0.69	-0.34

Descriptive statistics of PPT_{mean} for Intervention of Female in Visit 3													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.20	2.00	2.41	2.20	2.26	0.22	0.47	1.35	3.18	1.83	0.56	0.09	-0.31
LI20R	2.10	1.95	2.25	2.08	2.14	0.31	0.56	1.18	3.90	2.72	0.81	0.51	0.59
GB12R	3.50	3.18	3.81	3.46	3.38	0.81	0.90	2.08	5.78	3.70	1.22	0.49	0.00
2L	5.54	4.96	6.12	5.50	5.46	2.73	1.65	3.17	8.68	5.52	2.83	0.36	-1.11
2R	5.33	4.78	5.87	5.25	5.23	2.19	1.48	2.93	10.00	7.07	1.98	0.85	1.87
PC6L	3.44	2.79	4.09	3.36	3.36	1.05	1.02	2.17	6.12	3.95	0.94	1.71	4.00
PC6R	4.14	3.79	4.49	4.11	4.20	1.30	1.14	2.50	6.60	4.10	1.99	0.32	-1.02
LI10L	3.50	3.08	3.93	3.43	3.40	1.50	1.23	1.78	6.60	4.82	1.62	0.91	0.65
1L	3.51	3.12	3.89	3.48	3.27	1.17	1.08	1.83	5.75	3.92	1.70	0.36	-0.89
1R	3.94	3.54	4.33	3.84	3.63	2.16	1.47	1.75	8.42	6.67	2.18	0.96	0.90
LI5L	3.15	2.74	3.56	3.04	2.83	1.39	1.18	1.60	7.65	6.05	1.18	1.92	5.31
LI5R	3.53	3.19	3.88	3.43	3.26	1.97	1.40	1.62	8.17	6.55	1.46	1.24	1.46
ST36L	5.01	4.39	5.62	4.93	5.22	2.77	1.67	2.07	9.93	7.87	2.17	0.65	1.68
ST36R	4.97	4.43	5.52	4.88	4.67	3.92	1.98	1.40	9.97	8.57	2.58	0.80	0.30
3R	4.71	4.17	5.26	4.62	4.33	3.07	1.75	1.38	9.27	7.88	1.97	1.02	1.05
SP6R	4.13	3.08	5.17	3.96	3.58	2.72	1.65	2.63	8.62	5.98	1.10	2.17	5.05
KD3R	4.05	3.63	4.46	3.99	3.87	1.94	1.39	1.72	7.53	5.82	1.89	0.56	-0.02

Descriptive statistics of PPT_{mean} for Intervention of Female in Visit 4													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.48	2.26	2.69	2.47	2.56	0.24	0.49	1.70	3.48	1.78	0.84	-0.13	-0.57
LI20R	2.32	2.14	2.50	2.29	2.22	0.45	0.67	1.13	4.53	3.40	1.00	0.77	0.85
GB12R	3.77	3.46	4.08	3.75	3.90	0.81	0.90	2.20	5.67	3.47	1.29	0.21	-0.31
2L	5.75	5.08	6.41	5.68	5.33	3.61	1.90	3.02	9.68	6.67	2.70	0.64	-0.49
2R	5.56	4.89	6.23	5.47	5.27	3.33	1.82	2.88	10.23	7.35	2.42	0.74	0.09
PC6L	3.60	3.13	4.07	3.57	3.55	0.55	0.74	2.48	5.17	2.68	0.87	0.65	0.67
PC6R	4.54	4.18	4.91	4.52	4.44	1.46	1.21	2.70	7.25	4.55	2.24	0.23	-1.07
LI10L	3.91	3.49	4.33	3.83	3.88	1.47	1.21	2.13	7.18	5.05	1.51	0.96	1.26
1L	3.80	3.41	4.20	3.79	3.87	1.27	1.13	1.85	6.37	4.52	1.82	0.18	-0.73
1R	4.28	3.86	4.70	4.20	4.17	2.47	1.57	1.97	8.17	6.20	2.19	0.72	-0.19
LI5L	3.46	3.02	3.89	3.35	3.17	1.57	1.25	1.72	8.52	6.80	1.25	2.04	7.07
LI5R	3.87	3.51	4.24	3.78	3.59	2.20	1.48	1.55	9.17	7.62	2.19	1.01	1.39
ST36L	5.29	4.63	5.96	5.28	5.53	3.29	1.81	1.80	8.93	7.13	2.92	-0.05	-0.38
ST36R	5.22	4.74	5.71	5.16	5.15	3.09	1.76	2.13	10.73	8.60	2.28	0.65	0.75
3R	5.06	4.54	5.59	4.98	4.77	2.85	1.69	1.93	9.40	7.47	1.89	0.83	0.82
SP6R	4.55	3.48	5.62	4.50	4.13	2.81	1.68	2.45	7.50	5.05	2.42	0.79	-0.41
KD3R	4.37	3.95	4.79	4.31	4.27	1.96	1.40	2.05	7.72	5.67	2.04	0.40	-0.06

Descriptive statistics of PPT_{mean} for Control of Male in Visit 1													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.87	1.57	2.16	1.85	1.74	0.76	0.87	0.27	3.68	3.42	1.27	0.37	-0.50
LI20R	1.99	1.68	2.31	1.98	1.82	0.86	0.93	0.27	3.90	3.63	1.36	0.46	-0.27
GB12R	2.92	2.58	3.25	2.89	2.67	1.00	1.00	1.28	5.22	3.93	1.72	0.56	-0.61
2L	4.65	4.00	5.31	4.52	4.45	3.74	1.93	2.13	9.73	7.60	3.02	0.90	0.45
2R	5.18	4.47	5.90	5.08	5.08	4.51	2.12	1.50	11.57	10.07	2.96	0.78	0.85
PC6L	4.29	3.83	4.75	4.21	3.99	1.84	1.36	2.53	7.68	5.15	1.85	0.85	-0.08
PC6R	4.42	3.99	4.85	4.35	4.35	1.65	1.28	2.67	8.08	5.42	2.11	0.66	0.18
LI10L	3.58	3.13	4.02	3.52	3.24	1.70	1.30	1.62	6.70	5.08	1.78	0.67	-0.22
1L	3.72	3.26	4.19	3.66	3.45	1.87	1.37	1.75	7.18	5.43	2.19	0.73	-0.18
1R	4.08	3.54	4.62	3.97	3.83	2.58	1.61	2.25	7.97	5.72	2.72	0.80	-0.28
LI5L	3.59	3.19	4.00	3.56	3.14	1.44	1.20	1.75	6.12	4.37	1.80	0.53	-0.68
LI5R	3.91	3.46	4.37	3.80	3.76	1.80	1.34	2.20	8.93	6.73	2.00	1.49	4.15
ST36L	5.94	5.40	6.48	5.94	6.10	2.54	1.59	3.00	9.17	6.17	2.65	-0.12	-0.98
ST36R	6.36	5.63	7.08	6.35	5.93	4.59	2.14	2.75	10.18	7.43	3.00	0.21	-1.02
3R	5.36	4.77	5.96	5.24	5.03	3.08	1.75	3.10	10.30	7.20	2.51	0.95	0.68
SP6R	5.32	4.68	5.97	5.20	5.20	3.64	1.91	2.40	11.53	9.13	2.74	0.94	1.86
KD3R	5.35	4.70	6.01	5.28	5.43	3.77	1.94	1.77	10.05	8.28	2.55	0.49	0.33

Descriptive statistics of PPT_{mean} for Control of Male in Visit 2													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.78	1.51	2.04	1.75	1.63	0.63	0.79	0.30	3.82	3.52	1.03	0.50	0.12
LI20R	1.87	1.60	2.15	1.85	1.79	0.65	0.81	0.30	3.92	3.62	1.05	0.50	0.05
GB12R	2.81	2.46	3.17	2.77	2.73	1.11	1.05	1.12	5.47	4.35	1.69	0.64	-0.09
2L	4.97	4.34	5.59	4.90	4.81	3.42	1.85	1.83	9.60	7.77	2.73	0.47	-0.28
2R	5.19	4.53	5.84	5.17	5.20	3.73	1.93	1.68	8.73	7.05	3.36	0.13	-1.04
PC6L	4.45	4.01	4.89	4.38	4.18	1.68	1.29	2.77	7.72	4.95	1.83	0.84	0.03
PC6R	4.47	4.09	4.84	4.42	4.49	1.23	1.11	2.80	7.22	4.42	1.65	0.41	-0.20
LI10L	3.53	3.20	3.86	3.48	3.21	0.95	0.97	2.10	6.50	4.40	1.59	0.92	0.94
1L	3.70	3.28	4.12	3.65	3.18	1.54	1.24	2.20	6.37	4.17	2.28	0.55	-1.03
1R	3.95	3.47	4.43	3.89	3.63	2.01	1.42	1.72	7.18	5.47	2.00	0.72	-0.06
LI5L	3.71	3.31	4.12	3.66	3.68	1.43	1.19	1.85	7.30	5.45	1.90	0.71	0.64
LI5R	3.86	3.44	4.28	3.78	3.63	1.57	1.25	1.93	7.72	5.78	1.94	0.91	1.02
ST36L	6.33	5.57	7.08	6.20	6.03	4.93	2.22	3.50	12.80	9.30	3.64	0.89	0.42
ST36R	6.42	5.66	7.19	6.33	6.18	5.10	2.26	3.25	11.40	8.15	3.13	0.69	-0.46
3R	5.39	4.85	5.94	5.31	5.25	2.61	1.62	2.95	9.45	6.50	2.18	0.70	0.22
SP6R	5.33	4.70	5.95	5.27	5.17	3.44	1.85	2.63	9.93	7.30	3.60	0.34	-0.57
KD3R	5.34	4.74	5.94	5.26	5.36	3.14	1.77	2.65	9.60	6.95	2.11	0.66	0.29

Descriptive statistics of PPT_{mean} for Control of Male in Visit 3													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.75	1.48	2.03	1.73	1.63	0.64	0.80	0.57	3.50	2.93	1.19	0.49	-0.57
LI20R	1.78	1.51	2.05	1.74	1.79	0.62	0.79	0.63	4.08	3.45	1.13	0.57	0.56
GB12R	2.79	2.44	3.14	2.72	2.59	1.07	1.03	1.43	5.58	4.15	1.54	1.00	0.59
2L	4.93	4.36	5.51	4.92	4.82	2.87	1.69	1.20	8.62	7.42	2.66	0.03	-0.30
2R	5.49	4.83	6.16	5.34	5.38	3.87	1.97	2.45	12.65	10.20	2.72	1.44	3.60
PC6L	4.31	3.89	4.73	4.22	3.98	1.55	1.25	2.80	7.85	5.05	1.75	1.09	0.74
PC6R	4.62	4.21	5.04	4.51	4.25	1.50	1.22	3.22	8.55	5.33	1.58	1.31	2.08
LI10L	3.48	3.07	3.89	3.37	3.21	1.47	1.21	1.70	8.38	6.68	1.33	1.96	6.60
1L	3.69	3.23	4.15	3.54	3.34	1.87	1.37	2.17	9.57	7.40	1.48	2.45	8.84
1R	3.95	3.41	4.49	3.77	3.28	2.54	1.59	2.18	10.07	7.88	1.54	2.03	5.24
LI5L	3.77	3.33	4.22	3.64	3.68	1.73	1.31	2.08	9.55	7.47	1.42	2.48	9.92
LI5R	3.88	3.56	4.20	3.82	3.80	0.89	0.94	2.50	6.35	3.85	1.04	0.99	0.82
ST36L	6.37	5.57	7.17	6.20	5.97	5.57	2.36	3.07	13.93	10.87	2.82	1.25	1.80
ST36R	6.30	5.56	7.04	6.11	5.60	4.79	2.19	3.95	13.13	9.18	2.79	1.37	1.54
3R	5.74	5.04	6.45	5.51	5.28	4.34	2.08	3.15	14.20	11.05	2.03	2.24	7.06
SP6R	5.21	4.78	5.65	5.16	5.08	1.68	1.30	3.27	8.70	5.43	1.91	0.61	0.08
KD3R	5.36	4.82	5.91	5.25	5.03	2.62	1.62	3.08	10.60	7.52	1.93	1.16	1.93

Descriptive statistics of PPT_{mean} for Control of Male in Visit 4													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.64	1.39	1.88	1.61	1.53	0.53	0.73	0.62	3.35	2.73	1.03	0.42	-0.58
LI20R	1.70	1.44	1.97	1.68	1.49	0.60	0.78	0.50	3.47	2.97	1.01	0.51	-0.41
GB12R	2.78	2.37	3.18	2.72	2.65	1.44	1.20	0.92	5.93	5.02	1.54	0.69	0.11
2L	4.60	4.02	5.18	4.52	4.62	2.91	1.71	1.98	8.68	6.70	2.60	0.51	-0.24
2R	5.18	4.50	5.87	5.10	4.72	4.14	2.04	1.78	11.17	9.38	2.83	0.76	0.69
PC6L	4.34	3.93	4.75	4.28	4.29	1.48	1.22	2.58	7.13	4.55	1.89	0.53	-0.50
PC6R	4.62	4.21	5.04	4.61	4.54	1.51	1.23	2.35	7.15	4.80	1.77	0.23	-0.63
LI10L	3.34	2.93	3.75	3.25	3.15	1.48	1.22	1.43	7.28	5.85	1.15	1.31	2.33
1L	3.49	3.05	3.93	3.40	3.24	1.68	1.29	1.75	7.00	5.25	1.66	1.02	0.66
1R	3.78	3.30	4.25	3.71	3.29	1.98	1.41	1.22	8.15	6.93	1.99	1.01	1.24
LI5L	3.70	3.27	4.13	3.60	3.55	1.63	1.28	1.82	7.87	6.05	1.64	1.20	2.24
LI5R	3.96	3.52	4.41	3.86	3.78	1.74	1.32	1.93	8.17	6.23	1.61	1.29	2.57
ST36L	6.09	5.37	6.80	5.91	5.77	4.48	2.12	3.12	14.63	11.52	2.32	1.92	6.49
ST36R	6.25	5.56	6.93	6.15	6.03	4.12	2.03	2.67	11.63	8.97	2.96	0.69	0.41
3R	5.37	4.63	6.11	5.17	5.16	4.80	2.19	2.42	15.27	12.85	2.18	2.61	11.33
SP6R	5.38	4.74	6.02	5.24	5.28	3.58	1.89	2.58	12.27	9.68	2.12	1.36	3.72
KD3R	5.44	4.77	6.10	5.34	5.33	3.85	1.96	2.45	11.40	8.95	3.19	0.69	0.89

Descriptive statistics of PPT_{mean} for Intervention of Male in Visit 1													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.46	2.05	2.86	2.44	2.27	0.84	0.92	1.07	4.10	3.03	1.02	0.58	-0.53
LI20R	2.52	2.30	2.73	2.48	2.46	0.55	0.74	1.32	4.40	3.08	0.96	0.56	-0.13
GB12R	3.63	3.13	4.13	3.54	3.28	2.07	1.44	1.70	7.22	5.52	1.86	0.96	0.24
2L	5.53	4.80	6.25	5.46	5.25	3.64	1.91	2.60	9.70	7.10	2.94	0.50	-0.28
2R	5.29	4.75	5.83	5.30	5.38	1.64	1.28	2.78	7.40	4.62	1.79	-0.27	-0.76
PC6L	3.57	2.82	4.31	3.53	3.32	1.38	1.18	2.13	5.75	3.62	1.95	0.66	-0.65
PC6R	4.77	4.23	5.31	4.63	4.39	2.83	1.68	2.50	9.70	7.20	1.98	1.28	1.67
LI10L	4.76	3.96	5.56	4.58	4.32	5.28	2.30	1.78	11.87	10.08	3.25	1.12	1.46
1L	4.53	3.86	5.20	4.45	3.67	3.56	1.89	2.03	8.83	6.80	2.98	0.68	-0.63
1R	4.57	4.17	4.97	4.46	4.37	1.96	1.40	2.73	8.43	5.70	1.80	1.06	0.93
LI5L	3.82	3.47	4.18	3.78	3.50	0.99	0.99	2.32	6.40	4.08	1.23	0.83	0.22
LI5R	4.06	3.65	4.46	3.90	3.58	2.47	1.57	2.17	9.63	7.47	1.79	1.63	3.00
ST36L	7.13	6.24	8.03	7.06	6.42	5.51	2.35	3.68	12.00	8.32	3.68	0.59	-0.63
ST36R	6.03	5.49	6.58	5.97	5.97	3.30	1.82	2.53	12.00	9.47	2.03	0.75	1.55
3R	5.78	5.20	6.36	5.70	5.35	2.86	1.69	2.90	10.22	7.32	2.32	0.73	0.09
SP6R	4.87	3.67	6.07	4.81	4.09	3.55	1.89	2.87	7.93	5.07	3.60	0.59	-1.38
KD3R	4.97	4.39	5.56	4.89	4.43	3.76	1.94	2.18	9.67	7.48	3.04	0.56	-0.45

Descriptive statistics of PPT_{mean} for Intervention of Male in Visit 2													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.66	2.19	3.12	2.55	2.60	1.09	1.04	1.20	6.15	4.95	1.08	1.79	5.21
LI20R	2.61	2.38	2.84	2.58	2.46	0.66	0.81	1.12	4.68	3.57	1.09	0.73	0.07
GB12R	4.07	3.54	4.60	3.97	3.98	2.32	1.52	2.17	7.95	5.78	2.10	0.91	0.30
2L	6.19	5.33	7.06	6.11	5.78	5.12	2.26	3.20	10.77	7.57	3.27	0.64	-0.60
2R	5.86	5.14	6.59	5.79	5.58	2.97	1.72	3.18	10.10	6.92	2.05	0.60	0.38
PC6L	3.95	3.12	4.78	3.87	3.70	1.71	1.31	2.38	6.98	4.60	1.63	1.15	1.43
PC6R	4.99	4.37	5.61	4.84	4.47	3.77	1.94	1.97	11.30	9.33	2.18	1.26	1.81
LI10L	4.78	4.02	5.54	4.68	4.09	4.77	2.18	1.87	9.43	7.57	3.28	0.86	-0.44
1L	4.96	4.21	5.72	4.81	4.38	4.54	2.13	2.08	10.70	8.62	2.18	1.12	0.93
1R	4.76	4.31	5.20	4.67	4.53	2.46	1.57	2.47	9.35	6.88	2.18	0.86	0.46
LI5L	4.28	3.83	4.72	4.23	4.26	1.51	1.23	2.37	7.17	4.80	1.78	0.46	-0.56
LI5R	4.21	3.79	4.62	4.07	3.56	2.57	1.60	2.37	9.10	6.73	2.06	1.27	1.08
ST36L	7.70	6.73	8.68	7.56	7.90	6.58	2.57	3.48	15.47	11.98	3.78	0.82	1.61
ST36R	6.63	6.01	7.25	6.55	6.67	4.25	2.06	3.42	11.50	8.08	2.53	0.56	-0.07
3R	6.24	5.62	6.86	6.16	5.88	3.23	1.80	3.80	10.83	7.03	3.07	0.48	-0.45
SP6R	5.17	3.99	6.36	5.12	4.35	3.50	1.87	3.08	8.18	5.10	3.58	0.55	-1.40
KD3R	5.52	4.88	6.16	5.42	5.40	4.57	2.14	2.48	11.30	8.82	3.34	0.59	-0.29

Descriptive statistics of PPT_{mean} for Intervention of Male in Visit 3													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.83	2.31	3.36	2.72	2.65	1.39	1.18	1.30	6.60	5.30	1.30	1.51	3.85
LI20R	2.91	2.64	3.19	2.88	2.71	0.93	0.96	0.98	5.52	4.53	1.35	0.51	-0.03
GB12R	4.57	3.94	5.20	4.47	4.21	3.22	1.80	2.35	8.65	6.30	2.72	0.71	-0.38
2L	6.89	5.93	7.84	6.83	7.15	6.32	2.51	2.52	12.70	10.18	4.53	0.25	-0.57
2R	6.20	5.44	6.96	6.27	6.48	3.21	1.79	2.40	8.67	6.27	2.77	-0.49	-0.59
PC6L	4.28	3.39	5.17	4.23	4.33	1.96	1.40	2.57	6.97	4.40	2.20	0.43	-0.85
PC6R	5.33	4.63	6.03	5.13	4.68	4.81	2.19	2.67	12.45	9.78	2.97	1.34	1.89
LI10L	5.38	4.59	6.17	5.30	5.07	5.16	2.27	2.42	9.90	7.48	3.85	0.54	-0.86
1L	5.53	4.66	6.40	5.38	4.73	5.98	2.44	2.52	11.98	9.47	3.29	0.98	0.09
1R	5.10	4.56	5.64	5.03	4.48	3.62	1.90	1.53	9.93	8.40	2.64	0.77	-0.13
LI5L	4.82	4.26	5.37	4.77	4.80	2.38	1.54	1.88	8.23	6.35	2.45	0.39	-0.17
LI5R	4.57	4.09	5.04	4.48	4.02	3.36	1.83	1.30	9.18	7.88	2.97	0.70	-0.17
ST36L	7.91	6.86	8.96	7.86	7.70	7.59	2.75	2.73	14.30	11.57	3.59	0.24	-0.19
ST36R	6.97	6.25	7.69	6.91	6.30	5.75	2.40	2.40	12.00	9.60	4.13	0.42	-0.68
3R	6.98	6.12	7.84	6.91	6.07	6.29	2.51	2.60	13.20	10.60	3.83	0.50	-0.33
SP6R	5.69	4.31	7.07	5.61	5.43	4.74	2.18	3.08	9.80	6.72	4.01	0.49	-0.75
KD3R	5.91	5.21	6.61	5.88	5.90	5.46	2.34	2.27	10.58	8.32	4.43	0.08	-1.26

Descriptive statistics of PPT_{mean} for Intervention of Male in Visit 4													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	3.12	2.60	3.65	3.09	2.85	1.41	1.19	1.50	5.43	3.93	1.89	0.38	-0.90
LI20R	3.04	2.77	3.31	2.99	2.79	0.89	0.94	1.02	5.52	4.50	1.56	0.76	0.45
GB12R	4.93	4.21	5.66	4.84	4.23	4.27	2.07	2.40	9.10	6.70	3.38	0.77	-0.68
2L	7.18	6.25	8.10	7.04	7.27	5.91	2.43	3.82	14.13	10.32	3.59	0.76	0.67
2R	6.69	5.89	7.49	6.61	6.37	3.60	1.90	3.75	11.30	7.55	2.87	0.54	-0.04
PC6L	4.88	3.81	5.96	4.89	4.83	2.88	1.70	2.12	7.58	5.47	2.95	0.12	-0.78
PC6R	5.47	4.71	6.23	5.33	4.67	5.63	2.37	2.45	11.67	9.22	3.40	0.93	-0.09
LI10L	6.02	5.01	7.03	5.84	5.23	8.39	2.90	2.03	13.37	11.33	4.16	0.98	0.50
1L	6.13	5.19	7.07	6.06	5.32	6.99	2.64	2.28	11.30	9.02	4.03	0.64	-0.74
1R	5.57	5.00	6.15	5.46	5.11	4.09	2.02	2.43	10.97	8.53	2.78	0.88	0.13
LI5L	5.22	4.63	5.80	5.18	4.59	2.65	1.63	2.87	8.37	5.50	2.61	0.38	-1.06
LI5R	4.83	4.32	5.33	4.70	4.17	3.80	1.95	1.90	11.57	9.67	2.84	1.09	1.12
ST36L	9.09	7.91	10.27	9.04	8.83	9.63	3.10	3.63	15.87	12.23	5.29	0.11	-0.61
ST36R	7.62	6.89	8.36	7.60	7.48	5.93	2.44	3.07	12.82	9.75	3.88	0.27	-0.66
3R	7.07	6.28	7.86	6.98	6.80	5.31	2.30	3.28	12.88	9.60	3.37	0.51	-0.28
SP6R	5.89	4.28	7.51	5.82	5.30	6.48	2.55	3.00	10.08	7.08	5.02	0.54	-1.25
KD3R	6.39	5.56	7.22	6.30	6.10	7.67	2.77	2.13	12.18	10.05	4.37	0.62	-0.58

Descriptive statistics of PPT_{median} for Control of Female													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.43	1.33	1.54	1.39	1.40	0.56	0.75	0.15	4.10	3.95	0.90	0.79	0.75
LI20R	1.49	1.38	1.60	1.46	1.40	0.60	0.78	0.15	3.90	3.75	1.10	0.54	-0.18
GB12R	2.62	2.45	2.80	2.56	2.48	1.60	1.26	0.45	7.15	6.70	1.80	0.84	0.72
2L	4.00	3.75	4.24	3.90	3.78	3.04	1.74	0.80	9.20	8.40	2.29	0.86	0.51
2R	4.39	4.16	4.63	4.33	4.23	2.88	1.70	1.10	9.10	8.00	2.28	0.54	-0.12
PC6L	3.69	3.49	3.88	3.60	3.50	1.92	1.39	1.20	9.10	7.90	1.70	0.96	1.33
PC6R	3.78	3.59	3.98	3.73	3.68	1.88	1.37	0.50	7.90	7.40	1.60	0.66	0.59
LI10L	3.03	2.82	3.23	2.90	2.73	2.02	1.42	0.90	12.05	11.15	1.59	2.15	9.11
1L	3.28	3.11	3.46	3.23	3.15	1.49	1.22	0.70	7.05	6.35	1.64	0.68	0.55
1R	3.45	3.25	3.64	3.36	3.20	1.95	1.40	0.70	10.90	10.20	1.70	1.30	3.64
LI5L	3.47	3.27	3.67	3.37	3.10	1.98	1.41	0.85	8.50	7.65	1.70	1.09	1.29
LI5R	3.40	3.22	3.58	3.32	3.10	1.64	1.28	0.90	9.50	8.60	1.58	1.28	2.84
ST36L	5.36	5.07	5.64	5.24	4.98	4.09	2.02	1.40	12.20	10.80	2.40	0.90	0.87
ST36R	5.35	5.08	5.62	5.24	4.98	3.63	1.90	1.50	12.30	10.80	2.29	0.98	1.59
3R	4.86	4.59	5.13	4.73	4.58	3.61	1.90	1.35	11.40	10.05	2.29	1.04	1.33
SP6R	4.42	4.20	4.63	4.35	4.08	2.32	1.52	1.40	9.60	8.20	1.88	0.74	0.71
KD3R	4.49	4.26	4.73	4.43	4.30	2.81	1.68	1.20	9.90	8.70	2.00	0.65	0.34

Descriptive statistics of PPT_{median} for Intervention of Female													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.15	2.05	2.26	2.14	2.10	0.24	0.49	1.10	3.50	2.40	0.70	0.15	-0.41
LI20R	2.11	2.02	2.19	2.07	2.08	0.39	0.63	1.05	4.50	3.45	0.90	0.71	0.72
GB12R	3.36	3.19	3.53	3.33	3.30	0.96	0.98	1.35	6.00	4.65	1.34	0.40	-0.21
2L	5.23	4.93	5.54	5.18	4.88	3.16	1.78	2.10	9.60	7.50	2.49	0.52	-0.44
2R	5.22	4.93	5.51	5.15	4.90	2.68	1.64	2.10	10.50	8.40	2.19	0.69	0.50
PC6L	3.22	2.95	3.49	3.17	3.13	0.86	0.93	1.70	6.00	4.30	1.25	0.76	0.76
PC6R	4.11	3.94	4.29	4.08	4.00	1.34	1.16	1.90	7.65	5.75	1.60	0.47	-0.40
LI10L	3.50	3.28	3.72	3.41	3.33	1.67	1.29	1.40	7.30	5.90	1.88	0.87	0.61
1L	3.49	3.29	3.69	3.43	3.40	1.34	1.16	1.70	6.65	4.95	1.88	0.56	-0.27
1R	3.88	3.69	4.07	3.77	3.50	2.08	1.44	1.75	8.50	6.75	2.05	1.05	0.89
LI5L	3.14	2.94	3.34	3.02	2.88	1.40	1.18	1.60	8.45	6.85	1.24	2.08	6.26
LI5R	3.49	3.33	3.65	3.39	3.20	1.74	1.32	1.50	8.80	7.30	1.63	1.21	1.57
ST36L	4.97	4.67	5.27	4.91	4.95	2.83	1.68	1.80	9.80	8.00	2.28	0.44	0.09
ST36R	4.81	4.56	5.05	4.70	4.63	3.23	1.80	1.40	10.80	9.40	2.30	0.88	0.79
3R	4.75	4.47	5.02	4.64	4.40	3.22	1.80	1.35	10.10	8.75	2.28	0.89	0.72
SP6R	4.02	3.61	4.43	3.91	3.60	1.96	1.40	2.00	8.75	6.75	1.38	1.41	2.36
KD3R	4.07	3.86	4.27	4.00	3.85	1.91	1.38	1.70	8.70	7.00	1.98	0.70	0.19

Descriptive statistics of PPT_{median} for Control of Male													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.76	1.63	1.89	1.73	1.63	0.65	0.80	0.30	3.80	3.50	1.10	0.47	-0.47
LI20R	1.83	1.69	1.97	1.80	1.78	0.70	0.84	0.20	4.00	3.80	1.20	0.46	-0.29
GB12R	2.83	2.65	3.02	2.78	2.60	1.22	1.11	0.90	6.10	5.20	1.63	0.76	0.19
2L	4.76	4.47	5.06	4.69	4.63	3.21	1.79	1.30	9.70	8.40	2.58	0.49	-0.25
2R	5.29	4.96	5.63	5.20	4.95	4.24	2.06	1.50	12.70	11.20	2.83	0.77	0.77
PC6L	4.35	4.14	4.56	4.28	4.03	1.63	1.28	2.35	7.85	5.50	1.89	0.78	-0.19
PC6R	4.52	4.32	4.72	4.46	4.45	1.45	1.21	2.40	8.50	6.10	1.80	0.66	0.46
LI10L	3.48	3.28	3.68	3.40	3.15	1.44	1.20	1.35	8.40	7.05	1.34	1.18	1.97
1L	3.65	3.43	3.88	3.56	3.20	1.81	1.34	1.65	9.80	8.15	1.70	1.26	2.29
1R	3.96	3.70	4.21	3.84	3.43	2.35	1.53	1.15	10.50	9.35	2.08	1.22	1.92
LI5L	3.68	3.48	3.89	3.61	3.55	1.52	1.23	1.70	9.50	7.80	1.63	1.21	3.09
LI5R	3.89	3.68	4.09	3.80	3.78	1.52	1.23	1.90	8.85	6.95	1.50	1.15	2.07
ST36L	6.19	5.84	6.54	6.04	5.98	4.45	2.11	2.90	14.70	11.80	2.64	1.22	2.44
ST36R	6.33	5.97	6.69	6.22	5.95	4.67	2.16	2.45	13.20	10.75	2.89	0.75	0.14
3R	5.45	5.13	5.77	5.29	5.28	3.70	1.92	2.30	15.60	13.30	2.19	1.91	7.12
SP6R	5.34	5.04	5.63	5.25	5.20	3.12	1.77	2.20	12.50	10.30	2.38	0.93	1.98
KD3R	5.37	5.08	5.67	5.29	5.35	3.27	1.81	1.60	11.20	9.60	2.34	0.59	0.50

Descriptive statistics of PPT_{median} for Intervention of Male													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.75	2.52	2.98	2.68	2.55	1.18	1.09	1.05	6.80	5.75	1.48	1.05	1.44
LI20R	2.77	2.65	2.90	2.73	2.60	0.79	0.89	1.00	5.50	4.50	1.20	0.69	0.25
GB12R	4.28	3.97	4.58	4.16	3.83	3.19	1.79	1.70	9.00	7.30	2.41	0.96	0.11
2L	6.43	5.99	6.86	6.35	6.00	5.61	2.37	2.40	14.00	11.60	3.63	0.54	-0.18
2R	5.95	5.60	6.31	5.90	5.80	3.06	1.75	2.75	11.40	8.65	2.31	0.45	0.05
PC6L	4.19	3.77	4.60	4.13	3.80	2.07	1.44	2.00	7.55	5.55	2.30	0.57	-0.48
PC6R	5.13	4.81	5.46	4.96	4.40	4.44	2.11	1.95	12.90	10.95	2.38	1.30	1.43
LI10L	5.24	4.82	5.66	5.08	4.58	6.12	2.47	1.90	13.50	11.60	3.28	0.98	0.62
1L	5.29	4.88	5.70	5.14	4.65	5.69	2.39	2.00	12.05	10.05	2.88	0.98	0.22
1R	5.01	4.76	5.26	4.90	4.48	3.25	1.80	1.50	10.90	9.40	2.15	0.98	0.47
LI5L	4.51	4.25	4.77	4.42	4.30	2.22	1.49	2.00	9.40	7.40	2.10	0.85	0.27
LI5R	4.42	4.19	4.65	4.29	3.90	3.26	1.81	1.40	11.90	10.50	2.19	1.17	1.15
ST36L	8.02	7.49	8.54	7.90	7.90	8.17	2.86	3.00	16.20	13.20	3.90	0.50	-0.18
ST36R	6.79	6.45	7.12	6.70	6.40	5.27	2.30	2.20	13.00	10.80	3.24	0.55	-0.26
3R	6.49	6.13	6.86	6.39	5.83	4.73	2.18	2.70	13.20	10.50	2.98	0.74	0.05
SP6R	5.40	4.79	6.01	5.29	4.50	4.40	2.10	2.90	10.05	7.15	3.49	0.60	-0.84
KD3R	5.68	5.33	6.03	5.56	5.43	5.64	2.37	2.20	12.35	10.15	3.70	0.61	-0.35

Descriptive statistics of PPT_{median} for Control of Female in Visit 1													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.52	1.27	1.77	1.46	1.50	0.76	0.87	0.15	4.10	3.95	0.88	1.01	1.18
LI20R	1.52	1.28	1.76	1.47	1.50	0.69	0.83	0.15	3.90	3.75	1.03	0.78	0.41
GB12R	2.55	2.17	2.94	2.46	2.30	1.78	1.33	0.45	7.15	6.70	1.83	1.20	2.02
2L	3.89	3.34	4.44	3.75	3.60	3.63	1.91	1.55	9.20	7.65	2.90	0.94	0.44
2R	4.27	3.74	4.79	4.19	4.10	3.36	1.83	1.35	8.65	7.30	3.00	0.43	-0.58
PC6L	3.85	3.37	4.33	3.72	3.30	2.77	1.67	1.50	9.10	7.60	2.20	1.12	1.43
PC6R	3.76	3.36	4.16	3.71	3.60	1.95	1.40	1.05	7.15	6.10	1.55	0.72	0.23
LI10L	3.14	2.63	3.66	2.97	2.70	3.23	1.80	0.90	12.05	11.15	2.25	2.66	11.58
1L	3.32	2.93	3.72	3.22	3.15	1.88	1.37	1.40	7.05	5.65	1.68	1.11	1.22
1R	3.56	3.08	4.05	3.40	3.20	2.84	1.69	1.30	10.90	9.60	1.93	2.01	6.38
LI5L	3.42	2.94	3.90	3.28	2.90	2.80	1.67	0.85	8.50	7.65	2.13	1.36	1.73
LI5R	3.36	2.93	3.78	3.22	3.00	2.17	1.47	1.30	9.50	8.20	1.55	1.93	5.36
ST36L	5.30	4.70	5.90	5.18	5.00	4.33	2.08	1.40	12.20	10.80	2.20	1.11	1.92
ST36R	5.36	4.79	5.93	5.24	5.10	3.91	1.98	1.70	11.60	9.90	2.30	1.01	1.77
3R	4.83	4.24	5.41	4.69	4.30	4.10	2.02	1.35	10.90	9.55	2.60	1.06	1.17
SP6R	4.27	3.86	4.69	4.22	4.00	2.05	1.43	1.40	8.90	7.50	1.95	0.71	1.10
KD3R	4.49	3.96	5.02	4.40	4.10	3.47	1.86	1.20	9.90	8.70	1.90	0.95	1.06

Descriptive statistics of PPT_{median} for Control of Female in Visit 2													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.33	1.14	1.52	1.31	1.40	0.43	0.65	0.20	2.80	2.60	0.98	0.33	-0.72
LI20R	1.37	1.17	1.58	1.35	1.40	0.51	0.72	0.20	3.00	2.80	1.03	0.40	-0.41
GB12R	2.58	2.23	2.93	2.53	2.50	1.47	1.21	0.50	5.50	5.00	1.83	0.60	-0.10
2L	3.82	3.37	4.27	3.74	3.55	2.42	1.55	1.35	8.85	7.50	1.75	0.91	1.10
2R	4.27	3.80	4.73	4.23	4.00	2.62	1.62	1.10	7.75	6.65	1.95	0.56	-0.09
PC6L	3.45	3.13	3.78	3.41	3.45	1.29	1.14	1.20	7.20	6.00	1.30	0.74	1.37
PC6R	3.74	3.36	4.12	3.72	3.65	1.76	1.33	0.50	7.70	7.20	1.55	0.34	1.19
LI10L	3.00	2.60	3.40	2.84	2.80	1.91	1.38	1.10	8.80	7.70	1.00	2.24	6.95
1L	3.24	2.92	3.55	3.19	3.15	1.20	1.09	1.40	6.10	4.70	1.50	0.53	0.30
1R	3.35	2.99	3.71	3.26	3.40	1.57	1.25	1.40	7.20	5.80	1.63	1.00	1.19
LI5L	3.49	3.09	3.89	3.39	3.15	1.94	1.39	1.25	8.25	7.00	1.48	1.20	1.69
LI5R	3.37	2.99	3.75	3.28	3.00	1.76	1.32	0.90	7.85	6.95	1.68	1.19	1.76
ST36L	5.19	4.63	5.75	5.09	4.90	3.77	1.94	1.75	11.70	9.95	2.38	0.95	1.57
ST36R	5.21	4.68	5.74	5.13	4.75	3.39	1.84	1.50	10.70	9.20	2.28	0.80	1.04
3R	4.72	4.21	5.22	4.60	4.20	3.10	1.76	1.70	10.00	8.30	2.08	1.06	1.64
SP6R	4.31	3.89	4.72	4.23	4.00	2.09	1.45	1.65	8.60	6.95	1.43	0.88	1.19
KD3R	4.45	3.93	4.96	4.36	4.20	3.19	1.79	1.35	9.10	7.75	1.83	0.78	0.36

Descriptive statistics of PPT_{median} for Control of Female in Visit 3													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.46	1.25	1.67	1.43	1.35	0.54	0.73	0.20	3.40	3.20	1.08	0.73	0.40
LI20R	1.54	1.31	1.77	1.53	1.40	0.64	0.80	0.20	3.05	2.85	1.20	0.31	-0.83
GB12R	2.73	2.34	3.12	2.66	2.60	1.81	1.34	0.55	6.80	6.25	1.73	0.83	0.82
2L	4.05	3.58	4.52	3.97	3.95	2.67	1.63	1.10	8.75	7.65	1.58	0.87	1.18
2R	4.43	3.98	4.87	4.37	4.40	2.40	1.55	1.65	8.70	7.05	2.03	0.45	0.40
PC6L	3.68	3.31	4.04	3.62	3.80	1.61	1.27	1.70	7.50	5.80	1.75	0.58	0.35
PC6R	3.75	3.36	4.15	3.68	3.80	1.93	1.39	1.35	7.70	6.35	1.95	0.77	0.72
LI10L	2.93	2.59	3.27	2.86	2.70	1.41	1.19	1.20	7.10	5.90	1.48	1.07	1.85
1L	3.33	3.00	3.66	3.32	3.25	1.31	1.14	0.70	6.00	5.30	1.53	0.13	-0.21
1R	3.50	3.13	3.88	3.47	3.45	1.69	1.30	0.80	6.70	5.90	1.85	0.45	0.04
LI5L	3.48	3.10	3.86	3.41	3.20	1.72	1.31	1.30	7.20	5.90	1.65	0.91	0.73
LI5R	3.40	3.06	3.75	3.35	3.10	1.42	1.19	0.95	6.95	6.00	1.63	0.76	1.09
ST36L	5.39	4.83	5.94	5.31	4.95	3.73	1.93	2.40	10.00	7.60	2.73	0.57	-0.39
ST36R	5.24	4.76	5.72	5.17	4.95	2.79	1.67	2.00	10.00	8.00	2.05	0.59	0.54
3R	4.93	4.37	5.50	4.81	4.80	3.85	1.96	2.05	11.00	8.95	2.98	0.91	1.02
SP6R	4.44	3.98	4.91	4.37	4.10	2.64	1.62	1.70	9.15	7.45	2.20	0.66	0.39
KD3R	4.43	4.02	4.84	4.41	4.35	2.03	1.42	1.80	7.70	5.90	1.95	0.16	-0.45

Descriptive statistics of PPT_{median} for Control of Female in Visit 4													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.42	1.21	1.63	1.39	1.35	0.51	0.72	0.25	3.40	3.15	0.73	0.62	0.20
LI20R	1.53	1.31	1.75	1.50	1.50	0.59	0.77	0.30	3.65	3.35	1.05	0.57	-0.02
GB12R	2.63	2.29	2.98	2.58	2.50	1.42	1.19	0.60	5.65	5.05	1.65	0.68	0.04
2L	4.24	3.70	4.77	4.15	3.85	3.52	1.88	0.80	8.90	8.10	2.40	0.75	0.01
2R	4.62	4.10	5.13	4.53	4.40	3.25	1.80	1.75	9.10	7.35	2.23	0.73	0.00
PC6L	3.77	3.36	4.18	3.69	3.55	2.05	1.43	1.70	7.95	6.25	1.93	0.79	0.50
PC6R	3.88	3.47	4.28	3.81	3.60	1.99	1.41	1.00	7.90	6.90	1.78	0.80	0.77
LI10L	3.02	2.66	3.39	2.94	2.80	1.62	1.27	1.00	7.20	6.20	1.63	0.98	1.48
1L	3.25	2.88	3.62	3.20	2.95	1.66	1.29	0.80	7.00	6.20	1.83	0.64	0.32
1R	3.37	2.99	3.75	3.31	3.10	1.77	1.33	0.70	6.95	6.25	1.78	0.73	0.43
LI5L	3.49	3.13	3.85	3.43	3.40	1.57	1.25	1.55	6.70	5.15	1.93	0.65	-0.02
LI5R	3.48	3.15	3.81	3.44	3.25	1.29	1.14	1.10	7.15	6.05	1.43	0.80	1.10
ST36L	5.55	4.93	6.17	5.42	5.10	4.70	2.17	2.40	11.30	8.90	2.28	0.93	0.71
ST36R	5.58	4.97	6.19	5.42	5.20	4.56	2.13	2.10	12.30	10.20	2.73	1.20	2.01
3R	4.97	4.43	5.51	4.83	4.90	3.56	1.89	1.70	11.40	9.70	1.75	1.21	2.32
SP6R	4.65	4.19	5.11	4.59	4.20	2.55	1.60	1.50	9.60	8.10	2.18	0.73	0.79
KD3R	4.61	4.14	5.09	4.57	4.30	2.72	1.65	1.60	8.60	7.00	2.00	0.40	-0.36

Descriptive statistics of PPT_{median} for Intervention of Female in Visit 1													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.92	1.74	2.11	1.92	1.93	0.17	0.41	1.15	2.65	1.50	0.73	0.06	-0.84
LI20R	2.03	1.85	2.22	2.00	1.93	0.47	0.69	1.05	4.15	3.10	1.13	0.72	0.25
GB12R	3.03	2.67	3.38	2.96	3.05	1.03	1.02	1.35	6.00	4.65	1.18	0.93	1.46
2L	4.67	4.06	5.27	4.62	4.20	3.00	1.73	2.10	8.50	6.40	3.01	0.34	-0.92
2R	4.91	4.35	5.47	4.88	4.70	2.32	1.52	2.10	8.30	6.20	1.90	0.44	-0.17
PC6L	2.97	2.29	3.64	2.90	2.78	1.12	1.06	1.80	5.30	3.50	1.49	0.99	0.58
PC6R	3.79	3.49	4.10	3.76	3.80	0.99	1.00	1.90	6.15	4.25	1.30	0.53	0.43
LI10L	3.30	2.84	3.76	3.20	3.30	1.75	1.32	1.70	6.70	5.00	1.85	1.03	0.82
1L	3.34	2.87	3.80	3.24	3.30	1.71	1.31	1.80	6.65	4.85	1.70	1.04	0.64
1R	3.66	3.32	4.00	3.57	3.53	1.60	1.27	1.80	7.80	6.00	1.69	1.08	1.23
LI5L	2.91	2.54	3.28	2.81	2.68	1.12	1.06	1.65	6.85	5.20	1.09	1.84	4.87
LI5R	3.29	3.04	3.55	3.24	3.10	1.11	1.05	1.70	6.55	4.85	1.08	0.86	0.38
ST36L	4.77	4.14	5.40	4.70	4.40	2.97	1.72	2.15	9.00	6.85	2.60	0.63	-0.21
ST36R	4.44	4.02	4.86	4.36	4.30	2.36	1.54	2.10	8.65	6.55	2.18	0.62	0.06
3R	4.61	4.02	5.20	4.49	4.25	3.59	1.89	1.80	10.10	8.30	3.01	0.82	0.57
SP6R	3.84	3.17	4.51	3.85	3.60	1.11	1.06	2.00	5.55	3.55	1.79	0.19	-0.48
KD3R	3.89	3.46	4.32	3.77	3.50	2.04	1.43	1.90	8.70	6.80	1.85	1.26	1.97

Descriptive statistics of PPT_{median} for Intervention of Female in Visit 2													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.00	1.80	2.20	2.01	2.00	0.21	0.45	1.10	2.80	1.70	0.69	-0.05	-0.54
LI20R	1.96	1.82	2.10	1.94	2.00	0.26	0.51	1.15	3.10	1.95	0.83	0.33	-0.57
GB12R	3.11	2.81	3.42	3.10	2.93	0.76	0.87	1.60	4.70	3.10	1.45	0.30	-0.86
2L	5.00	4.42	5.59	4.90	4.60	2.83	1.68	2.50	9.50	7.00	2.08	0.85	0.37
2R	5.07	4.48	5.67	5.02	4.90	2.62	1.62	2.30	9.20	6.90	2.00	0.53	0.11
PC6L	2.88	2.41	3.35	2.88	2.90	0.55	0.74	1.70	4.20	2.50	1.15	0.40	-0.31
PC6R	3.96	3.62	4.29	3.91	3.85	1.21	1.10	2.30	6.50	4.20	1.45	0.51	-0.22
LI10L	3.30	2.84	3.76	3.22	3.00	1.74	1.32	1.40	7.20	5.80	2.08	0.89	0.62
1L	3.28	2.92	3.65	3.23	3.20	1.05	1.03	1.80	6.15	4.35	1.65	0.66	0.37
1R	3.64	3.27	4.00	3.50	3.30	1.85	1.36	1.95	8.25	6.30	1.75	1.52	2.69
LI5L	3.04	2.62	3.46	2.88	2.80	1.45	1.21	1.80	8.40	6.60	1.09	2.97	11.57
LI5R	3.28	2.96	3.60	3.14	2.90	1.68	1.30	1.70	8.45	6.75	1.41	1.84	4.25
ST36L	4.81	4.24	5.38	4.74	4.60	2.39	1.54	1.85	9.15	7.30	2.05	0.75	1.29
ST36R	4.60	4.15	5.05	4.50	4.20	2.69	1.64	1.95	9.65	7.70	1.93	1.05	1.40
3R	4.57	4.01	5.14	4.42	4.30	3.30	1.82	1.90	9.90	8.00	2.05	1.19	1.51
SP6R	3.63	2.92	4.33	3.58	3.30	1.22	1.10	2.00	6.05	4.05	1.18	0.76	0.98
KD3R	3.94	3.56	4.33	3.88	3.40	1.64	1.28	2.25	7.40	5.15	1.83	0.68	-0.41

Descriptive statistics of PPT_{median} for Intervention of Female in Visit 3													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.20	2.00	2.41	2.19	2.15	0.22	0.46	1.35	3.20	1.85	0.50	0.16	-0.20
LI20R	2.11	1.96	2.26	2.09	2.08	0.31	0.55	1.20	3.80	2.60	0.78	0.44	0.40
GB12R	3.50	3.17	3.82	3.47	3.35	0.87	0.93	2.00	5.70	3.70	1.30	0.45	-0.24
2L	5.54	4.95	6.13	5.52	5.30	2.85	1.69	3.00	8.60	5.60	2.86	0.36	-1.04
2R	5.34	4.78	5.90	5.25	5.10	2.34	1.53	3.00	10.00	7.00	1.90	0.84	1.51
PC6L	3.42	2.79	4.05	3.34	3.33	0.98	0.99	2.20	6.00	3.80	1.15	1.61	3.81
PC6R	4.15	3.79	4.50	4.12	4.25	1.36	1.17	2.20	6.50	4.30	2.00	0.30	-0.93
LI10L	3.48	3.05	3.91	3.40	3.38	1.54	1.24	1.75	6.90	5.15	1.83	0.86	0.69
1L	3.49	3.10	3.87	3.47	3.20	1.19	1.09	1.80	5.75	3.95	1.88	0.29	-1.03
1R	3.93	3.53	4.33	3.84	3.60	2.20	1.48	1.75	8.50	6.75	2.23	0.97	1.09
LI5L	3.16	2.74	3.58	3.05	2.80	1.44	1.20	1.60	7.70	6.10	1.30	1.87	5.08
LI5R	3.52	3.18	3.86	3.43	3.20	1.91	1.38	1.50	7.40	5.90	1.44	1.10	0.89
ST36L	4.99	4.39	5.59	4.91	5.10	2.68	1.64	2.00	9.80	7.80	1.75	0.63	1.59
ST36R	4.99	4.41	5.57	4.87	4.60	4.39	2.10	1.40	10.80	9.40	2.45	0.96	0.62
3R	4.72	4.18	5.26	4.63	4.43	3.00	1.73	1.35	9.30	7.95	2.21	0.89	0.86
SP6R	4.06	2.99	5.13	3.87	3.45	2.83	1.68	2.80	8.75	5.95	1.21	2.31	5.77
KD3R	4.05	3.64	4.46	4.01	3.80	1.88	1.37	1.70	7.60	5.90	2.05	0.49	-0.13

Descriptive statistics of PPT_{median} for Intervention of Female in Visit 4													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.48	2.26	2.69	2.46	2.50	0.23	0.48	1.70	3.50	1.80	0.79	-0.09	-0.40
LI20R	2.33	2.14	2.52	2.30	2.25	0.49	0.70	1.10	4.50	3.40	1.04	0.80	0.77
GB12R	3.81	3.48	4.13	3.80	3.90	0.87	0.93	2.10	5.60	3.50	1.25	0.17	-0.34
2L	5.73	5.07	6.38	5.66	5.38	3.52	1.88	3.00	9.60	6.60	2.58	0.63	-0.48
2R	5.57	4.89	6.25	5.48	5.30	3.43	1.85	2.85	10.50	7.65	2.60	0.81	0.39
PC6L	3.62	3.12	4.11	3.60	3.58	0.61	0.78	2.35	5.10	2.75	1.10	0.40	0.02
PC6R	4.56	4.18	4.94	4.53	4.40	1.54	1.24	2.65	7.65	5.00	2.06	0.32	-0.68
LI10L	3.90	3.47	4.34	3.81	3.65	1.54	1.24	2.20	7.30	5.10	1.45	1.12	1.48
1L	3.85	3.45	4.26	3.84	3.90	1.33	1.15	1.70	6.50	4.80	1.85	0.19	-0.58
1R	4.29	3.86	4.71	4.20	4.18	2.49	1.58	1.85	8.30	6.45	2.25	0.71	-0.12
LI5L	3.46	3.02	3.89	3.34	3.25	1.56	1.25	1.70	8.45	6.75	1.23	1.96	6.73
LI5R	3.86	3.50	4.22	3.78	3.60	2.11	1.45	1.60	8.80	7.20	2.23	0.87	0.80
ST36L	5.31	4.63	5.98	5.29	5.60	3.38	1.84	1.80	9.10	7.30	2.80	-0.06	-0.44
ST36R	5.20	4.70	5.70	5.13	4.90	3.28	1.81	2.00	10.70	8.70	2.35	0.58	0.53
3R	5.08	4.53	5.62	5.00	4.83	3.09	1.76	2.00	9.50	7.50	1.86	0.88	0.95
SP6R	4.55	3.50	5.60	4.51	4.10	2.73	1.65	2.35	7.50	5.15	2.21	0.79	-0.24
KD3R	4.38	3.95	4.82	4.33	4.40	2.06	1.43	2.05	8.00	5.95	2.18	0.41	-0.10

Descriptive statistics of PPT_{median} for Control of Male in Visit 1													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.85	1.56	2.14	1.83	1.70	0.74	0.86	0.30	3.65	3.35	1.33	0.41	-0.44
LI20R	1.98	1.66	2.29	1.97	1.85	0.87	0.93	0.20	3.75	3.55	1.44	0.31	-0.51
GB12R	2.92	2.57	3.28	2.89	2.63	1.10	1.05	1.25	5.50	4.25	1.71	0.62	-0.41
2L	4.63	3.96	5.30	4.51	4.45	3.88	1.97	2.10	9.70	7.60	3.28	0.76	0.03
2R	5.20	4.46	5.94	5.10	4.90	4.77	2.18	1.50	11.70	10.20	3.19	0.77	0.71
PC6L	4.28	3.80	4.75	4.20	3.93	1.95	1.40	2.35	7.85	5.50	2.03	0.84	-0.09
PC6R	4.37	3.93	4.81	4.30	4.38	1.67	1.29	2.55	8.35	5.80	1.98	0.77	0.92
LI10L	3.60	3.15	4.05	3.54	3.23	1.78	1.33	1.60	6.75	5.15	1.75	0.71	-0.11
1L	3.72	3.25	4.19	3.66	3.30	1.93	1.39	1.65	6.80	5.15	2.01	0.73	-0.31
1R	4.08	3.54	4.62	3.96	3.80	2.54	1.59	2.25	8.30	6.05	2.63	0.89	0.11
LI5L	3.59	3.17	4.00	3.56	3.30	1.49	1.22	1.70	6.00	4.30	1.93	0.42	-0.96
LI5R	3.89	3.44	4.35	3.78	3.73	1.83	1.35	2.20	8.85	6.65	2.05	1.43	3.66
ST36L	5.95	5.41	6.49	5.95	6.13	2.54	1.59	2.90	9.50	6.60	2.61	-0.14	-0.71
ST36R	6.31	5.59	7.03	6.29	5.90	4.56	2.13	2.65	10.20	7.55	3.06	0.19	-0.98
3R	5.27	4.70	5.83	5.17	4.93	2.79	1.67	2.90	10.30	7.40	2.53	0.82	0.70
SP6R	5.33	4.67	5.99	5.21	5.05	3.81	1.95	2.20	12.00	9.80	2.71	1.06	2.47
KD3R	5.37	4.72	6.02	5.32	5.58	3.71	1.93	1.60	9.75	8.15	2.56	0.32	0.20

Descriptive statistics of PPT_{median} for Control of Male in Visit 2													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.78	1.50	2.05	1.75	1.65	0.65	0.81	0.30	3.80	3.50	1.24	0.48	-0.13
LI20R	1.87	1.59	2.14	1.85	1.75	0.66	0.81	0.30	3.90	3.60	1.18	0.48	0.00
GB12R	2.85	2.48	3.22	2.78	2.70	1.20	1.10	1.15	6.10	4.95	1.65	0.88	0.89
2L	4.95	4.32	5.57	4.87	4.55	3.39	1.84	1.95	9.50	7.55	2.53	0.58	-0.18
2R	5.17	4.50	5.84	5.13	5.23	3.93	1.98	1.65	9.20	7.55	3.30	0.26	-0.79
PC6L	4.48	4.04	4.91	4.40	4.15	1.65	1.28	2.90	7.40	4.50	1.89	0.81	-0.19
PC6R	4.47	4.09	4.85	4.41	4.48	1.25	1.12	2.80	7.35	4.55	1.80	0.51	0.10
LI10L	3.51	3.16	3.85	3.45	3.18	1.03	1.02	2.10	6.65	4.55	1.63	0.95	0.95
1L	3.69	3.27	4.12	3.63	3.18	1.57	1.25	2.15	6.60	4.45	2.16	0.60	-0.82
1R	3.95	3.46	4.44	3.87	3.78	2.10	1.45	1.70	7.60	5.90	2.00	0.80	0.19
LI5L	3.74	3.34	4.14	3.69	3.80	1.38	1.18	1.80	7.30	5.50	1.65	0.70	0.83
LI5R	3.87	3.44	4.29	3.80	3.65	1.58	1.26	1.90	7.45	5.55	2.00	0.79	0.34
ST36L	6.38	5.61	7.14	6.24	5.98	5.08	2.25	3.50	12.90	9.40	3.61	0.92	0.43
ST36R	6.48	5.67	7.28	6.35	6.28	5.59	2.37	3.30	12.50	9.20	3.20	0.77	-0.12
3R	5.40	4.84	5.96	5.33	5.13	2.77	1.66	2.95	9.30	6.35	2.33	0.64	0.02
SP6R	5.35	4.71	5.99	5.29	5.40	3.53	1.88	2.70	10.00	7.30	3.60	0.32	-0.58
KD3R	5.36	4.76	5.96	5.28	5.40	3.16	1.78	2.60	9.50	6.90	2.23	0.61	0.15

Descriptive statistics of PPT_{median} for Control of Male in Visit 3													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.76	1.48	2.04	1.74	1.50	0.68	0.83	0.60	3.40	2.80	1.19	0.49	-0.70
LI20R	1.78	1.51	2.04	1.73	1.80	0.62	0.79	0.70	4.00	3.30	1.13	0.51	0.28
GB12R	2.78	2.42	3.15	2.71	2.48	1.18	1.08	1.30	5.90	4.60	1.46	1.10	1.08
2L	4.89	4.33	5.46	4.88	4.75	2.77	1.66	1.30	8.70	7.40	2.58	0.08	-0.19
2R	5.59	4.89	6.30	5.43	5.40	4.34	2.08	2.40	12.70	10.30	3.01	1.34	2.56
PC6L	4.28	3.86	4.69	4.19	4.00	1.51	1.23	2.55	7.60	5.05	1.90	1.01	0.48
PC6R	4.63	4.21	5.04	4.52	4.25	1.49	1.22	3.15	8.50	5.35	1.48	1.32	2.00
LI10L	3.48	3.07	3.89	3.37	3.13	1.46	1.21	1.70	8.40	6.70	1.18	1.98	6.84
1L	3.68	3.20	4.16	3.53	3.30	2.00	1.41	2.20	9.80	7.60	1.45	2.50	9.20
1R	3.98	3.43	4.54	3.81	3.30	2.73	1.65	2.10	10.50	8.40	1.63	2.09	5.90
LI5L	3.76	3.31	4.21	3.63	3.55	1.77	1.33	1.90	9.50	7.60	1.48	2.33	9.05
LI5R	3.86	3.53	4.18	3.80	3.80	0.92	0.96	2.20	6.40	4.20	1.18	0.86	0.75
ST36L	6.36	5.55	7.18	6.18	5.88	5.81	2.41	3.20	14.10	10.90	3.01	1.28	1.84
ST36R	6.32	5.58	7.06	6.14	5.58	4.76	2.18	3.90	13.20	9.30	2.70	1.35	1.57
3R	5.77	5.07	6.48	5.54	5.38	4.39	2.09	3.15	14.20	11.05	2.09	2.17	6.73
SP6R	5.28	4.83	5.73	5.23	5.10	1.76	1.33	3.30	8.70	5.40	2.19	0.57	-0.21
KD3R	5.35	4.79	5.91	5.25	5.08	2.72	1.65	2.80	10.70	7.90	2.00	1.07	1.86

Descriptive statistics of PPT_{median} for Control of Male in Visit 4													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	1.65	1.40	1.91	1.62	1.60	0.55	0.74	0.60	3.40	2.80	1.05	0.47	-0.48
LI20R	1.70	1.42	1.98	1.67	1.50	0.68	0.82	0.40	3.50	3.10	1.09	0.53	-0.48
GB12R	2.78	2.36	3.19	2.73	2.55	1.51	1.23	0.90	6.00	5.10	1.81	0.65	-0.06
2L	4.58	4.00	5.16	4.51	4.53	2.97	1.72	1.75	8.70	6.95	2.80	0.49	-0.32
2R	5.22	4.52	5.91	5.12	4.75	4.17	2.04	1.85	11.20	9.35	2.90	0.77	0.67
PC6L	4.36	3.94	4.78	4.30	4.20	1.54	1.24	2.60	7.10	4.50	1.84	0.57	-0.50
PC6R	4.61	4.20	5.02	4.60	4.60	1.48	1.22	2.40	7.00	4.60	1.96	0.15	-0.81
LI10L	3.34	2.92	3.77	3.26	3.10	1.59	1.26	1.35	7.20	5.85	1.09	1.26	1.81
1L	3.52	3.06	3.98	3.41	3.15	1.86	1.36	1.80	7.15	5.35	1.74	1.12	0.82
1R	3.81	3.31	4.31	3.74	3.25	2.20	1.48	1.15	8.40	7.25	2.35	0.97	1.09
LI5L	3.65	3.23	4.08	3.56	3.50	1.55	1.25	1.90	7.70	5.80	1.54	1.17	2.11
LI5R	3.92	3.46	4.38	3.81	3.68	1.86	1.36	1.95	8.15	6.20	1.49	1.25	2.15
ST36L	6.07	5.34	6.79	5.89	5.80	4.59	2.14	3.00	14.70	11.70	2.41	1.88	6.40
ST36R	6.21	5.52	6.90	6.11	6.20	4.15	2.04	2.45	11.50	9.05	3.03	0.67	0.47
3R	5.36	4.61	6.12	5.16	5.20	5.03	2.24	2.30	15.60	13.30	2.46	2.67	11.87
SP6R	5.39	4.74	6.03	5.25	5.23	3.63	1.91	2.60	12.50	9.90	2.21	1.47	4.30
KD3R	5.41	4.76	6.07	5.32	5.40	3.77	1.94	2.35	11.20	8.85	3.19	0.57	0.74

Descriptive statistics of PPT_{median} for Intervention of Male in Visit 1													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.44	2.03	2.85	2.43	2.28	0.86	0.93	1.05	4.10	3.05	1.08	0.66	-0.53
LI20R	2.52	2.31	2.72	2.49	2.48	0.54	0.74	1.30	4.35	3.05	1.03	0.51	-0.28
GB12R	3.62	3.11	4.12	3.52	3.20	2.07	1.44	1.70	7.40	5.70	1.93	1.05	0.56
2L	5.61	4.85	6.36	5.54	5.20	3.90	1.97	2.65	10.00	7.35	3.13	0.38	-0.57
2R	5.15	4.59	5.71	5.14	5.00	1.76	1.33	2.80	7.80	5.00	1.66	0.24	-0.37
PC6L	3.60	2.83	4.37	3.56	3.25	1.47	1.21	2.20	5.70	3.50	2.18	0.58	-1.03
PC6R	4.75	4.19	5.30	4.60	4.35	3.04	1.74	2.50	9.80	7.30	1.78	1.28	1.56
LI10L	4.76	3.96	5.56	4.58	4.30	5.23	2.29	1.90	11.70	9.80	3.41	1.06	1.22
1L	4.53	3.84	5.23	4.43	3.60	3.85	1.96	2.00	9.20	7.20	2.88	0.82	-0.24
1R	4.60	4.18	5.02	4.49	4.23	2.15	1.47	2.70	8.60	5.90	1.74	1.09	0.80
LI5L	3.79	3.44	4.14	3.75	3.50	0.96	0.98	2.30	6.30	4.00	1.28	0.78	0.12
LI5R	4.06	3.64	4.48	3.89	3.60	2.61	1.62	2.15	9.60	7.45	1.56	1.69	2.95
ST36L	7.08	6.15	8.01	7.01	6.50	5.99	2.45	3.60	12.00	8.40	3.60	0.58	-0.66
ST36R	6.00	5.44	6.55	5.93	5.90	3.42	1.85	2.50	12.00	9.50	2.03	0.76	1.47
3R	5.73	5.18	6.28	5.65	5.35	2.56	1.60	3.05	9.95	6.90	2.55	0.83	0.36
SP6R	4.97	3.77	6.17	4.92	4.23	3.55	1.88	3.00	7.90	4.90	3.78	0.50	-1.54
KD3R	5.02	4.42	5.63	4.93	4.30	4.08	2.02	2.25	9.70	7.45	3.00	0.58	-0.51

Descriptive statistics of PPT_{median} for Intervention of Male in Visit 2													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.61	2.18	3.03	2.53	2.60	0.92	0.96	1.20	5.55	4.35	0.98	1.39	3.21
LI20R	2.62	2.39	2.85	2.58	2.48	0.66	0.81	1.15	4.75	3.60	1.13	0.77	0.10
GB12R	4.04	3.51	4.56	3.94	3.93	2.24	1.50	2.00	7.80	5.80	2.06	0.92	0.41
2L	6.10	5.23	6.96	6.03	5.50	5.19	2.28	2.90	10.40	7.50	3.40	0.61	-0.67
2R	5.83	5.13	6.54	5.76	5.75	2.77	1.66	3.35	9.80	6.45	1.81	0.59	0.37
PC6L	4.00	3.23	4.76	3.93	3.75	1.45	1.21	2.55	6.65	4.10	1.65	0.97	0.68
PC6R	4.94	4.33	5.54	4.79	4.40	3.62	1.90	1.95	11.40	9.45	2.08	1.36	2.33
LI10L	4.82	4.06	5.57	4.73	4.23	4.70	2.17	1.90	9.30	7.40	3.25	0.78	-0.62
1L	4.95	4.20	5.70	4.82	4.30	4.47	2.11	2.10	10.50	8.40	2.24	1.06	0.66
1R	4.74	4.30	5.19	4.65	4.40	2.44	1.56	2.45	9.60	7.15	2.06	0.94	0.94
LI5L	4.20	3.76	4.65	4.14	3.98	1.52	1.23	2.50	7.20	4.70	1.64	0.68	-0.30
LI5R	4.22	3.80	4.63	4.08	3.63	2.60	1.61	2.40	9.40	7.00	2.04	1.26	1.19
ST36L	7.81	6.81	8.80	7.66	8.00	6.81	2.61	3.25	15.70	12.45	3.70	0.81	1.69
ST36R	6.58	5.95	7.21	6.48	6.60	4.36	2.09	3.20	12.00	8.80	2.30	0.60	0.16
3R	6.20	5.56	6.84	6.11	5.85	3.48	1.87	3.55	11.20	7.65	3.05	0.61	-0.13
SP6R	5.19	3.99	6.39	5.13	4.40	3.55	1.89	3.05	8.40	5.35	3.44	0.58	-1.24
KD3R	5.49	4.83	6.15	5.37	5.40	4.78	2.19	2.50	11.20	8.70	3.53	0.62	-0.27

Descriptive statistics of PPT_{median} for Intervention of Male in Visit 3													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	2.83	2.29	3.37	2.71	2.55	1.50	1.22	1.30	6.80	5.50	1.34	1.63	4.21
LI20R	2.91	2.63	3.18	2.88	2.75	0.94	0.97	1.00	5.40	4.40	1.36	0.41	-0.20
GB12R	4.55	3.91	5.19	4.44	4.13	3.37	1.84	2.40	9.00	6.60	2.79	0.77	-0.30
2L	6.87	5.92	7.83	6.82	7.10	6.33	2.52	2.40	12.80	10.40	4.55	0.23	-0.49
2R	6.18	5.44	6.91	6.22	6.53	3.05	1.75	2.75	8.75	6.00	2.88	-0.39	-0.76
PC6L	4.27	3.39	5.15	4.22	4.30	1.92	1.39	2.50	6.90	4.40	2.34	0.39	-0.92
PC6R	5.37	4.64	6.09	5.15	4.63	5.15	2.27	2.70	12.90	10.20	2.98	1.45	2.25
LI10L	5.40	4.60	6.21	5.32	5.20	5.35	2.31	2.40	9.90	7.50	3.71	0.55	-0.81
1L	5.55	4.67	6.43	5.40	4.50	6.17	2.48	2.55	12.00	9.45	3.63	1.00	0.04
1R	5.13	4.57	5.68	5.05	4.43	3.83	1.96	1.50	10.00	8.50	2.73	0.79	-0.11
LI5L	4.84	4.26	5.43	4.76	4.73	2.62	1.62	2.00	9.40	7.40	2.34	0.72	0.74
LI5R	4.56	4.08	5.04	4.47	4.05	3.51	1.87	1.40	9.45	8.05	2.91	0.75	0.03
ST36L	7.99	6.91	9.07	7.93	8.00	8.04	2.84	3.00	14.50	11.50	3.65	0.27	-0.33
ST36R	6.88	6.16	7.60	6.82	6.15	5.74	2.40	2.20	12.00	9.80	3.95	0.40	-0.67
3R	6.97	6.11	7.84	6.91	6.00	6.35	2.52	2.70	13.20	10.50	3.80	0.48	-0.42
SP6R	5.60	4.21	6.99	5.52	5.63	4.82	2.20	3.00	9.70	6.70	4.08	0.45	-0.81
KD3R	5.88	5.19	6.57	5.87	5.90	5.31	2.30	2.20	9.70	7.50	4.30	0.03	-1.39

Descriptive statistics of PPT_{median} for Intervention of Male in Visit 4													
Site	Mean	95% Confidence Interval for Mean		5% Trimmed Mean	Median	Variance	Std. Deviation	Minimum	Maximum	Range	Interquartile Range	Skewness	Kurtosis
		Lower Bound	Upper Bound										
LI20L	3.12	2.60	3.64	3.08	2.85	1.36	1.17	1.40	5.50	4.10	1.99	0.34	-0.85
LI20R	3.04	2.77	3.31	2.99	2.80	0.90	0.95	1.00	5.50	4.50	1.40	0.73	0.42
GB12R	4.91	4.18	5.64	4.82	4.35	4.38	2.09	2.40	9.00	6.60	3.48	0.74	-0.77
2L	7.13	6.20	8.07	6.99	7.30	6.07	2.46	3.90	14.00	10.10	4.05	0.69	0.34
2R	6.64	5.82	7.47	6.56	6.20	3.82	1.96	3.50	11.40	7.90	2.88	0.60	0.01
PC6L	4.88	3.78	5.99	4.90	4.88	3.02	1.74	2.00	7.55	5.55	3.16	0.07	-0.85
PC6R	5.49	4.71	6.27	5.34	4.70	5.93	2.44	2.40	11.50	9.10	3.33	0.96	-0.07
LI10L	5.97	4.94	7.01	5.77	5.10	8.76	2.96	2.10	13.50	11.40	4.50	1.04	0.52
1L	6.13	5.17	7.09	6.03	5.20	7.32	2.71	2.30	12.05	9.75	3.93	0.75	-0.47
1R	5.57	4.98	6.15	5.47	5.00	4.22	2.05	2.40	10.90	8.50	2.81	0.81	-0.12
LI5L	5.21	4.61	5.80	5.17	4.58	2.74	1.66	2.80	8.20	5.40	2.79	0.40	-1.09
LI5R	4.86	4.33	5.38	4.73	4.20	4.10	2.03	1.90	11.90	10.00	2.98	1.08	1.10
ST36L	9.19	7.97	10.41	9.13	9.20	10.34	3.22	3.85	16.20	12.35	5.80	0.14	-0.69
ST36R	7.68	6.92	8.45	7.66	7.35	6.42	2.53	2.70	13.00	10.30	3.95	0.20	-0.80
3R	7.07	6.26	7.89	7.00	7.05	5.67	2.38	3.15	12.90	9.75	3.55	0.51	-0.41
SP6R	5.83	4.22	7.44	5.76	5.08	6.40	2.53	2.90	10.05	7.15	4.70	0.61	-1.20
KD3R	6.31	5.47	7.16	6.21	5.60	7.84	2.80	2.20	12.35	10.15	4.35	0.67	-0.53

Appendix 13: Supplementary results II: Unilateral LI4m^{+}21 (LI4R) session

This section could be incorporated with Section 4.18 to form a standalone comprehensive report about the effect of LI4R intervention on regional PPT. Whilst all intervention studies involved LI4m^{+}21, Studies 1, 2, 3 and 6 involved LI4R and Studies 4 and 5 applied bilateral LI4. In this section, only the PPT database from the unilateral LI4m^{+}21 (LI4R) intervention was established to explore the stability of PPT after intervention. Section 4.18 examined the absolute differences of PPT_{mean} and PPT_{median} between pre- and post-intervention, and the relative differences of each parameter with respect to its pre-intervention values.

A13.1: Percentage change of $POST_{mean}$ from PRE_{mean}

For each site by gender, the grand mean PPT were obtained from the overall pre-intervention and post-intervention PPT measures and defined as PRE_{mean} and $POST_{mean}$ respectively. The percentage change between PRE_{mean} and $POST_{mean}$ was calculated as $\%Mean=(POST_{mean}-PRE_{mean})/PRE_{mean} \times 100\%$. Table A13.1 shows the grand mean PPT before and after interventions (PRE_{mean} and $POST_{mean}$) with the associated %Mean at each measurement site by gender. The percentage increase in $POST_{mean}$ varied from 6.4% (2L) to 19.6% (PC6R) for females and 5.5% (ST36R) to 19.3% (LI5R) for males.

Site	Percentage change of $POST_{mean}$ from PRE_{mean} (%Mean)					
	Female			Male		
	PRE_{mean}	$POST_{mean}$	%Mean	PRE_{mean}	$POST_{mean}$	%Mean
LI20R	2.10	2.34	11.4%	2.62	3.00	14.5%
GB12R	3.36	3.83	14.0%	4.20	4.71	12.1%
2L	5.16	5.49	6.4%	6.12	6.75	10.3%
2R	5.01	5.71	14.0%	5.39	6.40	18.7%
PC6L	3.57	3.87	8.4%	4.04	4.72	16.8%
PC6R	3.62	4.33	19.6%	4.82	5.29	9.8%
LI10L	3.24	3.76	16.0%	4.49	5.35	19.2%
1L	3.19	3.57	11.9%	4.88	5.36	9.8%
1R	3.52	4.12	17.0%	4.86	5.31	9.3%
LI5L	3.30	3.58	8.5%	4.32	4.86	12.5%
LI5R	3.03	3.61	19.1%	3.84	4.58	19.3%
ST36L	4.59	5.02	9.4%	7.33	7.74	5.6%
ST36R	4.87	5.61	15.2%	6.78	7.15	5.5%
3R	4.76	5.26	10.5%	6.29	6.90	9.7%
KD3R	4.00	4.28	7.0%	5.67	6.30	11.1%

Table A13.1: The percentage change between overall grand mean PPT in pre and post-interventions.

A13.2: Percentage change of $POST_{median}$ from PRE_{median}

For each site by gender, the grand median PPT were obtained from the overall pre-intervention and post-intervention PPT measures and defined as PRE_{median} and $POST_{median}$ respectively. The percentage change between PRE_{median} and $POST_{median}$ was calculated as $\%Median=(POST_{median}-PRE_{median})/PRE_{median}x100\%$. Table A13.2 shows the grand median PPT before and after interventions (PRE_{median} and $POST_{median}$) with the associated %Median at each measurement site by gender. The percentage increase in $POST_{median}$ varied from 5.2% (2L) to 19.4% (PC6R) for females and 3.3% (ST36L) to 20.8% (LI10L) for males.

Site	Percentage change of $POST_{median}$ from PRE_{median}					
	Female			Male		
	PRE_{median}	$POST_{median}$	%Median	PRE_{median}	$POST_{median}$	%Median
LI20R	2.12	2.34	10.4%	2.63	3.00	14.1%
GB12R	3.39	3.82	12.7%	4.22	4.68	10.9%
2L	5.15	5.42	5.2%	6.14	6.85	11.6%
2R	5.05	5.73	13.5%	5.41	6.47	19.6%
PC6L	3.63	3.89	7.2%	4.06	4.73	16.5%
PC6R	3.61	4.31	19.4%	4.83	5.19	7.5%
LI10L	3.23	3.73	15.5%	4.43	5.35	20.8%
1L	3.16	3.53	11.7%	4.83	5.36	11.0%
1R	3.53	4.12	16.7%	4.81	5.31	10.4%
LI5L	3.28	3.54	7.9%	4.28	4.82	12.6%
LI5R	3.03	3.56	17.5%	3.87	4.56	17.8%
ST36L	4.60	4.92	7.0%	7.48	7.73	3.3%
ST36R	4.90	5.60	14.3%	6.80	7.13	4.9%
3R	4.76	5.26	10.5%	6.29	6.86	9.1%
KD3R	3.99	4.32	8.3%	5.72	6.33	10.7%

Table A13.2: The percentage change between overall grand median PPT in pre and post-interventions.

A13.3: Percentage change of PRE_{median} from PRE_{mean}

For each site by gender, the grand mean and grand median were generated from the pre-intervention PPT scores (i.e. PRE_{mean} and PRE_{median}) and the percentage change between PRE_{mean} and PRE_{median} was calculated as $\%PRE=(PRE_{median}-PRE_{mean})/PRE_{mean}$ x100%. Table A13.3 shows the PRE_{mean} and PRE_{median} with the associated percentage change %PRE at each measurement site by gender. The percentage changes between PRE_{mean} and PRE_{median} were negligible.

Site	Percentage change between PRE_{mean} and PRE_{median}					
	Female			Male		
	PRE_{mean}	PRE_{median}	%PRE	PRE_{mean}	PRE_{median}	%PRE
LI20R	2.10	2.12	1.0%	2.62	2.63	0.4%
GB12R	3.36	3.39	0.9%	4.20	4.22	0.5%
2L	5.16	5.15	-0.2%	6.12	6.14	0.3%
2R	5.01	5.05	0.8%	5.39	5.41	0.4%
PC6L	3.57	3.63	1.7%	4.04	4.06	0.5%
PC6R	3.62	3.61	-0.3%	4.82	4.83	0.2%
LI10L	3.24	3.23	-0.3%	4.49	4.43	-1.3%
1L	3.19	3.16	-0.9%	4.88	4.83	-1.0%
1R	3.52	3.53	0.3%	4.86	4.81	-1.0%
LI5L	3.30	3.28	-0.6%	4.32	4.28	-0.9%
LI5R	3.03	3.03	0.0%	3.84	3.87	0.8%
ST36L	4.59	4.60	0.2%	7.33	7.48	2.0%
ST36R	4.87	4.90	0.6%	6.78	6.80	0.3%
3R	4.76	4.76	0.0%	6.29	6.29	0.0%
KD3R	4.00	3.99	-0.2%	5.67	5.72	0.9%

Table A13.3: The percentage change between grand mean and median PPT in pre-intervention.

A13.4: Percentage change of $POST_{median}$ from $POST_{mean}$

For each site by gender, the $POST_{mean}$ and $POST_{median}$ were generated from the overall post-intervention PPT scores and the percentage change between $POST_{mean}$ and $POST_{median}$ was calculated as $\%POST=(POST_{median} - POST_{mean})/ POST_{mean}$ x100%. Table A13.4 shows the $POST_{mean}$ and $POST_{median}$ with the associated percentage change %POST at each measurement site by gender. The percentage changes between $POST_{mean}$ and $POST_{median}$ were negligible.

Site	Percentage change between $POST_{mean}$ and $POST_{median}$					
	Female			Male		
	$POST_{mean}$	$POST_{median}$	%POST	$POST_{mean}$	$POST_{median}$	%POST
LI20R	2.34	2.34	0.0%	3.00	3.00	0.0%
GB12R	3.83	3.82	-0.3%	4.71	4.68	-0.6%
2L	5.49	5.42	-1.3%	6.75	6.85	1.5%
2R	5.71	5.73	0.4%	6.40	6.47	1.1%
PC6L	3.87	3.89	0.5%	4.72	4.73	0.2%
PC6R	4.33	4.31	-0.5%	5.29	5.19	-1.9%
LI10L	3.76	3.73	-0.8%	5.35	5.35	0.0%
1L	3.57	3.53	-1.1%	5.36	5.36	0.0%
1R	4.12	4.12	0.0%	5.31	5.31	0.0%
LI5L	3.58	3.54	-1.1%	4.86	4.82	-0.8%
LI5R	3.61	3.56	-1.4%	4.58	4.56	-0.4%
ST36L	5.02	4.92	-2.0%	7.74	7.73	-0.1%
ST36R	5.61	5.60	-0.2%	7.15	7.13	-0.3%
3R	5.26	5.26	0.0%	6.90	6.86	-0.6%
KD3R	4.28	4.32	0.9%	6.30	6.33	0.5%

Table A13.4: The percentage change between overall grand mean and median PPT in post-intervention.

A13.5: To examine the mean percentage change of regional PPT from its pre-intervention mean PPT ($\%PRE_{mean}$)

Research question: Any significant difference in the mean percentage change of regional PPT from its PRE_{mean} ($\%PRE_{mean}$)?

The percentage change between post-intervention PPT and PRE_{mean} was calculated as $\%PRE_{mean}$ = (post PPT-PRE_{mean})/PRE_{mean} x 100%. A one-sample t-test was conducted to determine whether the mean of $\%PRE_{mean}$ was the same as the test value of zero at alpha level of 0.05. Table A13.5 shows the statistics yielded by t-test and the Cohen's d for effect size at 15 measurement sites by gender. The results revealed that 11 sites (LI20R, GB12R, 2R, PC6R, LI10L, 1L, 1R, LI5L, LI5R, ST36R, 3R) for females and ten sites (LI20R, 2L, 2R, PC6L, LI10L, 1R, LI5L, LI5R, 3R, KD3R) for males had displayed significant increase in the mean of $\%PRE_{mean}$ in which seven sites were common for both genders (LI20R, 2R, LI10L, 1R, LI5L, LI5R, 3R). The ranges of $\%PRE_{mean}$ varied from 6.5% (2L) to 19.8% (PC6R) for females and from 5.5% (ST36L, ST36R) to 19.2% (LI10L) for males. The Cohen's d ranged from 0.18 (KD3R) to 0.56 (PC6R) for females and 0.13 (ST36L) to 0.46

(2R) for males with PC6R (d=0.56) and LI10L (d=0.49) of females exhibited a moderate effect size of around 50%.

T-test on percentage change of post PPT from PRE_{mean} ($\%PRE_{mean}$)										
Site	Female					Male				
	Mean	t	p	d	95% CI	Mean	t	p	d	95% CI
LI20R	11.5	t_{167}=4.4	0.000	0.34	(6.3,16.6)	14.4	t_{149}=3.6	0.000	0.29	(6.5,22.3)
GB12R	14.0	t_{35}=2.2	0.035	0.37	(1.1,26.9)	12.2	t_{35}=1.9	0.067	0.31	(-0.9,25.4)
2L	6.5	t_{68}=1.7	0.094	0.20	(-1.2,14.3)	10.3	t_{62}=2.1	0.045	0.26	(0.3,20.3)
2R	13.9	t_{92}=3.7	0.000	0.39	(6.5,21.3)	18.8	t_{71}=3.9	0.000	0.46	(9.2,28.4)
PC6L	8.4	t_{35}=1.6	0.116	0.27	(-2.2,19.0)	16.8	t_{35}=2.5	0.017	0.42	(3.2,30.4)
PC6R	19.8	t_{65}=4.6	0.000	0.56	(11.2,28.5)	9.6	t_{53}=1.7	0.088	0.24	(-1.5,20.8)
LI10L	16.0	t_{35}=2.9	0.006	0.49	(4.9,27.2)	19.2	t_{35}=2.1	0.046	0.35	(0.4,38.0)
1L	12.2	t_{68}=2.7	0.010	0.32	(3.0,21.3)	9.8	t_{68}=1.9	0.057	0.23	(-0.3,20.0)
1R	17.2	t_{131}=4.0	0.000	0.35	(8.7,25.7)	9.2	t_{113}=2.1	0.039	0.20	(0.5,17.9)
LI5L	8.5	t_{101}=2.1	0.040	0.21	(0.4,16.7)	12.5	t_{95}=2.7	0.009	0.27	(3.2,21.7)
LI5R	19.0	t_{131}=4.5	0.000	0.39	(10.6,27.3)	19.1	t_{113}=4.1	0.000	0.38	(9.8,28.4)
ST36L	9.4	t_{62}=1.7	0.087	0.22	(-1.4,20.1)	5.5	t_{56}=1.0	0.321	0.13	(-5.5,16.6)
ST36R	15.1	t_{158}=4.3	0.000	0.34	(8.2,22.0)	5.5	t_{134}=1.6	0.112	0.14	(-1.3,12.2)
3R	10.4	t_{125}=2.6	0.010	0.23	(2.5,18.3)	9.7	t_{104}=2.4	0.017	0.24	(1.8,17.6)
KD3R	7.0	t_{68}=1.5	0.139	0.18	(-2.3,16.2)	11.0	t_{68}=2.1	0.039	0.25	(0.6,21.4)

Table A13.5: The results of one-sample t-test on percentage change of post PPT from its baseline mean. Cohen's d gives the effect size.

A13.6 To examine the mean percentage change of regional PPT from its pre-intervention median PPT ($\%PRE_{median}$)

Research question: Any significant difference in the mean percentage change of regional PPT from its pre-intervention median, PRE_{median} ($\%PRE_{median}$)?

The percentage change between post-intervention PPT and PRE_{median} was calculated as $\%PRE_{median}$ = (post PPT-PRE_{median})/PRE_{median} x 100%. A one-sample t-test was conducted to determine whether the mean of $\%PRE_{median}$ was the same as the test value of zero at alpha level of 0.05. Table A13.6 shows the statistics yielded by t-test and the Cohen's d for effect size at 15 measurement sites by gender. The results revealed that all sites for both genders except ST36L for males, had displayed significant increase in the mean of $\%PRE_{median}$ from zero. The ranges of $\%PRE_{median}$ varied from 13.3% (2L) to 39.7% (1R) for females and from 10.5% (ST36L) to 44.7% (LI10L) for males. The Cohen's d ranged from 0.32 (3R) to 0.73 (PC6R) for females and 0.24 (ST36L) to 0.66 (LI10L) for males with seven sites (GB12R, 2R, PC6R, LI10L, 1R, LI5L, LI5R) from females and seven sites

(GB12R, PC6L, PC6R, LI10L, 1L, LI5R, 3R) for males exhibited a moderate effect size of at least 50%. No cases acquired Cohen's large effect size of 0.8.

T-test on percentage change of post PPT from PRE_{median} ($\%PRE_{median}$)										
Site	Female					Male				
	Mean	t	p	d	95% CI	Mean	t	p	d	95% CI
LI20R	15.6	t_{167}=5.7	0.000	0.44	(10.2,20.9)	20.1	t_{149}=4.8	0.000	0.39	(11.8,28.4)
GB12R	25.5	t_{35}=3.6	0.001	0.61	(11.2,39.7)	20.8	t_{35}=3.0	0.005	0.50	(6.6,35.0)
2L	13.3	t_{68}=3.2	0.002	0.39	(5.1,21.4)	14.3	t_{62}=2.8	0.008	0.35	(4.0,24.7)
2R	22.8	t_{92}=5.7	0.000	0.59	(14.8,30.8)	15.8	t_{71}=3.4	0.001	0.40	(6.5,25.2)
PC6L	12.9	t_{35}=2.4	0.024	0.39	(1.8,23.9)	24.3	t_{35}=3.4	0.002	0.57	(9.8,38.8)
PC6R	27.5	t_{65}=6.0	0.000	0.73	(18.3,36.6)	32.1	t_{53}=4.8	0.000	0.65	(18.7,45.6)
LI10L	25.3	t_{35}=4.3	0.000	0.71	(13.3,37.4)	44.7	t_{35}=4.0	0.000	0.66	(21.9,67.5)
1L	19.2	t_{68}=3.9	0.000	0.47	(9.4,28.9)	24.6	t_{68}=4.3	0.000	0.51	(13.1,36.1)
1R	39.7	t_{131}=7.8	0.000	0.68	(29.6,49.8)	19.3	t_{113}=4.0	0.000	0.38	(9.8,28.8)
LI5L	24.6	t_{101}=5.2	0.000	0.52	(15.3,34.0)	21.6	t_{95}=4.3	0.000	0.44	(11.6,31.6)
LI5R	28.8	t_{131}=6.3	0.000	0.55	(19.8,37.8)	31.7	t_{113}=6.1	0.000	0.57	(21.4,42.0)
ST36L	15.5	t_{62}=2.7	0.008	0.34	(4.2,26.9)	10.5	t_{56}=1.8	0.074	0.24	(-1.1,22.1)
ST36R	20.6	t_{158}=5.7	0.000	0.45	(13.4,27.8)	11.7	t_{134}=3.2	0.002	0.28	(4.6,18.9)
3R	14.9	t_{125}=3.6	0.000	0.32	(6.7,23.1)	23.1	t_{104}=5.2	0.000	0.50	(14.2,32.0)
KD3R	18.9	t_{68}=3.7	0.000	0.44	(8.6,29.2)	18.8	t_{68}=3.4	0.001	0.41	(7.7,30.0)

Table A13.6: The results of one-sample t-test on percentage change of PPT from its baseline median. Cohen's d gives the effect size.

A13.7 To compare the means between $\%PRE_{mean}$ and $\%PRE_{median}$

Research question: Were the means of the $\%PRE_{mean}$ and $\%PRE_{median}$ differ by gender?

The $\%PRE_{mean}$ and $\%PRE_{median}$ were analysed with ANOVA by GLM. Test of normality and homogeneity of variance were satisfactory with robust sample size of each site by gender. Table A13.7 gives the F statistics and p-value by GLM between $\%PRE_{mean}$ and $\%PRE_{median}$ at each measurement site by gender. The results revealed that there were two significant differences between the means of the $\%PRE_{mean}$ and $\%PRE_{median}$ for females (1R, LI5L) and for males (PC6R, 3R).

Site	GLM between $\%PRE_{mean}$ and $\%PRE_{median}$			
	Female		Male	
	F	p	F	p
LI20R	$F_{1,334}$=1.19	0.276	$F_{1,298}$=0.95	0.330
GB12R	$F_{1,70}$=1.47	0.229	$F_{1,70}$=0.81	0.373
2L	$F_{1,136}$=1.41	0.236	$F_{1,124}$=0.32	0.573
2R	$F_{1,184}$=2.65	0.105	$F_{1,142}$=0.19	0.662
PC6L	$F_{1,70}$=0.35	0.557	$F_{1,70}$=0.59	0.447
PC6R	$F_{1,130}$=1.46	0.229	$F_{1,106}$=6.68	0.011*
LI10L	$F_{1,70}$=1.32	0.255	$F_{1,70}$=3.06	0.086
1L	$F_{1,136}$=1.09	0.297	$F_{1,136}$=3.68	0.057
1R	$F_{1,262}$=11.39	0.001*	$F_{1,226}$=2.42	0.121
LI5L	$F_{1,202}$=6.61	0.011*	$F_{1,190}$=1.77	0.185
LI5R	$F_{1,262}$=2.50	0.115	$F_{1,226}$=3.24	0.073
ST36L	$F_{1,124}$=0.62	0.434	$F_{1,112}$=0.39	0.534
ST36R	$F_{1,316}$=1.19	0.276	$F_{1,268}$=1.58	0.211
3R	$F_{1,250}$=0.61	0.434	$F_{1,208}$=5.01	0.026*
KD3R	$F_{1,136}$=2.96	0.088	$F_{1,136}$=1.05	0.308

Table A13.7: The comparison between the means of $\%PRE_{mean}$ and $\%PRE_{median}$. The asterisk indicates $p<0.05$.

Appendix 14: Syntax for data analyses

I. Research Study One

Section 4.1
Figure 4.1:

```
BP<-read.csv("E:\\For R\\LI20L.CSV",header=T)
boxplot(PPToriginal~Gender, data=BP,col=c(hcl(230),hcl(100)),ylab= "PPT in
kg/cm^2",notch=T,varwidth=T,ylim=c(-1,15))
rb<-boxplot(PPToriginal~Gender, data=BP,col=c(hcl(230),hcl(100)),ylab= "PPT in
kg/cm^2",notch=T,varwidth=T,ylim=c(-1,15))
title("LI20L")
mn.t<-tapply(BP$PPToriginal, BP$Gender, mean)
sd.t<-tapply(BP$PPToriginal, BP$Gender, sd)
xi<-0+seq(rb$n)
points(xi,mn.t, col="red",pch=18)
arrows(xi,mn.t-sd.t,xi,mn.t+sd.t,code=3,col="red",angle=45,length=.1)
text(x=1.05, y=1.95,label="Mean=1.66",adj=0)
text(x=2.05, y=2.4,label="Mean=2.14",adj=0)
text(x=0.8, y=-0.2,label="Skewness =0.31",adj=0)
text(x=1.8, y=-0.2,label="Skewness =1.04",adj=0)
text(x=0.8, y=-1,label="N=71",adj=0)
text(x=1.8, y=-1,label="N=58",adj=0)
```

Similarly, same syntax was iteratively generated by manually replacing relevant parameters (LI20L, mean and skewness for both genders) with the other 16 sites.

```
NPTESTS
  /INDEPENDENT TEST (PPToriginal) GROUP (Gender) MEDIAN(TESTVALUE=SAMPLE
COMPARE=PAIRWISE)
  /MISSING SCOPE=ANALYSIS USERMISSING=EXCLUDE
  /CRITERIA ALPHA=0.05 CILEVEL=95.
```

Section 4.2
Table 4.2:

```
SORT CASES  BY Site.
SPLIT FILE LAYERED BY Site.
UNIANOVA PPToriginal BY Gender
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /CRITERIA=ALPHA(0.05)
  /DESIGN=Gender.

NPTESTS
  /INDEPENDENT TEST (PPToriginal) GROUP (Gender) MEDIAN(TESTVALUE=SAMPLE
COMPARE=PAIRWISE)
  /MISSING SCOPE=ANALYSIS USERMISSING=EXCLUDE
  /CRITERIA ALPHA=0.05 CILEVEL=95.
```

Table 4.3:

```
SORT CASES BY Site.
```

```
SPLIT FILE LAYERED BY Site.
GLM MeanPPTo.1 MeanPPTo.2 MeanPPTo.3 MeanPPTo.4 BY Gender
  /WSFACTOR=Visit 4
  /METHOD=SSTYPE(3)
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=Visit
  /DESIGN=Gender.
```

OR

```
SORT CASES BY Site.
SPLIT FILE LAYERED BY Site.
GLM PPToriginal.1.1 PPToriginal.1.2 PPToriginal.1.3 PPToriginal.2.1 PPToriginal.2.2 PPToriginal.2.3
PPToriginal.3.1 PPToriginal.3.2 PPToriginal.3.3 PPToriginal.4.1 PPToriginal.4.2 PPToriginal.4.3 BY
Gender
  /WSFACTOR=Visit 4 Reading 3
  /METHOD=SSTYPE(3)
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=Visit Reading Visit*Reading
  /DESIGN=Gender.

SORT CASES BY Site.
SPLIT FILE LAYERED BY Site.
GLM MedianPPTo.1 MedianPPTo.2 MedianPPTo.3 MedianPPTo.4 BY Gender
  /WSFACTOR=Visit 4
  /METHOD=SSTYPE(3)
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=Visit
  /DESIGN=Gender.
```

Figure 4.2:

```
GRAPH
  /BAR(GROUPED)=MEAN(PPToriginal) BY Site BY Gender
  /INTERVAL CI(95.0).

GRAPH
  /BAR(GROUPED)=MED(PPToriginal) BY Site BY Gender
  /INTERVAL CI(95.0).

GRAPH
  /BAR(GROUPED)=MEAN(MeanPPTo) BY Site BY Gender
  /INTERVAL CI(95.0).

GRAPH
  /BAR(GROUPED)=MEAN(MedianPPTo) BY Site BY Gender
  /INTERVAL CI(95.0).
```

Section 4.3

Figure 4.3:

```
GRAPH
  /BAR(GROUPED)=MEAN(PPToriginal) BY Site BY Reading
```

```
  /PANEL ROWVAR=Gender ROWOP=CROSS
  /INTERVAL CI(95.0).
```

Figure 4.4:

```
GRAPH
  /BAR(GROUPED)=MED(PPToriginal) BY Site BY Reading
  /PANEL ROWVAR=Gender ROWOP=CROSS
  /INTERVAL CI(95.0).
```

Table 4.4:

```
SORT CASES BY Gender Site.
SPLIT FILE LAYERED BY Gender Site.
GLM PPToriginal.1 PPToriginal.2 PPToriginal.3 PPToriginal.4 BY Reading
  /WSFACTOR=Visit 4
  /METHOD=SSTYPE(3)
  /POSTHOC=Reading(TUKEY)
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=Visit
  /DESIGN=Reading.

SORT CASES BY Gender Site.
SPLIT FILE LAYERED BY Gender Site.
NPTESTS
  /INDEPENDENT TEST (PPToriginal) GROUP (Reading) MEDIAN(TESTVALUE=SAMPLE
COMPARE=PAIRWISE)
  /MISSING SCOPE=ANALYSIS USERMISSING=EXCLUDE
  /CRITERIA ALPHA=0.05 CILEVEL=95.
```

OR

```
SORT CASES  BY Site Gender.
SPLIT FILE LAYERED BY Site Gender.
NPTESTS
  /INDEPENDENT TEST (PPToriginal.1 PPToriginal.2 PPToriginal.3 PPToriginal.4) GROUP (Reading)
MEDIAN(TESTVALUE=SAMPLE COMPARE=PAIRWISE)
  /MISSING SCOPE=ANALYSIS USERMISSING=EXCLUDE
  /CRITERIA ALPHA=0.05 CILEVEL=95.
```

Section 4.4

Figure 4.5:

```
SORT CASES  BY MM.
SPLIT FILE LAYERED BY MM.
GRAPH
  /ERRORBAR(CI 95)=MM_PPT BY Visit BY Gender
  /PANEL COLVAR=Site COLOP=NEST.
```

Figure 4.6:

```
GRAPH
  /BAR(GROUPED)=MEAN(PPToriginal) BY Site BY Visit
  /PANEL ROWVAR=Gender ROWOP=CROSS.
```

```
GRAPH
  /BAR(GROUPED)=MED(PPToriginal) BY Site BY Visit
  /PANEL ROWVAR=Gender ROWOP=CROSS.

SORT CASES  BY Gender Site.
SPLIT FILE LAYERED BY Gender Site.
GLM MeanPPTo.1 MeanPPTo.2 MeanPPTo.3 MeanPPTo.4
  /WSFACTOR=Visit 4
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(Visit) COMPARE ADJ(SIDAK)
  /PRINT=DESCRIPTIVE ETASQ OPOWER HOMOGENEITY
  /CRITERIA=ALPHA(.05)
  /WSDESIGN= Visit.

SORT CASES  BY Gender Site.
SPLIT FILE LAYERED BY Gender Site.
GLM MedianPPTo.1 MedianPPTo.2 MedianPPTo.3 MedianPPTo.4
  /WSFACTOR=Visit 4
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(Visit) COMPARE ADJ(SIDAK)
  /PRINT=DESCRIPTIVE ETASQ OPOWER HOMOGENEITY
  /CRITERIA=ALPHA(.05)
  /WSDESIGN= Visit.
```

Section 4.5
Figure 4.8:

```
SORT CASES  BY Gender.
SPLIT FILE LAYERED BY Gender.
SPLIT FILE OFF.
GRAPH
  /HISTOGRAM=Age
  /PANEL ROWVAR=Gender ROWOP=CROSS.

GRAPH
  /HISTOGRAM=BMI
  /PANEL ROWVAR=Gender ROWOP=CROSS.
```

Table 4.5:

```
SORT CASES  BY Gender Site.
SPLIT FILE LAYERED BY Gender Site.
DESCRIPTIVES VARIABLES=Age BMI
  /STATISTICS=MEAN STDDEV.
```

Figure 4.9:

```
USE ALL.
COMPUTE filter_$=(Visit = 1).
VARIABLE LABELS filter_$ 'Visit = 1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
```

```
SPLIT FILE OFF.
GRAPH
  /SCATTERPLOT(BIVAR)=Age WITH MeanPPTo
  /PANEL COLVAR=Gender COLOP=NEST ROWVAR=Site ROWOP=NEST
  /MISSING=LISTWISE.

GRAPH
  /SCATTERPLOT(BIVAR)=Age WITH MedianPPTo
  /PANEL COLVAR=Site COLOP=NEST ROWVAR=Gender ROWOP=NEST
  /MISSING=LISTWISE
  /TEMPLATE='C:\Users\LEONG-TAN\Desktop\Scatter.sgt'.

GRAPH
  /SCATTERPLOT(BIVAR)=BMI WITH MeanPPTo
  /PANEL COLVAR=Site COLOP=NEST ROWVAR=Gender ROWOP=NEST
  /MISSING=LISTWISE
  /TEMPLATE='C:\Users\LEONG-TAN\Desktop\Scatter.sgt'.

GRAPH
  /SCATTERPLOT(BIVAR)=BMI WITH MedianPPTo
  /PANEL COLVAR=Site COLOP=NEST ROWVAR=Gender ROWOP=NEST
  /MISSING=LISTWISE
  /TEMPLATE='C:\Users\LEONG-TAN\Desktop\Scatter BMI.sgt'.
```

Table 4.7:

```
USE ALL.
COMPUTE filter_$=(Visit = 1).
VARIABLE LABELS filter_$ 'Visit = 1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Site.
SPLIT FILE LAYERED BY Site.
CORRELATIONS
  /VARIABLES=MeanPPTo Gender Age BMI
  /PRINT=TWOTAIL NOSIG
  /MISSING=PAIRWISE.
```

Table 4.8:

```
USE ALL.
COMPUTE filter_$=(Visit = 1).
VARIABLE LABELS filter_$ 'Visit = 1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Site.
SPLIT FILE LAYERED BY Site.
CORRELATIONS
  /VARIABLES=MedianPPTo Gender Age BMI
```

```
  /PRINT=TWOTAIL NOSIG
  /MISSING=PAIRWISE.
```

Table 4.7:

```
USE ALL.
COMPUTE filter_$=(Visit = 1).
VARIABLE LABELS filter_$ 'Visit = 1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Gender Site.
SPLIT FILE LAYERED BY Gender Site.
CORRELATIONS
  /VARIABLES=MeanPPTo Age BMI
  /PRINT=TWOTAIL NOSIG
  /MISSING=PAIRWISE.
```

Table 4.8:

```
USE ALL.
COMPUTE filter_$=(Visit = 1).
VARIABLE LABELS filter_$ 'Visit = 1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Gender Site.
SPLIT FILE LAYERED BY Gender Site.
CORRELATIONS
  /VARIABLES=MedianPPTo Age BMI
  /PRINT=TWOTAIL NOSIG
  /MISSING=PAIRWISE.
```

Table 4.9a:

```
USE ALL.
COMPUTE filter_$=(Visit = 1).
VARIABLE LABELS filter_$ 'Visit = 1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Site.
SPLIT FILE LAYERED BY Site.
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT MeanPPTo
  /METHOD= STEPWISE Gender Age BMI.
```

Table 4.9b:

```
USE ALL.
COMPUTE filter_$=(Visit = 1).
VARIABLE LABELS filter_$ 'Visit = 1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Site.
SPLIT FILE LAYERED BY Site.
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT MedianPPTo
  /METHOD= STEPWISE Gender Age BMI.
```

Section 4.6

Figure 4.10:

```
SORT CASES  BY Gender Site.
SPLIT FILE LAYERED BY Gender Site.
GLM MeanPPTo.1 MeanPPTo.2 MeanPPTo.3 MeanPPTo.4 WITH Age
  /WSFACTOR=Visit 4
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(OVERALL) WITH(Age=MEAN)
  /EMMEANS=TABLES(Visit) WITH(Age=MEAN)COMPARE ADJ(SIDAK)
  /PRINT=DESCRIPTIVE ETASQ OPOWER HOMOGENEITY
  /CRITERIA=ALPHA(.05)
  /WSDESIGN= Visit
  /DESIGN= Age.

SORT CASES  BY Gender Site.
SPLIT FILE LAYERED BY Gender Site.
GLM MedianPPTo.1 MedianPPTo.2 MedianPPTo.3 MedianPPTo.4 WITH Age
  /WSFACTOR=Visit 4
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(OVERALL) WITH(Age=MEAN)
  /EMMEANS=TABLES(Visit) WITH(Age=MEAN)COMPARE ADJ(SIDAK)
  /PRINT=DESCRIPTIVE ETASQ OPOWER HOMOGENEITY
  /CRITERIA=ALPHA(.05)
  /WSDESIGN= Visit
  /DESIGN= Age.
```

Section 4.7

Figure 4.11:

```
SORT CASES  BY Gender Site.
SPLIT FILE LAYERED BY Gender Site.
GLM MeanPPTo.1 MeanPPTo.2 MeanPPTo.3 MeanPPTo.4 WITH BMI
  /WSFACTOR=Visit 4
  /METHOD=SSTYPE(3)
```

```
  /EMMEANS=TABLES(OVERALL) WITH(BMI=MEAN)
  /EMMEANS=TABLES(Visit) WITH(BMI=MEAN)COMPARE ADJ(SIDAK)
  /PRINT=DESCRIPTIVE ETASQ OPOWER HOMOGENEITY
  /CRITERIA=ALPHA(.05)
  /WSDESIGN= Visit
  /DESIGN= BMI.

SORT CASES  BY Gender Site.
SPLIT FILE LAYERED BY Gender Site.
GLM MedianPPTo.1 MedianPPTo.2 MedianPPTo.3 MedianPPTo.4 WITH BMI
  /WSFACTOR=Visit 4
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(OVERALL) WITH(BMI=MEAN)
  /EMMEANS=TABLES(Visit) WITH(BMI=MEAN)COMPARE ADJ(SIDAK)
  /PRINT=DESCRIPTIVE ETASQ OPOWER HOMOGENEITY
  /CRITERIA=ALPHA(.05)
  /WSDESIGN= Visit
  /DESIGN= BMI.
```

Section 4.8
Table 4.11:

```
USE ALL.
COMPUTE filter_$=(Site = 6 & (BMI_Class = 2 or BMI_Class=3)).
VARIABLE LABELS filter_$ 'Site = 6 & (BMI_Class = 2 or BMI_Class=3) (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Gender.
SPLIT FILE LAYERED BY Gender.
ONEWAY MeanPPTo.1 MedianPPTo.1 BY BMI_Class
  /MISSING ANALYSIS.
```

Table 4.12:

```
USE ALL.
COMPUTE filter_$=(Visit = 1 & Site = 6 & ((BMI_Class >= 2 and BMI_Class <= 3) or (Gender = 0 &
BMI_Class = 4))).
VARIABLE LABELS filter_$ 'Visit = 1 & Site = 6 & ((BMI_Class >= 2 and BMI_Class <= 3) or
(Gender = 0 & BMI_Class = 4)) (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Gender.
SPLIT FILE LAYERED BY Gender.
UNIANOVA MeanPPTo BY BMI_Class WITH BMI
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /EMMEANS=TABLES(BMI_Class) WITH(BMI=MEAN) COMPARE ADJ(SIDAK)
  /CRITERIA=ALPHA(.05)
  /DESIGN=BMI BMI_Class.
```

```
USE ALL.
COMPUTE filter_$=(Visit = 1 & Site = 6 & ((BMI_Class >= 2 and BMI_Class <= 3) or (Gender = 0 &
BMI_Class = 4))).
VARIABLE LABELS filter_$ 'Visit = 1 & Site = 6 & ((BMI_Class >= 2 and BMI_Class <= 3) or
(Gender = 0 & BMI_Class = 4)) (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Gender.
SPLIT FILE LAYERED BY Gender.
UNIANOVA MedianPPTo BY BMI_Class WITH BMI
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /EMMEANS=TABLES(BMI_Class) WITH(BMI=MEAN) COMPARE ADJ(SIDAK)
  /CRITERIA=ALPHA(.05)
  /DESIGN=BMI BMI_Class.
```

Section 4.9

```
USE ALL.
COMPUTE filter_$=(Site = 6 & Gender = 0 & (BMI_Class = 2 or BMI_Class=3 or BMI_Class = 4)).
VARIABLE LABELS filter_$ 'Site = 6 & Gender = 0 & (BMI_Class = 2 or BMI_Class=3 or BMI_Class
= 4) (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SPLIT FILE OFF.
USE ALL.
UNIANOVA MeanPPTo.1 BY BMI_Class WITH BMI
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /EMMEANS=TABLES(BMI_Class) WITH(BMI=MEAN) COMPARE ADJ(SIDAK)
  /CRITERIA=ALPHA(.05)
  /DESIGN=BMI BMI_Class.

USE ALL.
COMPUTE filter_$=(Site = 6 & Gender = 0 & (BMI_Class = 2 or BMI_Class=3 or BMI_Class = 4)).
VARIABLE LABELS filter_$ 'Site = 6 & Gender = 0 & (BMI_Class = 2 or BMI_Class=3 or BMI_Class
= 4) (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SPLIT FILE OFF.
USE ALL.
UNIANOVA MedianPPTo.1 BY BMI_Class WITH BMI
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /EMMEANS=TABLES(BMI_Class) WITH(BMI=MEAN) COMPARE ADJ(SIDAK)
```

```
  /CRITERIA=ALPHA(.05)
  /DESIGN=BMI BMI_Class.

USE ALL.
COMPUTE filter_$=(Site = 6 & ((BMI_Class = 2 or BMI_Class=3)  or (Gender = 0 and BMI_Class =
4))).
VARIABLE LABELS filter_$ 'Site = 6 & ((BMI_Class = 2 or BMI_Class=3)  or (Gender = 0 and
BMI_Class = 4)) (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Gender.
SPLIT FILE LAYERED BY Gender.
GLM MeanPPTo.1 MeanPPTo.2 MeanPPTo.3 MeanPPTo.4 BY BMI_Class WITH BMI
  /WSFACTOR=Visit 4 Polynomial
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(Visit) WITH(BMI=MEAN)COMPARE ADJ(SIDAK)
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=Visit
  /DESIGN=BMI BMI_Class.

USE ALL.
COMPUTE filter_$=(Site = 6 & ((BMI_Class = 2 or BMI_Class=3)  or (Gender = 0 and BMI_Class =
4))).
VARIABLE LABELS filter_$ 'Site = 6 & ((BMI_Class = 2 or BMI_Class=3)  or (Gender = 0 and
BMI_Class = 4)) (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Gender.
SPLIT FILE LAYERED BY Gender.
GLM MedianPPTo.1 MedianPPTo.2 MedianPPTo.3 MedianPPTo.4 BY BMI_Class WITH BMI
  /WSFACTOR=Visit 4 Polynomial
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(Visit) WITH(BMI=MEAN)COMPARE ADJ(SIDAK)
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=Visit
  /DESIGN=BMI BMI_Class.
```

Figure 4.12:

```
USE ALL.
COMPUTE filter_$=(Site=6 and Txt_Grp=0 and ((Gender = 0 and BMI_Class=4) or BMI_Class=2 or
BMI_Class=3)).
VARIABLE LABELS filter_$ '(Gender = 0 and BMI_Class=4) or BMI_Class=2 or BMI_Class=3
(FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
```

```
GRAPH
  /BAR(GROUPED)=MEAN(MeanPPTo) BY BMI_Class BY Visit
  /PANEL ROWVAR=Gender ROWOP=CROSS
  /INTERVAL CI(95.0).

GRAPH
  /BAR(GROUPED)=MEAN(MedianPPTo) BY BMI_Class BY Visit
  /PANEL ROWVAR=Gender ROWOP=CROSS
  /INTERVAL CI(95.0).
```

Section 4.10
Figure 4.13:

```
GRAPH
  /BAR(GROUPED)=MEAN(PPToriginal) BY Site BY Reading
  /PANEL COLVAR=Gender COLOP=NEST ROWVAR=Txt_Grp ROWOP=NEST
  /INTERVAL CI(95.0).

SORT CASES  BY Txt_Grp Gender Site.
SPLIT FILE LAYERED BY Txt_Grp Gender Site.
GLM PPToriginal.1 PPToriginal.2 PPToriginal.3 PPToriginal.4 BY Reading
  /WSFACTOR=Visit 4
  /METHOD=SSTYPE(3)
  /POSTHOC=Reading(TUKEY)
  /CRITERIA=ALPHA(.05)
  /WSDESIGN= Visit
  /DESIGN= Reading.
```

Figure 4.14:

```
GRAPH
  /BAR(GROUPED)=MED(PPToriginal) BY Site BY Reading
  /PANEL COLVAR=Gender COLOP=NEST ROWVAR=Txt_Grp ROWOP=NEST
  /INTERVAL CI(95.0)

SORT CASES  BY Txt_Grp Gender Site.
SPLIT FILE LAYERED BY Txt_Grp Gender Site.
NPTESTS
  /INDEPENDENT TEST (PPToriginal) GROUP (Reading) MEDIAN(TESTVALUE=SAMPLE
COMPARE=PAIRWISE)
  /MISSING SCOPE=ANALYSIS USERMISSING=EXCLUDE
  /CRITERIA ALPHA=0.05  CILEVEL=95.
```

Section 4.11
Figure 4.15:

```
GRAPH
  /BAR(GROUPED)=MEAN(MeanPPTo) BY Site BY Visit
  /PANEL ROWVAR=Gender Txt_Grp ROWOP=NEST.

SORT CASES  BY Txt_Grp Gender Site.
SPLIT FILE LAYERED BY Txt_Grp Gender Site.
GLM MeanPPTo.1 MeanPPTo.2 MeanPPTo.3 MeanPPTo.4
```

```
  /WSFACTOR=Visit 4
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(Visit) COMPARE ADJ(SIDAK)
  /CRITERIA=ALPHA(.05)
  /WSDESIGN= Visit.
```

Figure 4.17:

```
GRAPH
  /BAR(GROUPED)=MEAN(MedianPPTo) BY Site BY Visit
  /PANEL ROWVAR=Gender Txt_Grp ROWOP=NEST

SORT CASES  BY Txt_Grp Gender Site.
SPLIT FILE LAYERED BY Txt_Grp Gender Site.
GLM MedianPPTo.1 MedianPPTo.2 MedianPPTo.3 MedianPPTo.4
  /WSFACTOR=Visit 4
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(Visit) COMPARE ADJ(SIDAK)
  /CRITERIA=ALPHA(.05)
  /WSDESIGN= Visit.
```

Section 4.12

Tables 4.13 and 4.14:

```
SORT CASES  BY Gender Site.
SPLIT FILE LAYERED BY Gender Site.
GLM MeanPPTo.1 MeanPPTo.2 MeanPPTo.3 MeanPPTo.4 BY Txt_Grp
  /WSFACTOR=Visit 4
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(Txt_Grp) COMPARE ADJ(SIDAK)
  /PRINT=ETASQ OPOWER
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=Visit
  /DESIGN=Txt_Grp.

SORT CASES  BY Gender Site.
SPLIT FILE LAYERED BY Gender Site.
GLM MedianPPTo.1 MedianPPTo.2 MedianPPTo.3 MedianPPTo.4 BY Txt_Grp
  /WSFACTOR=Visit 4
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(Txt_Grp) COMPARE ADJ(SIDAK)
  /PRINT=ETASQ OPOWER
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=Visit
  /DESIGN=Txt_Grp.

SORT CASES  BY Gender Site.
SPLIT FILE LAYERED BY Gender Site.
ONEWAY MeanPPTo.1 BY Txt_Grp
  /MISSING ANALYSIS.

ONEWAY MedianPPTo.1 BY Txt_Grp
  /MISSING ANALYSIS.
```

Section 4.13
Figure 4.19:

```
SORT CASES  BY Txt_Grp Gender Site.
SPLIT FILE LAYERED BY Txt_Grp Gender Site.
GLM MeanPPTo.1 MeanPPTo.2 MeanPPTo.3 MeanPPTo.4 WITH Age
  /WSFACTOR=Visit 4
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(Visit) WITH(Age=MEAN)COMPARE ADJ(SIDAK)
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=Visit
  /DESIGN=Age.

GLM MedianPPTo.1 MedianPPTo.2 MedianPPTo.3 MedianPPTo.4 WITH Age
  /WSFACTOR=Visit 4
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(Visit) WITH(Age=MEAN)COMPARE ADJ(SIDAK)
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=Visit
  /DESIGN=Age.
```

Section 4.14
Figure 4.20:

```
USE ALL.
COMPUTE filter_$=(Site = 6).
VARIABLE LABELS filter_$ 'Site = 6 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Txt_Grp Gender.
SPLIT FILE LAYERED BY Txt_Grp Gender.
GLM MeanPPTo.1 MeanPPTo.2 MeanPPTo.3 MeanPPTo.4 WITH BMI
  /WSFACTOR=Visit 4 Polynomial
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(Visit) WITH(BMI=MEAN)COMPARE ADJ(SIDAK)
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=Visit
  /DESIGN=BMI.

USE ALL.
COMPUTE filter_$=(Site = 6).
VARIABLE LABELS filter_$ 'Site = 6 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Txt_Grp Gender.
SPLIT FILE LAYERED BY Txt_Grp Gender.
GLM MedianPPTo.1 MedianPPTo.2 MedianPPTo.3 MedianPPTo.4 WITH BMI
  /WSFACTOR=Visit 4 Polynomial
```

```
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(Visit) WITH(BMI=MEAN)COMPARE ADJ(SIDAK)
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=Visit
  /DESIGN=BMI.
```

Section 4.15
Table 4.16:

```
USE ALL.
COMPUTE filter_$=(Site = 6 & BMI_Class = 2).
VARIABLE LABELS filter_$ 'Site = 6 & BMI_Class = 2 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Gender.
SPLIT FILE LAYERED BY Gender.
ONEWAY MeanPPTo.1 MedianPPTo.1 BY Txt_Grp
  /STATISTICS HOMOGENEITY
  /MISSING ANALYSIS.
```

Section 4.16
Table 4.17:

```
USE ALL.
COMPUTE filter_$=(Site = 6 & Txt_Grp = 0 & (BMI_Class = 2 or BMI_Class=3)).
VARIABLE LABELS filter_$ 'Site = 6 & Txt_Grp = 0 & (BMI_Class = 2 or BMI_Class=3) (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Gender.
SPLIT FILE LAYERED BY Gender.
UNIANOVA MeanPPTo.1 BY BMI_Class
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /CRITERIA=ALPHA(0.05)
  /DESIGN=BMI_Class.

UNIANOVA MedianPPTo.1 BY BMI_Class
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /CRITERIA=ALPHA(0.05)
  /DESIGN=BMI_Class.

USE ALL.
COMPUTE filter_$=(Site = 6 & Txt_Grp = 0 & Gender = 0 &  (BMI_Class = 2 or BMI_Class=4)).
VARIABLE LABELS filter_$ 'Site = 6 & Txt_Grp = 0 & Gender = 0 &  (BMI_Class = 2 or
BMI_Class=4) (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
```

```
EXECUTE.
SPLIT FILE OFF.
UNIANOVA MeanPPTo.1 BY BMI_Class
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /EMMEANS=TABLES(BMI_Class) COMPARE ADJ(SIDAK)
  /PRINT=HOMOGENEITY
  /CRITERIA=ALPHA(.05)
  /DESIGN=BMI_Class.

USE ALL.
COMPUTE filter_$=(Site = 6 & Txt_Grp = 0 & Gender = 0 &  (BMI_Class = 2 or BMI_Class=4)).
VARIABLE LABELS filter_$ 'Site = 6 & Txt_Grp = 0 & Gender = 0 &  (BMI_Class = 2 or
BMI_Class=4) (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SPLIT FILE OFF.
UNIANOVA MedianPPTo.1 BY BMI_Class
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /EMMEANS=TABLES(BMI_Class) COMPARE ADJ(SIDAK)
  /PRINT=HOMOGENEITY
  /CRITERIA=ALPHA(.05)
  /DESIGN=BMI_Class.

USE ALL.
COMPUTE filter_$=(Site = 6 & Txt_Grp = 0 & Gender = 0 &  (BMI_Class = 3 or BMI_Class=4)).
VARIABLE LABELS filter_$ 'Site = 6 & Txt_Grp = 0 & Gender = 0 &  (BMI_Class = 3 or
BMI_Class=4) (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SPLIT FILE OFF.
UNIANOVA MeanPPTo.1 BY BMI_Class
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /EMMEANS=TABLES(BMI_Class) COMPARE ADJ(SIDAK)
  /PRINT=HOMOGENEITY
  /CRITERIA=ALPHA(.05)
  /DESIGN=BMI_Class.

USE ALL.
COMPUTE filter_$=(Site = 6 & Txt_Grp = 0 & Gender = 0 &  (BMI_Class = 3 or BMI_Class=4)).
VARIABLE LABELS filter_$ 'Site = 6 & Txt_Grp = 0 & Gender = 0 &  (BMI_Class = 3 or
BMI_Class=4) (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
```

```
EXECUTE.
SPLIT FILE OFF.
UNIANOVA MedianPPTo.1 BY BMI_Class
  /METHOD=SSTYPE(3)
  /INTERCEPT=INCLUDE
  /EMMEANS=TABLES(BMI_Class) COMPARE ADJ(SIDAK)
  /PRINT=HOMOGENEITY
  /CRITERIA=ALPHA(.05)
  /DESIGN=BMI_Class.
```

Section 4.17
Figure 4.21:

```
USE ALL.
COMPUTE filter_$=(Site=6 and Txt_Grp=0 and ((Gender = 0 and BMI_Class=4) or BMI_Class=2 or
BMI_Class=3)).
VARIABLE LABELS filter_$ '(Gender = 0 and BMI_Class=4) or BMI_Class=2 or BMI_Class=3
(FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
GRAPH
  /BAR(GROUPED)=MEAN(MeanPPTo) BY BMI_Class BY Visit
  /PANEL ROWVAR=Gender ROWOP=CROSS
  /INTERVAL CI(95.0).

USE ALL.
COMPUTE filter_$=(Site=6 and Txt_Grp=0 and ((Gender = 0 and BMI_Class=4) or BMI_Class=2 or
BMI_Class=3)).
VARIABLE LABELS filter_$ '(Gender = 0 and BMI_Class=4) or BMI_Class=2 or BMI_Class=3
(FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
GRAPH
  /BAR(GROUPED)=MEAN(MedianPPTo) BY BMI_Class BY Visit
  /PANEL ROWVAR=Gender ROWOP=CROSS
  /INTERVAL CI(95.0).

USE ALL.
COMPUTE filter_$=(Txt_Grp = 0 & Site = 6 & (BMI_Class = 2 or BMI_Class = 3 or (BMI_Class = 4
and Gender = 0))).
VARIABLE LABELS filter_$ 'Txt_Grp = 0 & Site = 6 & (BMI_Class = 2 or BMI_Class = 3 or
(BMI_Class = 4 and Gender = 0)) (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Gender BMI_Class.
SPLIT FILE LAYERED BY Gender BMI_Class.
```

```
GLM MeanPPTo.1 MeanPPTo.2 MeanPPTo.3 MeanPPTo.4
  /WSFACTOR=Visit 4 Polynomial
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(Visit) COMPARE ADJ(SIDAK)
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=Visit.

USE ALL.
COMPUTE filter_$=(Txt_Grp = 0 & Site = 6 & (BMI_Class = 2 or BMI_Class = 3 or (BMI_Class = 4
and Gender = 0))).
VARIABLE LABELS filter_$ 'Txt_Grp = 0 & Site = 6 & (BMI_Class = 2 or BMI_Class = 3 or
(BMI_Class = 4 and Gender = 0)) (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Gender BMI_Class.
SPLIT FILE LAYERED BY Gender BMI_Class.
GLM MedianPPTo.1 MedianPPTo.2 MedianPPTo.3 MedianPPTo.4
  /WSFACTOR=Visit 4 Polynomial
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(Visit) COMPARE ADJ(SIDAK)
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=Visit.
```

Section 4.18
Table 4.19:

```
SORT CASES  BY Gender Site.
SPLIT FILE LAYERED BY Gender Site.
T-TEST
  /TESTVAL=0
  /MISSING=ANALYSIS
  /VARIABLES=AbsDiff_Mean RelDiff_Mean AbsDiff_Median RelDiff_Median
  /CRITERIA=CI(.95).
```

Figure 4.22:

```
SORT CASES  BY Gender.
SPLIT FILE LAYERED BY Gender.
SPLIT FILE OFF.
GRAPH
  /BAR(SIMPLE)=MEAN(AbsDiff_Mean) BY Site
  /PANEL ROWVAR=Gender ROWOP=CROSS.

SORT CASES  BY Gender.
SPLIT FILE LAYERED BY Gender.
SPLIT FILE OFF.
GRAPH
  /BAR(SIMPLE)=MEAN(RelDiff_Mean) BY Site
  /PANEL ROWVAR=Gender ROWOP=CROSS

SORT CASES  BY Gender.
```

```
SPLIT FILE LAYERED BY Gender.
SPLIT FILE OFF.
GRAPH
  /BAR(SIMPLE)=MEAN(AbsDiff_Median) BY Site
  /PANEL ROWVAR=Gender ROWOP=CROSS

SORT CASES  BY Gender.
SPLIT FILE LAYERED BY Gender.
SPLIT FILE OFF.
GRAPH
  /BAR(SIMPLE)=MEAN(RelDiff_Median) BY Site
  /PANEL ROWVAR=Gender ROWOP=CROSS
```

II. Research Study Two

Section 4.20
Table 4.20:

```
SORT CASES  BY Site.
SPLIT FILE LAYERED BY Site.
GLM PPT.1.1.1 PPT.1.2.1 PPT.1.3.1 PPT.2.1.1 PPT.2.2.1 PPT.2.3.1 PPT.1.1.2 PPT.1.2.2 PPT.1.3.2
PPT.2.1.2 PPT.2.2.2 PPT.2.3.2 PPT.1.1.3 PPT.1.2.3 PPT.1.3.3 PPT.2.1.3 PPT.2.2.3 PPT.2.3.3 PPT.1.1.4
PPT.1.2.4 PPT.1.3.4 PPT.2.1.4 PPT.2.2.4 PPT.2.3.4 BY Gender
  /WSFACTOR=Visit 4 PP 2 Reading 3
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(Gender) COMPARE ADJ(SIDAK)
  /CRITERIA=ALPHA(.05)
  /DESIGN= Gender.
```

Section 4.21
Table 4.21:

```
SORT CASES  BY Gender Site.
SPLIT FILE LAYERED BY Gender Site.
GLM PPT.1.1.1 PPT.1.2.1 PPT.1.3.1 PPT.2.1.1 PPT.2.2.1 PPT.2.3.1
  /WSFACTOR=PrePost 2 Reading 3
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(PrePost) COMPARE ADJ(SIDAK)
  /CRITERIA=ALPHA(.05)
  /WSDESIGN= PrePost Reading.

GLM PPT.1.1.2 PPT.1.2.2 PPT.1.3.2 PPT.2.1.2 PPT.2.2.2 PPT.2.3.2
  /WSFACTOR=PrePost 2 Reading 3
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(PrePost) COMPARE ADJ(SIDAK)
  /CRITERIA=ALPHA(.05)
  /WSDESIGN= PrePost Reading.

GLM PPT.1.1.3 PPT.1.2.3 PPT.1.3.3 PPT.2.1.3 PPT.2.2.3 PPT.2.3.3
  /WSFACTOR=PrePost 2 Reading 3
  /METHOD=SSTYPE(3)
```

```
  /EMMEANS=TABLES(PrePost) COMPARE ADJ(SIDAK)
  /CRITERIA=ALPHA(.05)
  /WSDESIGN= PrePost Reading.

GLM PPT.1.1.4 PPT.1.2.4 PPT.1.3.4 PPT.2.1.4 PPT.2.2.4 PPT.2.3.4
  /WSFACTOR=PrePost 2 Reading 3
  /METHOD=SSTYPE(3)
  /EMMEANS=TABLES(PrePost) COMPARE ADJ(SIDAK)
  /CRITERIA=ALPHA(.05)
  /WSDESIGN= PrePost Reading.
```

Section 4.22

```
USE ALL.
COMPUTE filter_$=(Treatment = 1 & Site = 100).
VARIABLE LABELS filter_$ 'Treatment = 1 & Site = 100 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES BY filter_$ (A).
SORT CASES BY filter_$ (A).
SORT CASES BY filter_$ (D).
SORT CASES  BY Week Gender.
SPLIT FILE LAYERED BY Week Gender.
NPTESTS
  /RELATED TEST(PPT.1 PPT.2) FRIEDMAN(COMPARE=PAIRWISE)
  /MISSING SCOPE=ANALYSIS USERMISSING=EXCLUDE
  /CRITERIA ALPHA=0.05 CILEVEL=95.

USE ALL.
COMPUTE filter_$=(Treatment = 1 & Site = 101).
VARIABLE LABELS filter_$ 'Treatment = 1 & Site = 101 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
NPTESTS
  /RELATED TEST(PPT.1 PPT.2) FRIEDMAN(COMPARE=PAIRWISE)
  /MISSING SCOPE=ANALYSIS USERMISSING=EXCLUDE
  /CRITERIA ALPHA=0.05 CILEVEL=95.

USE ALL.
COMPUTE filter_$=(Treatment = 1 & Site = 110).
VARIABLE LABELS filter_$ 'Treatment = 1 & Site = 110 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
NPTESTS
  /RELATED TEST(PPT.1 PPT.2) FRIEDMAN(COMPARE=PAIRWISE)
  /MISSING SCOPE=ANALYSIS USERMISSING=EXCLUDE
```

```
  /CRITERIA ALPHA=0.05  CILEVEL=95.

USE ALL.
COMPUTE filter_$=(Treatment = 1 & Site = 111).
VARIABLE LABELS filter_$ 'Treatment = 1 & Site = 111 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
NPTESTS
  /RELATED TEST(PPT.1 PPT.2) FRIEDMAN(COMPARE=PAIRWISE)
  /MISSING SCOPE=ANALYSIS USERMISSING=EXCLUDE
  /CRITERIA ALPHA=0.05  CILEVEL=95.

USE ALL.
COMPUTE filter_$=(Treatment = 2 & Site = 100).
VARIABLE LABELS filter_$ 'Treatment = 2 & Site = 100 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
NPTESTS
  /RELATED TEST(PPT.1 PPT.2) FRIEDMAN(COMPARE=PAIRWISE)
  /MISSING SCOPE=ANALYSIS USERMISSING=EXCLUDE
  /CRITERIA ALPHA=0.05  CILEVEL=95.

USE ALL.
COMPUTE filter_$=(Treatment = 2 & Site = 101).
VARIABLE LABELS filter_$ 'Treatment = 2 & Site = 101 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
NPTESTS
  /RELATED TEST(PPT.1 PPT.2) FRIEDMAN(COMPARE=PAIRWISE)
  /MISSING SCOPE=ANALYSIS USERMISSING=EXCLUDE
  /CRITERIA ALPHA=0.05  CILEVEL=95.

USE ALL.
COMPUTE filter_$=(Treatment = 2 & Site = 110).
VARIABLE LABELS filter_$ 'Treatment = 2 & Site = 110 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
NPTESTS
  /RELATED TEST(PPT.1 PPT.2) FRIEDMAN(COMPARE=PAIRWISE)
  /MISSING SCOPE=ANALYSIS USERMISSING=EXCLUDE
  /CRITERIA ALPHA=0.05  CILEVEL=95.

USE ALL.
```

```
COMPUTE filter_$=(Treatment = 2 & Site = 111).
VARIABLE LABELS filter_$ 'Treatment = 2 & Site = 111 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
NPTESTS
  /RELATED TEST(PPT.1 PPT.2) FRIEDMAN(COMPARE=PAIRWISE)
  /MISSING SCOPE=ANALYSIS USERMISSING=EXCLUDE
  /CRITERIA ALPHA=0.05  CILEVEL=95.
```

Section 4.23
Table 4.23:

```
USE ALL.
COMPUTE filter_$=(Treatment = 1 & Week = 0 & Gender = 0).
VARIABLE LABELS filter_$ 'Treatment = 1 & Week = 0 & Gender = 0 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Pre_Post.
SPLIT FILE LAYERED BY Pre_Post.
NPTESTS
  /RELATED TEST(PPT.1 PPT.2) FRIEDMAN(COMPARE=PAIRWISE)
  /MISSING SCOPE=ANALYSIS USERMISSING=EXCLUDE
  /CRITERIA ALPHA=0.05  CILEVEL=95.
*Repeat the NPTESTS for other combinations among Treatment, Week and Gender
```

Table 4.24:

```
USE ALL.
COMPUTE filter_$=(Treatment = 1 & Week = 0 & Gender = 0).
VARIABLE LABELS filter_$ 'Treatment = 1 & Week = 0 & Gender = 0 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Pre_Post.
SPLIT FILE LAYERED BY Pre_Post.
NPTESTS
  /RELATED TEST(PPT.3 PPT.4) FRIEDMAN(COMPARE=PAIRWISE)
  /MISSING SCOPE=ANALYSIS USERMISSING=EXCLUDE
  /CRITERIA ALPHA=0.05  CILEVEL=95.
*Repeat the NPTESTS for other combinations among Treatment, Week and Gender
```

Section 4.24
Table 4.25:

```
USE ALL.
COMPUTE filter_$=( Week = 1 & Gender = 0).
VARIABLE LABELS filter_$ ' Week = 1 & Gender = 0 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
```

```
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Site Pre_Post.
SPLIT FILE LAYERED BY Site Pre_Post.
NPTESTS
  /INDEPENDENT TEST (PPT) GROUP (Treatment)
  /MISSING SCOPE=ANALYSIS USERMISSING=EXCLUDE
  /CRITERIA ALPHA=0.05  CILEVEL=95.
*Repeat the NPTESTS for other combinations from Week and Gender
```

Section 4.25
Table 4.26:

```
USE ALL.
COMPUTE filter_$=(Week > 0).
VARIABLE LABELS filter_$ 'Week > 0 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Gender Treatment Site Week Pre_Post.
SPLIT FILE LAYERED BY Gender Treatment Site Week Pre_Post.
T-TEST
  /TESTVAL=0
  /MISSING=ANALYSIS
  /VARIABLES=PerChange
  /CRITERIA=CI(.95).
```

Section 4.26
Table 4.27:

```
USE ALL.
COMPUTE filter_$=(Week = 1 & Pre_Post = 2).
VARIABLE LABELS filter_$ 'Week = 1 & Pre_Post = 2 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Gender Site.
SPLIT FILE LAYERED BY Gender Site.
NPTESTS
  /INDEPENDENT TEST (PerChange) GROUP (Treatment)
  /MISSING SCOPE=ANALYSIS USERMISSING=EXCLUDE
  /CRITERIA ALPHA=0.05  CILEVEL=95.
*Repeat the NPTESTS for other combinations between Week and Pre_Post
```

Section 4.27
Table 4.28:

```
USE ALL.
COMPUTE filter_$=(Treatment = 1 & Week = 1).
VARIABLE LABELS filter_$ 'Treatment = 1 & Week = 1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
```

```
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Site Gender.
SPLIT FILE LAYERED BY Site Gender.
NPTESTS
  /RELATED TEST(PerChange.1 PerChange.2) FRIEDMAN(COMPARE=PAIRWISE)
  /MISSING SCOPE=ANALYSIS USERMISSING=EXCLUDE
  /CRITERIA ALPHA=0.05  CILEVEL=95.
*Repeat the NPTESTS for other combinations among Treatment and Week
```

Section 4.28
Table 4.29:

```
USE ALL.
COMPUTE filter_$=(Treatment  = 1 & Week = 1).
VARIABLE LABELS filter_$ 'Treatment  = 1 & Week = 1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
SORT CASES  BY Pre_Post Gender.
SPLIT FILE LAYERED BY Pre_Post Gender.
NPTESTS
  /RELATED TEST(PerChange.100 PerChange.101) FRIEDMAN(COMPARE=PAIRWISE)
  /MISSING SCOPE=ANALYSIS USERMISSING=EXCLUDE
  /CRITERIA ALPHA=0.05  CILEVEL=95.
*Repeat the NPTESTS for other combinations between Treatment and Week

USE ALL.
COMPUTE filter_$=(Treatment  = 1 & Week = 1).
VARIABLE LABELS filter_$ 'Treatment  = 1 & Week = 1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.
NPTESTS
  /RELATED TEST(PerChange.110 PerChange.111) FRIEDMAN(COMPARE=PAIRWISE)
  /MISSING SCOPE=ANALYSIS USERMISSING=EXCLUDE
  /CRITERIA ALPHA=0.05  CILEVEL=95.
*Repeat the NPTESTS for other combinations between Treatment and Week
```

III. Research Study Three

Section 4.29
Table 4.30:

```
SORT CASES  BY Site.
SPLIT FILE LAYERED BY Site.
T-TEST PAIRS=E_PPT WITH M_PPT (PAIRED)
  /CRITERIA=CI(.9500)
  /MISSING=ANALYSIS.
```

Table 4.31:

```
SORT CASES  BY Site Reading.
SPLIT FILE LAYERED BY Site Reading.
T-TEST PAIRS=E_PPT WITH M_PPT (PAIRED)
  /CRITERIA=CI(.9500)
  /MISSING=ANALYSIS.
```

Syntax for Appendix 12

Section A12.1

Table A12.1:

```
CORRELATIONS
  /VARIABLES=Mmean Mmedian
  /PRINT=TWOTAIL NOSIG
  /MISSING=PAIRWISE.

CORRELATIONS
  /VARIABLES=Fmean Fmedian
  /PRINT=TWOTAIL NOSIG
  /MISSING=PAIRWISE.

SORT CASES  BY Gender.
SPLIT FILE LAYERED BY Gender.
CORRELATIONS
  /VARIABLES=MeanPPTo MedianPPTo
  /PRINT=TWOTAIL NOSIG
  /MISSING=PAIRWISE.
```

Section A12.2

Tables A12.3, A12.4, A12.5:

```
SORT CASES  BY Gender Site.
SPLIT FILE LAYERED BY Gender Site.
MEANS TABLES=CVR1 CVR2 CVR3 CV_V1 CV_V2 CV_V3 CV_V4
  /CELLS=MEAN.
```

Tables A12.6, A12.7, A12.8:

```
MEANS TABLES=PPToriginal BY Visit
  /CELLS=STDDEV MEAN.

MEANS TABLES=PPToriginal BY Reading
  /CELLS=STDDEV MEAN.
```

Syntax for Appendix 13

Sections A13.1 to A13.4

Tables A13.1, A13.2, A13.3, A13.4:

```
SORT CASES  BY Gender Site MM.
SPLIT FILE LAYERED BY Gender Site MM.
```

```
ONEWAY PPT_MM BY PP
  /MISSING ANALYSIS.
```

Sections A13.5 and A13.6

```
SORT CASES  BY Gender Site.
SPLIT FILE LAYERED BY Gender Site.
MEANS TABLES=PPToriginal
  /CELLS=MEAN MEDIAN.
```

Tables A13.5, A13.6:

```
SORT CASES  BY Gender Site.
SPLIT FILE LAYERED BY Gender Site.
T-TEST
  /TESTVAL=0
  /MISSING=ANALYSIS
  /VARIABLES=PC_Mean PC_Median
  /CRITERIA=CI(.95).
```

Section A13.7
Table A13.7:

```
ONEWAY PC_LI4R BY MM
  /MISSING ANALYSIS.
```

Appendix 15: Categorization of subjects into respondent groups

Identification of subjects in each intervention study (Study 1 to Study 6) by applying Wilcoxon signed rank test with $p<0.1$ (Note: $p<0.05$ returns no result due to small sample) on their Pre and Post PPT scores during LI4m^{+}21 intervention session and grouped them into three subgroups: "Positive responder", "Negative responder" and "Neutral responder". Wilcoxon signed-rank test with $p<0.1$ was employed. Table A15.7 summarises the number of respondents in each category at 17 selected sites and this revealed that "Negative responder" at each site by gender was too small for data analysis. The purpose of categorising the subjects is to minimise the pulling/cancelling effect among subjects who had responded differently to LI4m^{+}21. This would set up a clear presentation for more convincing results in data analysis. Each single study was too weak for this to be done. Tables A15.1 to A15.6 show the effect of LI4m^{+}21 at each study site for each subject in Study 1 to Study 6.

Study 1										
Subject	1R	2R	3R	CV12	LI10R	LI20R	LI5R	PC6R	SI3R	ST36R
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										
32										
33										
34										
35										
36										
37										
38										
39										
40										
N(+)	21	19	19	27	17	20	18	23	17	19
N(0)	18	18	18	13	21	19	22	17	19	18
N(-)	1	1	1	0	2	1	0	0	2	1
	Neutral responder: No significant change in mean PPT after LI4m^{+}21									
	Positive responder: Significant increase in mean PPT after LI4m^{+}21									
	Negative responder: Significant decrease in mean PPT after LI4m^{+}21									
	Absent of respondent									

Table A15.1: Effect of LI4m^{+}21 intervention at ten study sites on 40 subjects in Study 1.

Study 2										
Subject	LI5R	3R	ST36R	LI5L	ST36L	CV12	2L	1R	LI20R	2R
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
N(+)	13	6	7	5	7	11	6	7	9	6
N(0)	7	13	12	13	13	8	12	11	9	11
N(-)	0	0	1	2	0	1	2	2	2	3
	Neutral responder: No significant change in mean PPT after LI4m^{+}21									
	Positive responder: Significant increase in mean PPT after LI4m^{+}21									
	Negative responder: Significant decrease in mean PPT after LI4m^{+}21									
	Absent of respondent									

Table A15.2: Effect of LI4m^{+}21 intervention at ten study sites on 20 subjects in Study 2.

Study 3										
Subject	KD3R	1R	ST36R	LI5L	1L	KD3L	ST36L	LI5R	LI20R	GB20R
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
N(+)	8	6	9	7	11	9	4	9	7	12
N(0)	14	14	11	13	11	13	18	11	14	10
N(-)	0	2	2	2	0	0	0	2	1	0
	Neutral responder: No significant change in mean PPT after LI4m^{+}21									
	Positive responder: Significant increase in mean PPT after LI4m^{+}21									
	Negative responder: Significant decrease in mean PPT after LI4m^{+}21									

Table A15.3: Effect of LI4Rm^{+}21 intervention at ten study sites of 22 subjects in Study 3.

Study 4										
Subject	1R	2L	4L	GB12R	KD3R	LI10L	LI20L	LI5R	PC6R	SP6R
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
N(+)	5	4	6	5	7	6	7	2	7	7
N(0)	19	18	17	19	17	15	16	22	17	16
N(-)	0	0	1	0	0	3	1	0	0	1
	Neutral responder: No significant change in mean PPT after LI4m^{+}21									
	Positive responder: Significant increase in mean PPT after LI4m^{+}21									
	Negative responder: Significant decrease in mean PPT after LI4m^{+}21									
	Absent of respondent									

Table A15.4: Effect of LI4m^{+}21 intervention at ten study sites on 24 subjects in Study 4.

Study 5										
Subject	1L	4L	GB12R	KD3R	LI10L	LI20L	LI5R	LV5R	PC6R	ST36L
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
N(+)	8	12	7	5	1	12	2	9	6	5
N(0)	12	6	13	14	19	8	18	11	14	15
N(-)	0	0	0	1	0	0	0	0	0	0
	Neutral responder: No significant change in mean PPT after LI4m^{+}21									
	Positive responder: Significant increase in mean PPT after LI4m^{+}21									
	Negative responder: Significant decrease in mean PPT after LI4m^{+}21									
	Absent of respondent									

Table A15.5: Effect of LI4m^{+}21 intervention at ten study sites on 24 subjects in Study 5.

Study 6										
Subject	KD3R	3R	ST36R	LI5L	1L	PC6L	2L	LI10L	LI20R	GB12R
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
N(+)	5	7	10	8	4	7	6	11	7	8
N(0)	19	17	14	16	19	17	18	13	17	16
N(-)	0	0	0	0	1	0	0	0	0	0
	Neutral responder: No significant change in mean PPT after LI4m^{+}21									
	Positive responder: Significant increase in mean PPT after LI4m^{+}21									
	Negative responder: Significant decrease in mean PPT after LI4m^{+}21									

Table A15.6: Effect of LI4m^{+}21 intervention at ten study sites of 24 subjects in Study 6.

Table 12 provides a summary of the number of respondents in each category at 17 selected sites as used in Study 7. In general, there were more "Neutral responder" than "Positive responder" with substantial number of subjects at most sites in which GLM will be employed for data analysis for sensible comparisons by variables. As the number of "Negative responder" at each site by gender was too small, these respondents were excluded from data analysis.

Study 1 to Study 6			
Site	Category	Male	Female
LI5R	N(-1)	2	2
	N(0)	36	60
	N(1)	22	28
1R	N(-1)	4	2
	N(0)	30	50
	N(1)	16	28
LI20R	N(-1)	2	4
	N(0)	29	49
	N(1)	19	27
ST36R	N(-1)	1	4
	N(0)	31	42
	N(1)	16	34
KD3R	N(-1)	1	2
	N(0)	29	53
	N(1)	15	14
1L	N(-1)	0	3
	N(0)	21	38
	N(1)	12	16
LI5L	N(-1)	2	5
	N(0)	18	41
	N(1)	12	12
ST36L	N(-1)	0	3
	N(0)	23	40
	N(1)	7	13
PC6R	N(0)	25	23
	N(1)	15	21
3R	N(-1)	1	0
	N(0)	20	28
	N(1)	16	16
GB12R	N(0)	24	24
	N(1)	10	10
LI10L	N(-1)	2	1
	N(0)	25	22
	N(1)	7	11
2L	N(-1)	2	1
	N(0)	23	25
	N(1)	8	8
2R	N(-1)	2	2
	N(0)	14	15
	N(1)	10	15
LI20L	N(-1)	0	1
	N(0)	13	11
	N(1)	9	10
PC6L	N(0)	6	11
	N(1)	6	1
SP6R	N(-1)	0	1
	N(0)	7	9
	N(1)	5	2

N(-1) Number of "Negative responder" to LI4m^{+}21
N(0) Number of "Neutral responder" to LI4m^{+}21
N(1) Number of "Positive responder" to LI4m^{+}21

Table A15.7: Summary of number of respondents to LI4m^{+}21 by the categories of "Negative responder", "Neutral responder" and "Positive responder".

Appendix 16: Poster for New Horizons 2014

UNIVERSITY OF TECHNOLOGY SYDNEY

Temporal stability of regional pressure pain threshold between genders in healthy adults

Seong Cheah and Deirdre Cobbin
School of Medical and Molecular Biosciences, University of Technology Sydney

Background

Pain threshold is defined as the lowest application of a stimulus that is perceived as pain. Experimental pain studies use a range of pain challenges including electrical, heat or cold, ischaemic and pressure. Some carry a higher potential risk of tissue injury or the sensations experienced are less acceptable to subjects. Pressure pain threshold (PPT), measured by a simple mechanical algometer, is an attractive alternative well suited for noninvasive repeated measurements on multiple sites over short time intervals in a relaxed setting. Since 2000, seven studies in the University of Technology Sydney (UTS) that included PPT on both genders as an outcome measure, accumulated over 32000 baseline PPT measurements on 235 healthy subjects (127 females, 108 males) at 17 regional sites. These data are being analysed to develop comprehensive epidemiological profiles that assess relationships between gender, measurement location and temporal stability of regional PPT.

Aim

To examine relationships between gender and regional measurement site both within the same session and over extended time periods.

Methods

All studies used the same standardised protocol including the same model algometer (Figure 1), tip dimensions, application rates, rest interval between the three measurement cycles completed in each data collection visit (three to five minutes depending on number of regional sites used) and at least seven days between each of four collection visits (Loyeung and Cobbin 2013).

Figure 1: Wagner Pain Test™ Model FPK Algometer.

PPT measurement: Regional PPT was measured at the 17 sites, located on head, neck and limbs, shown in Figure 4. Subjects included 127 females (mean age 38.0; SD 14.1) and 108 males (mean age 36.7; SD 12.7) from the seven UTS PPT studies that involved both genders.

Statistical analyses: All PPT data were analysed using the general linear model (GLM) for repeated measures at 95% confidence intervals. While some datasets were not normally distributed, the GLM was tolerated due to their large size and observed high power. Mean and median PPTs were examined since not all datasets were normally distributed. Throughout this text, differences where $p<0.05$ are referred to as 'significantly different'.

Results

Gender based regional PPT comparisons independent of temporal variables

Overall, independent of temporal and regional site variables, the mean PPT for males was 25.3% greater than for females and the median difference was 22.9%. Similarly (Figure 2) for each regional site, mean and median PPTs for males were significantly higher than for females in overall visits. Differences among sites ranged from 17.7% to 34.3% for means and 10.7% to 32.3% for medians. Therefore all subsequent data analyses were completed separately by gender.

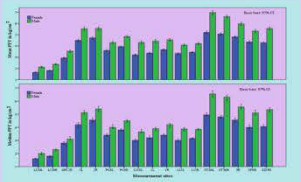

Figure 2: The mean and median PPTs by gender at each regional measurement site independent of visit. The GLM revealed that for each site, mean and median PPTs of males were significantly higher than for females.

Within the same gender, since mean and median PPTs for overall visits for each regional site were not significantly different, both mean or median PPT values were similarly appropriate for comparisons.

Temporal stability of PPT within the same measurement session by regional site

Three PPT readings were recorded for all 17 regional sites during each of the four data collection visits. Figure 3a shows the overall mean PPT across the four visits, for each of the three measurement cycles by regional site and gender. Figure 3b similarly compares the corresponding median PPT across site and gender.

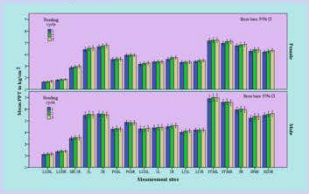

Figure 3a: Mean PPT for each reading cycle independent of visit shown for regional site and gender.

Mean values:

Figure 3a shows mean PPT values for each of the three readings at each site were stable across all visits for both genders, with four minor statistical significant differences involving Reading 1 for females. These included sites LI20L and LI20R (Reading 1 < Reading 3, 4.8% and 3.0% respectively), and 1R (Reading 1 < Reading 2, 3.7% and Reading 1 < Reading 3, 4.0%). Therefore for each site the mean PPT across measurement cycles was suitable for use in further PPT comparisons.

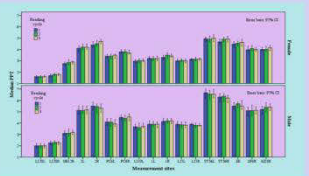

Figure 3b: Median PPT for each reading cycle independent of visit shown for regional site and gender.

Median values:

Similarly for each site, median PPTs independent of visit for each of three measurement cycles were generally stable (Figure 3b). All differences involved the first reading being modestly lower than a repeat reading. For females, Reading 1 was significantly lower than both Reading 2 and Reading 3 at LI20R and 2R (differences: 6.1%, 5.9%, 6.8% and 5.9% respectively). For males, Reading 1 was lower than Reading 2 for KD3R and 3R and lower than Reading 3 for PC6L and KD3R (3.8%, 3.6%, 4.3% and 3.8% respectively).

Although all significant differences were minor, two alternatives may be to either exclude the first reading and average several repeat measurements, or use only the second of two readings.

Temporal stability of PPT across the four measurement sessions by regional site

Figures 4, 5 and 6 summarise findings for mean and median PPTs by regional site and gender across the four visits. Both Figures 4 and 5 show a similar pattern among sites for both genders, with a trend where sites showed a gradual increase in mean or median PPT over delayed temporal sessions. Statistically significant effects were more frequent for males and for mean rather than median PPT values (Figures 4 and 5), and appeared in earlier visits (Figure 6). From Figures 5 and 6, several comparisons of the regional PPT values as well as its consistency over the extended temporal period are evident.

Since temporal patterns for the genders are different

- separate analyses are essential for females and males
- combining gender results in studies that include both genders is not recommended.

Both facial sites had very low mean PPT values. Given the limitations of the algometer measurement scale (ie $0.1kg/cm^2$) that has a possible reading error of $0.05kg/cm^2$ and the unavoidable measurement error due to delay through human reaction time, it is recommended that regional sites with low PPT values are not to be selected unless they are an essential part of a clinically oriented assessment.

Some sites were more likely to show significant temporal changes than others both within and between genders. For example, only for males, five sites (2L, LI5L, ST36L, ST36R, KD3R) had significant increases in mean PPT at Visits 2, 3 and 4 compared with Visit 1. For females, three sites showed significant minor decreases in mean PPT at Visit 2 (LI20L, LI20R and PC6L). The most temporally stable sites for both genders were LI20L, PC6L and LI10L for median values.

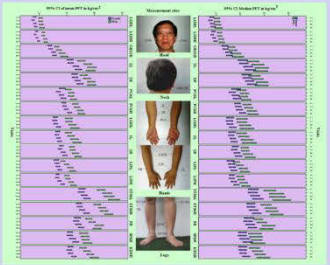

Figure 4: The 95% confidence interval (CI) of mean and median PPT by regional site and sessions (V1, V2, V3, V4) shown separately by gender. The body regions for the measurement sites are also indicated.

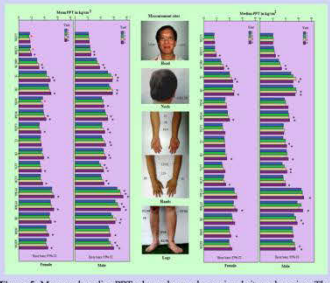

Figure 5: Mean and median PPTs shown by gender, regional site and session. The GLM on PPT between visits revealed some significant increases (*) and decreases (*) in mean/median PPT across temporal sessions of V1 to V2, V3 and V4.

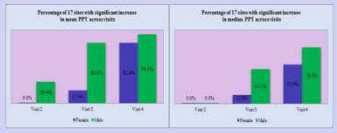

Figure 6: Percentage of the 17 regional measurement sites that showed statistical significant increase in mean/median PPT at each follow up session (V2, V3, V4) compared with the initial session (V1) for females (blue) and males (green).

Figure 6 shows there were gender differences evident in the rate of temporal change where mean PPT for males increased significantly (ie $p<0.05$) at more sites sooner than for females. There were no significant changes in the mean thresholds for any site for females from Visit 1 to Visit 2, compared with 29% of sites for males. For Visit 3, this effect involved 82% of sites for males compared with 18% for females. By Visit 4, these effects were evident for high proportions of sites for both males (94%) and females (82%). For median PPT values, there were no significant temporal effects for regional sites for females at Visit 2 and far fewer effects (12%) at V3 and V4 (53%).

These findings indicate the importance of recognising the presence of temporal drift if PPT measurements are used in longitudinal clinical or research studies, as well as the need to evaluate findings for the genders separately.

Conclusions:

PPT analyses need to be completed separately by gender.

Study designs that combine PPT findings across genders are not recommended (apples and oranges!)

If sites are selected for which temporal increases in PPT are significant, the impact of this variable must be considered:

- select sites that are more temporally stable
- limit duration of temporal delay between sessions
- limit study to female subjects since less temporal effects and at fewer sites.

Reference: BYK Loyeung, DM Cobbin. Investigating the effects of three needling parameters (manipulation, retention time, and insertion site) on needling sensation and pain profiles: a study of eight deep needling interventions. Evidence-based Complementary and Alternative Medicine: Volume 2013, Article ID 136763.

Appendix 17: Abstract for New Horizons 2014

New Horizons 2014, 17-19 November, Improving Healthcare Through Research and education, Kolling Building, Royal North Shore Hospital, NSW: Final program and abstract book. Page 49 .

Temporal stability of regional pressure pain threshold between genders in healthy adults

Seong L Cheah[1], Deirdre Cobbin[1]

[1]. *School of Medical and Molecular Biosciences, Faculty of Science, University of Technology, Sydney, NSW, Australia*

Background: Pain threshold is defined as the lowest application of a stimulus that is perceived as pain. Experimental pain studies use a range of pain challenges including electrical, heat or cold, ischaemic and pressure. Some carry a higher potential risk of tissue injury or the sensations experienced are less acceptable to subjects. Pressure pain threshold (PPT), measured by a simple mechanical algometer is an attractive alternative well-suited for non-invasive repeated measurements on multiple sites over short time intervals in a relaxed setting. Since 2000, eight studies in the University of Technology, Sydney that included PPT as an outcome measure, accumulated over 47,500 baseline PPT measurements on 262 healthy subjects at 24 regional sites. These data are being analysed to develop comprehensive epidemiological profiles that assess relationships between subject variables (gender, age, BMI), measurement locations and temporal stability of regional PPT.

Aims: This report examined relationships between gender and regional measurement site both within the same session and over extended time periods.

Methods: All studies used the same protocol including the same model algometer, tip dimensions, application rates, rest interval between measurement cycles and at least seven days between each of four data collection visit. Regional PPT measurement sites included sites on head, neck and limbs. Data analyses used a GLM on log(PPT) for meeting normality criteria.

Results: For all 17 sites, the mean PPT for males was significantly higher than for females for each visit and each measurement cycle. Mean PPT among cycles of readings within gender were stable with two minor exceptions for females. Irrespective of gender, most sites showed significant increase in mean PPT over temporal sessions.

Conclusion: PPT analyses need to be completed separately by gender. PPT between subjects experimental designs should ensure the gender ratio is the same across groups.

Appendix 18: Abstract for WFAS 2013

WFAS Sydney 2013: Selected Conference Abstracts
Australian Journal of Acupuncture and Chinese Medicine, 2013 VOLUME 8 ISSUE 2, 28-29

The effect of acupuncture treatment compared to sham laser for lateral elbow pain: a randomised controlled pilot study

Christine Berle; Chris Zaslawski; Deirdre Cobbin; Peter Meier; Sean Walsh; **Seong Leang Cheah**

Background: Lateral elbow pain is a common painful musculoskeletal condition affecting approximately 1–3% of the population. Methods: A randomised participant-blinded controlled pilot study was undertaken to determine whether acupuncture could relieve pain and improve function for this condition. Twenty participants were randomly allocated to either a standardised acupuncture protocol (n = 11) or sham laser (n = 9) over ten sessions. Outcome measures were PPT test, McGill/Melzac pain, DASH and VAS pain questionnaires. Participants were evaluated at baseline, on completion of treatment (week five) and one month later. Results: There was no significant difference between the groups at baseline for any outcome parameter. There were no significant changes found at completion or one month follow-up for the PPT and VAS measures. There were significant improvements for the acupuncture group for the McGill questionnaire at week five for the affective (p = 0.01) and miscellaneous (p = 0.02) sections; week nine total score (p < 0.03), affective (p = 0.01) and miscellaneous (p = 0.01) sections; the DASH at week five for work (p = 0.02) and sport (p = 0.01) modules and week nine general (p < 0.04), work (p = 0.01) and sport (p = 0.006) modules. There were no significant changes for any outcome measure for the control group. There was no significant difference found between the two groups for blinding efficacy (expectancy/credibility scale) and experience of *deqi* at baseline or on completion. Conclusion: Results indicate that acupuncture may be helpful in alleviating pain and improving arm functionality, but small participant numbers preclude any definitive conclusions, a larger sufficiently powered study is required.

Appendix 19: Abstract for AACMAC 2011

The 2011 Australasian Acupuncture and Chinese Medicine Association Annual Conference (AACMAC) Perth 2011: Selected Conference Abstracts
Australian Journal of Acupuncture and Chinese Medicine, 2012 VOLUME 7 ISSUE 1: 39

The effect of acupuncture treatment compared to sham laser for lateral epicondylalgia: results from a randomised controlled pilot study

Christopher Zaslawski; Peter Meier; Sean Walsh; Deirdre Cobbin; Christine Berle; **Seong Leang Cheah**

Lateral elbow pain is a painful common musculoskeletal condition that affects approximately 1-3% of the population at any given time and is associated with the degeneration of the common extensors tendon where it inserts on the lateral epicondyle of the elbow. A randomised controlled pilot study was undertaken at the University of Technology, Sydney to determine whether acupuncture could relieve pain and improve function associated with this debilitating condition. Twenty participants were randomly allocated to receive either a standardised acupuncture protocol (n = 11) or sham laser (n = 9) over 10 sessions. Outcome measures were pressure pain threshold (PPT) measured at designated acupoint sites by algometry, the McGill pain questionnaire, the disability of hand and shoulder (DASH) questionnaire and a visual analogue scale relating to pain. While no significant changes were found at the completion of the ten sessions or the one month follow up period for the PPT measures, significant improvements were reported by the acupuncture group for both the McGill pain questionnaire ($p < 0.03$) and the DASH ($p < 0.02$) at the one month follow up but not for those receiving the sham laser. In addition blinding efficacy and the experience of *deqi* reported by the acupuncture recipients were also evaluated. The results indicate that acupuncture may be helpful in alleviating pain and improving function but the small participant number involved preclude definitive conclusions. A larger sufficiently powered study is required. This presentation will discuss the results as well as some of the issues when conducting a clinical trial using acupuncture.