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# Sacroiliac Joint Assessment within the Australian Osteopathic Profession

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## ~ CONTENTS ~

## Abstract

**Study Design:** The Australian Osteopathic Profession was surveyed via mail-out.

**Objectives:** To determine what clinical test(s) are employed to assess for sacroiliac joint dysfunction (SIJD) and determine whether a correlation existed between tests employed and clinical experience.

**Summary of Background Data:** The range and frequency of SIJ clinical tests used by Australian osteopaths is unknown.

**Methods:** 168 practising osteopaths responded to mail-out survey

**Results:** Most practitioners that responded to the survey utilise asymmetry of bony landmarks, motion tests and pain provocation tests. Only 14% of respondents completely abstain from pain provocation testing.

**Conclusion:** It appeared that many osteopaths used diagnostic procedures consistent with the model proposed by Mitchell and advocated by most American authors. The use of these tests declined with increasing experience, whereas the use of a wide range of "other" tests increased. It appeared that the majority of osteopaths use some form of pain provocation tests, that are not advocated by any osteopathic text but commonly suggested in the wider manual therapy literature.

**Keywords:** sacroiliac joint dysfunction, osteopathy, clinical testing.

## Introduction

The mobility and dysfunction of the joints of the pelvis have created much passion and debate within the osteopathic profession.[1] Varying descriptions of biomechanics, sacroiliac joint dysfunction (SIJD) and techniques abound.[2,3]

The majority of osteopathic literature available for teaching, assessment and diagnosis of the sacroiliac joint (SIJ) has its origins in the United States.[4] It would seem the most widely accepted model is that devised by Mitchell, which has now "*...become embedded in very many parts of osteopathic practice throughout Europe and America.*"[5] The Mitchell model is a conglomeration of both the Fryette and Mackinnon theories, with personal additions. Mitchell attempts to simplify the biomechanics of this very complex joint for assessment and treatment purposes.[5]

In a review of the anatomy and biomechanics of the SIJ, motion was found to be a combination of rotation and translation occurring about no simple axis.[6] The motions available at the SIJ have been repeatedly found to be small[7,8], not exceeding 2-3° or 1-2mm.[6]

The SIJ has been established as a common source of LBP.[3,6,9] Stressing of the SIJ with injection of a contrast medium produced somatic pain directly over the joint and concurrent somatic referred pain of a variable nature in to the lower limb. The SIJ has been implicated to be the cause of chronic LBP in 15% of cases.[9] Research has failed to reveal a standard presentation for patients considered to have the SIJ as their source of pain.[6,10]

According to Levangie (1999), the two most common hypotheses for implication of the SIJ in LBP are that asymmetry within the pelvic ring resulted in areas of increased stress and subsequently production of pain. Secondly, that hypomobility at either SIJ would again result in tissue stress and pain. Dreyfuss et al (1994) considered relative hypomobility with altered anatomical relationship between sacrum and ilium to be the more common cause of SIJ pain. Bogduk stated that, "*the pathology of the pain is not known, although ventral capsular tears seem to underlie some cases*".[9] Presently there is no gold standard testing procedure to confirm the presence of SIJD.[10]

Many osteopathic authors advocate the detection of static bony asymmetry, soft tissue texture change and motion tests be used in combination to form a diagnosis.[11,12,13,14] The most commonly cited landmarks to be examined for asymmetry in decreasing frequency of citation are iliac crests,[4,11,12,13,14] medial malleoli,[4,11,12,13,14] pubic symphysis,[11,12,13,14] greater trochanters,[11,12,13,14] sacral sulci,[11,12,13,14] inferior lateral angles of the sacrum,[11,12,13,14] anterior superior iliac spines (ASIS),[11,12,14] posterior superior iliac spines (PSIS),[11,13,14] ischial tuberosities,[12,14] heel pads,[4] gluteal folds,[11] popliteal creases,[11] medial longitudinal arches of feet[11] and sacral base.[14]

The areas of tissue texture change investigated for SIJD most commonly cited in decreasing frequency are sacrotuberous ligament,[12,13,14] lumbar paraspinal muscles,[4,14] iliolumbar ligament,[14] posterior sacroiliac ligament,[14] rotator cuff muscles of the hip,[14] thoracolumbar and lumbosacral fascias,[14] trochanteric bursa,[14] piriformis and location of the sciatic nerve,[14] abdominal wall,[14] pelvic diaphragm.[14]

The motion tests for assessing SIJD most commonly cited in decreasing frequency include standing flexion test,[4,11,12,13,14] sacral springing,[4,11,12,13,14] pelvic rocking,[1,4,11,14] seated flexion test,[4,11,13,14] ASIS Compression Test,[4,13,14] sacral motion with respiration and cranial rhythmic impulse,[11,12,14] one-legged stork test / Gillet Test,[4,12] Trendelenburg Test,[4,14] lumbosacral spring test,[12,14] backward bending test,[12,14] sacroiliac springing.[1] standing trunk sidebending,[12] sacroiliac motion test by gapping,[12] and fascial preference of sacroiliac area.[13]

Osteopathic texts do not include pain provocation testing for sacroiliac joint dysfunction. The pain provocation tests investigated to assess for SIJD by non-osteopathic authors in descending frequency are Patrick (FABER) test,[15,16,17] sacral spring (prone),[15,16] Gaenslen test,[15,16] ASIS distraction test,[15] ASIS compression test,[15] resisted external rotation of the hip (prone),[15] spring pubic symphysis,[15] shear test,[16] standing extension,[16] Yeoman maneuver,[16] POSH,[17] and REAB,[17]

The ability to clinically diagnose SIJD by current non-invasive methods is under debate. Research suggests that intra-articular injection of local anaesthetics or irritants are diagnostic for SIJ pain.[9] Conversely, other research has refuted the validity of joint blocks. These authors cite the difficulty of joint capsule penetration, problems with leakage, and the possibility of local non-joint anaesthetising or irritation producing concomitant effects.[2,6]

Due to the conjecture that exists regarding the validity and reliability of non-invasive assessment of the SIJ, this research paper aimed to determine the most common method, or methods, employed by the Australian Osteopathic

Profession in regard to diagnosing SIJD. This included what static palpatory tests, motion tests and pain provocation tests, if any, are commonly used to assess the SIJ. In addition it was possible to determine if there is a correlation between tests employed and practitioner experience.

## Materials and Methods

### *Subjects*

A database of Australian osteopathic practice locations was produced with a resultant 953 records using information publicly available at www.yellowpages.com.au. Of these, 168 surveys were returned complete and included in the study.

### *Procedure*

Survey questions were developed based on SIJ tests described in current osteopathic textbooks to include the most likely tests to be employed when assessing the sacroiliac joint for dysfunction or as a possible cause of a patient's symptomatology. Two osteopaths and one medical practitioner assessed the survey for validity.

### *Statistical Analysis*

Raw data were collated according to year and institute graduated from. Data was then grouped by year of graduation such that categories consisted of 0-5, 5-10, 10-15, 15-20, greater than 20 and unknown years of experience.

Data was analysed using the SPSS 10.0 for Windows Student Version statistical program. A Chi-square analysis testing for independence, or relatedness of tests employed, compared to an osteopaths experience was performed.

## Results

Of the 953 surveys mailed out 168 surveys (18%) were returned complete (figure 1) and 68 surveys (7%) were returned to sender. Many of the 953 records generated contained redundant and repeat information (multiple locations, old addresses). The authors' had no way of validating which information was correct and/or current. It is estimated that the true response rate to this survey was approximately 30%.

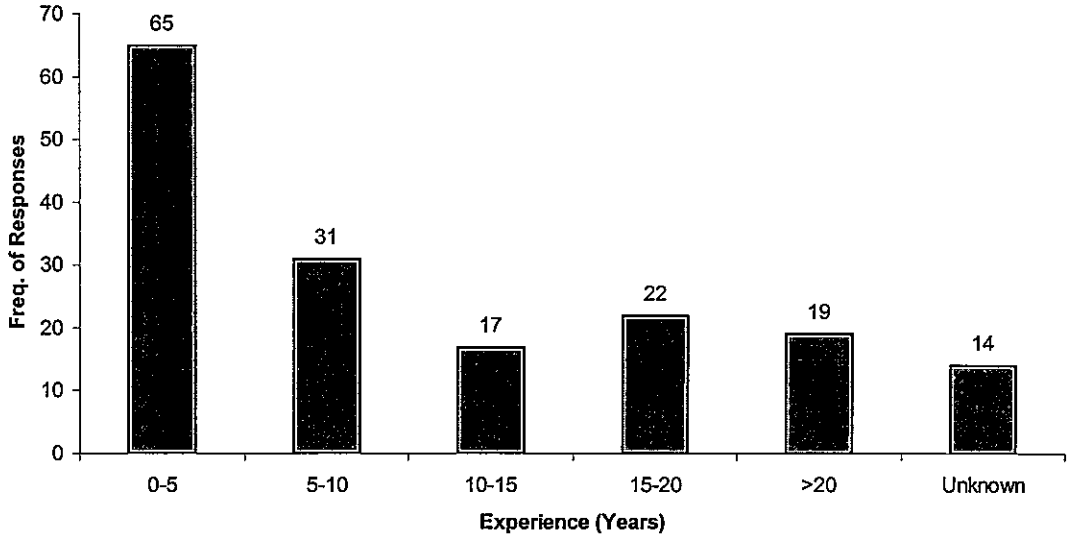


**Figure 1: Survey Participation and Osteopathic Experience**

The greatest participation was from those osteopaths with 0-5 years experience as they accounted for approximately 40% of all surveys returned.

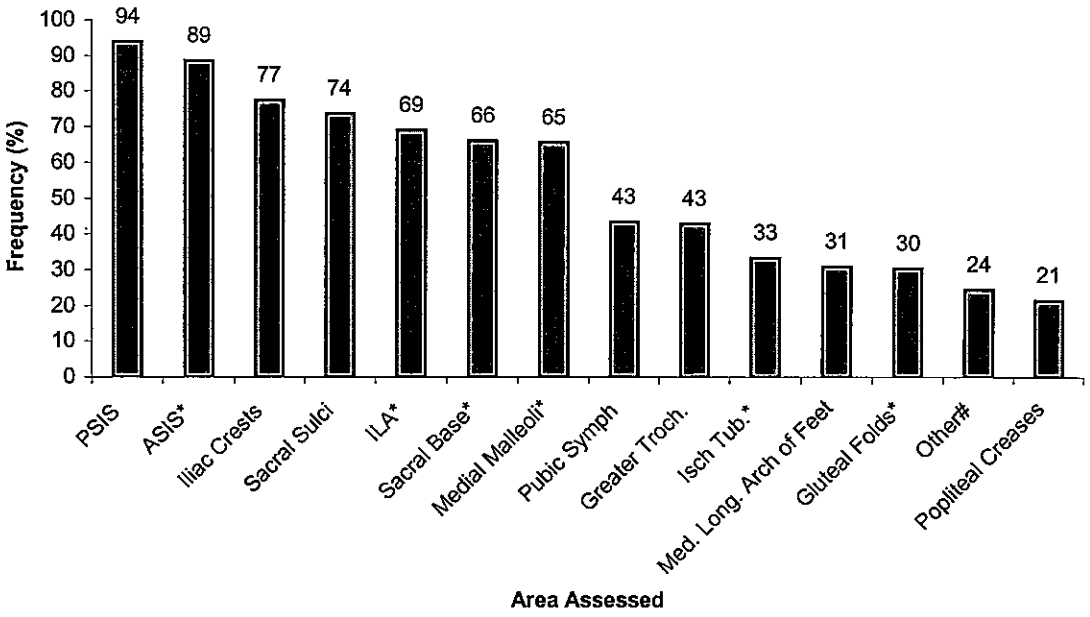


**Figure 2: Survey Question ~ Detection of asymmetry of pelvic bony landmarks**

* ~ Significant differences ($p<0.05$) occur with practitioner experience

# ~ Other includes individual assessment tests utilized by <1% of respondents

Figure 2 demonstrates the areas examined for static asymmetry in descending order of percentage frequency. The PSIS (94%) is most frequently examined for asymmetry, followed by ASIS (89%), and iliac crests (77%). Of the areas assessed, significant differences exist between practitioner experience and assessment of the ASIS (freq=89%, p=0.013) inferior lateral angle (freq=69%, p=0.002), sacral base (freq=66%, p=0.019), medial malleoli (freq=65%, p=0.002), ischial tuberosities (freq=33%, p=0.000) and gluteal folds (freq=30%, p=0.010). These significant results are represented in figure 3.

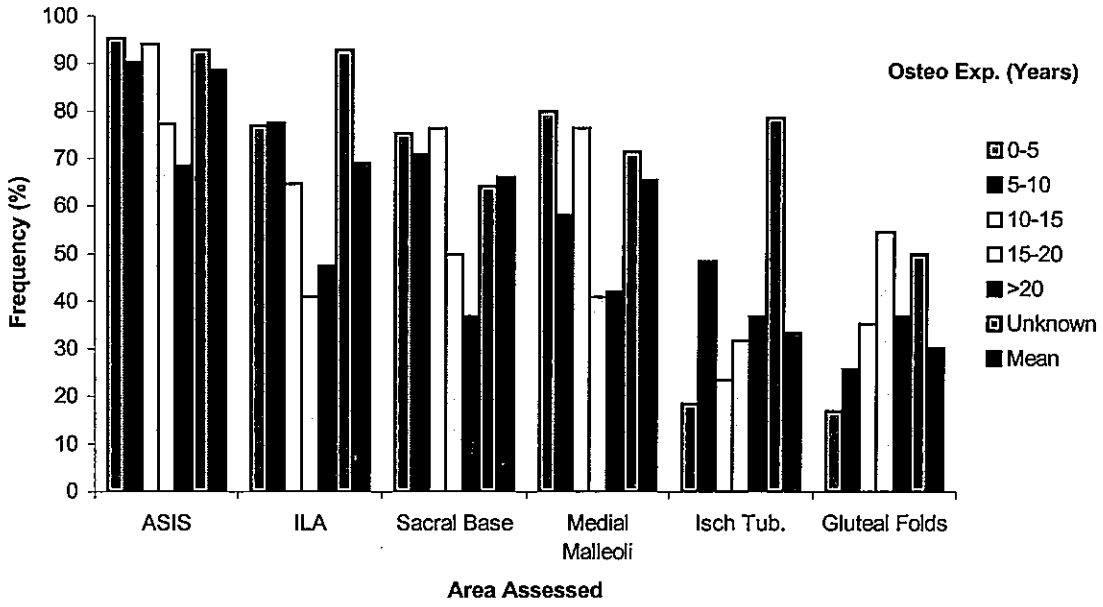


**Figure 3: Significant Differences with Osteopathic Experience and Detection of Static Asymmetry**

The more experienced osteopaths are utilising the ASIS, ILA, sacral base and medial malleoli landmarks with less frequency than their less experienced counterparts. Conversely, assessment of gluteal folds and ischial tuberosities become relatively more popular as experience increases.

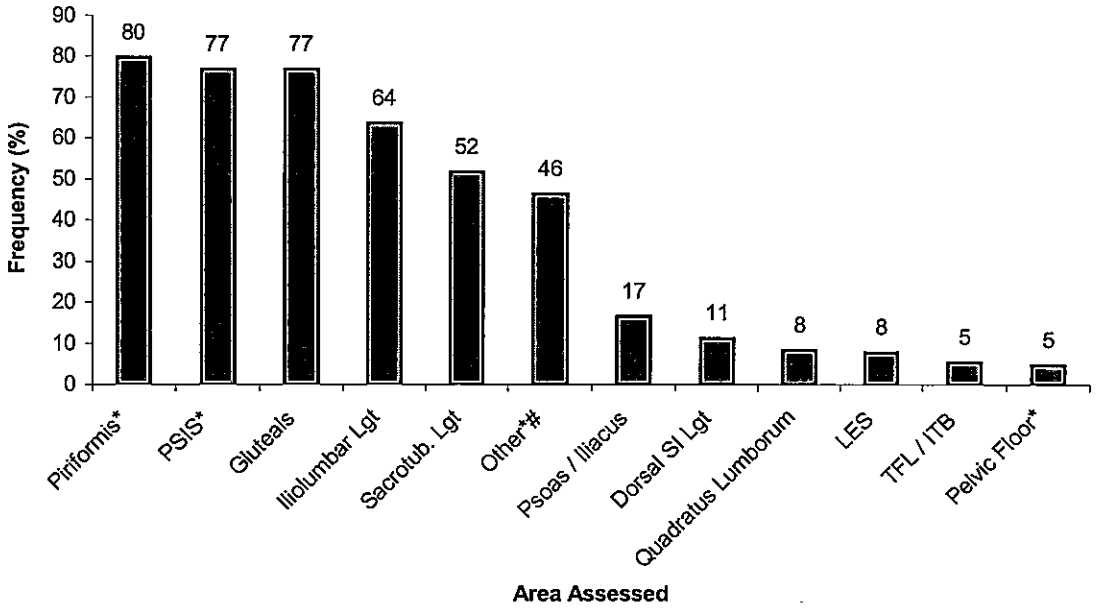


**Figure 4: Survey Question ~ Detection of Tenderness and/or Tissue Texture Change**

* ~ Significant differences ($p<0.05$) occur with practitioner experience

# ~ Other includes individual assessment tests utilized by <1% of respondents

Figure 4 demonstrates the areas for detection of tenderness and/or tissue texture change utilised by the practitioner in descending order of percentage frequency response of all participants. The piriformis (80%) is most frequently examined for tenderness and/or tissue texture change, followed by PSIS (77%) and Gluteals (77%). Of the areas assessed, significant differences exist between practitioner experience and assessment of piriformis (freq=80%, p=0.011), PSIS (freq=77%, p=0.005), other (freq=46%, p=0.005) and the pelvic floor (freq=5%, p=0.029. These significant results are represented in figure 5.

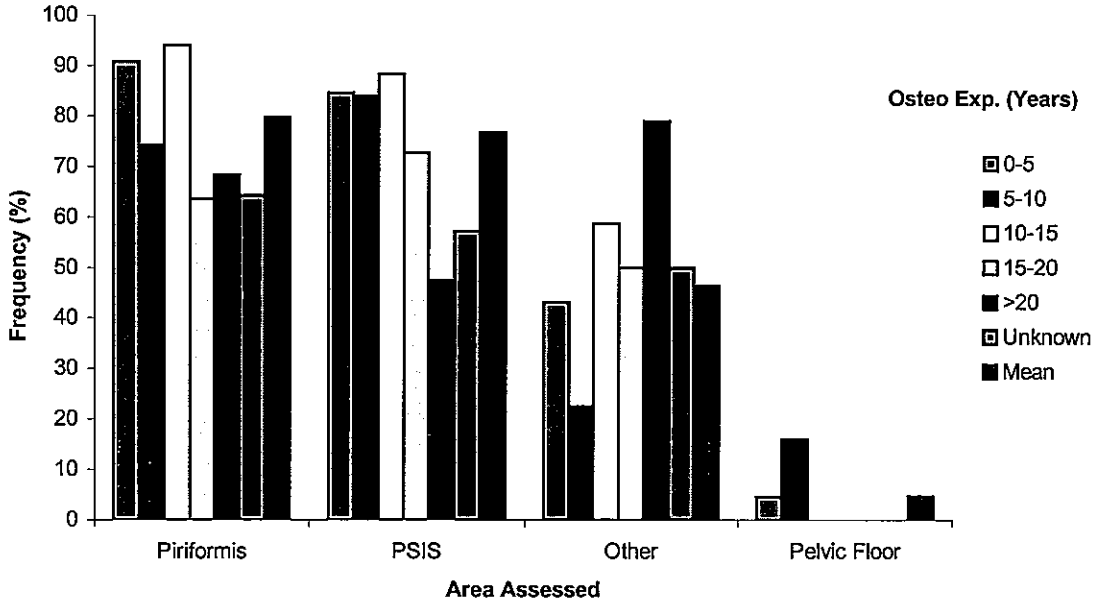


**Figure 5: Significant Difference with Osteopathic Experience and Detection of Tenderness and/or Tissue Texture Change**

Utilisation of recognised osteopathic assessments for detecting tissue texture change mimicked the trends of bony asymmetry in that as a practitioner's experience increases, the frequency with which they employ recognised osteopathic assessments decreased significantly (Figure 5). Practitioners tend to employ tests within the category of "other" as experience increases.

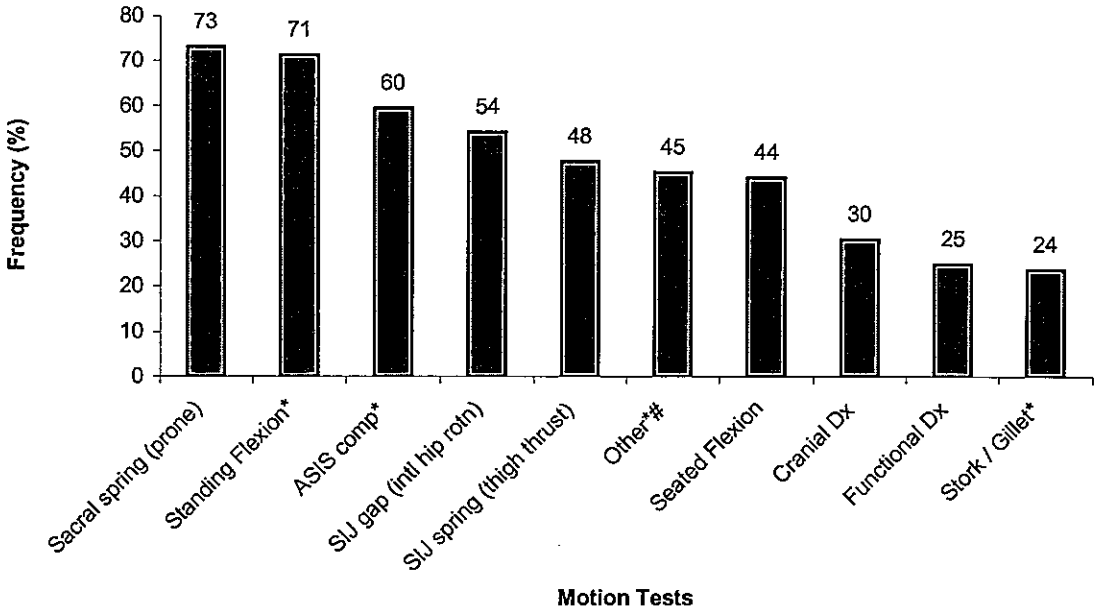


**Figure 6: Survey Question ~ Motion Testing of Pelvis**

* ~ Significant differences ($p<0.05$) occur with practitioner experience

# ~ Other includes individual assessment tests utilized by <1% of respondents

Figure 6 demonstrates the motion tests utilised by the practitioner in descending order of percentage frequency response of all participants. Sacral spring (prone) (73%) is most frequently utilised motion test, followed by standing flexion test (71%) and ASIS compression (60%). Of the motion tests identified, significant differences exist between practitioner experience and employment of the standing flexion test (freq=71%, p=0.029), ASIS compression (freq=60%, p=0.010), "other" tests (freq=45%, p=0.000), and the stork/Gillet test (freq=24%, p=0.001). These significant results are represented in figure 7.

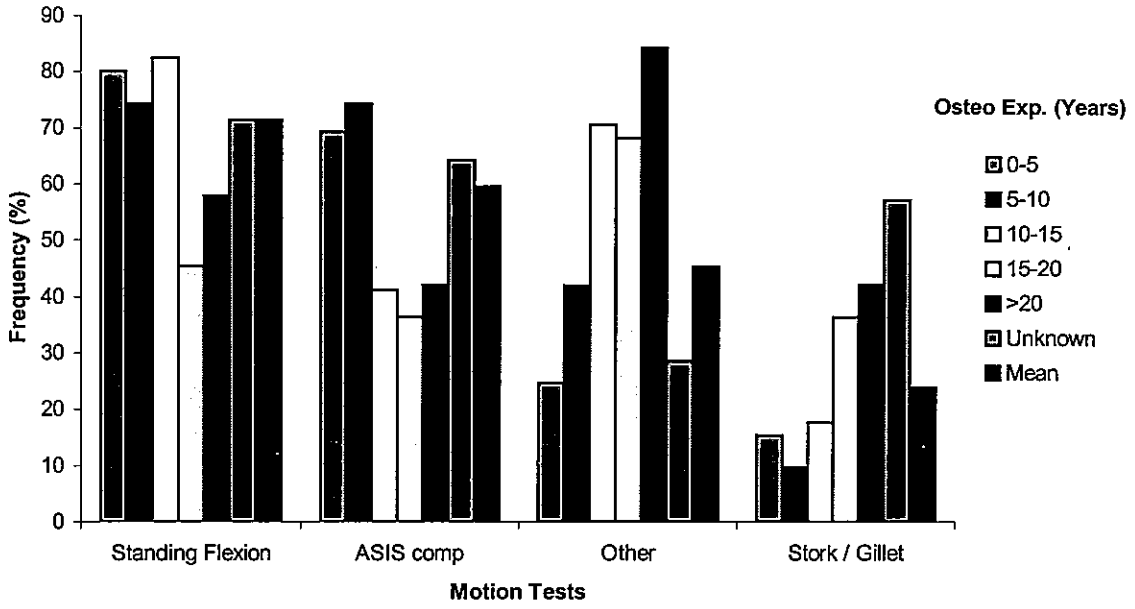


**Figure 7: Significant Difference with Osteopathic Experience and SIJ Motion Testing**

The standing flexion test and ASIS compression test findings are consistent with those of static asymmetries and tissue change, decreasing with increasing experience. The more experienced practitioners are more likely to use tests not commonly referred to in current osteopathic literature and as a resultant have a higher frequency of use of "other" testing protocols. The contrary finding here is that the Stork/Gillet test (standing Hip Flexion Test) is more frequently used among practitioners of greater experience.

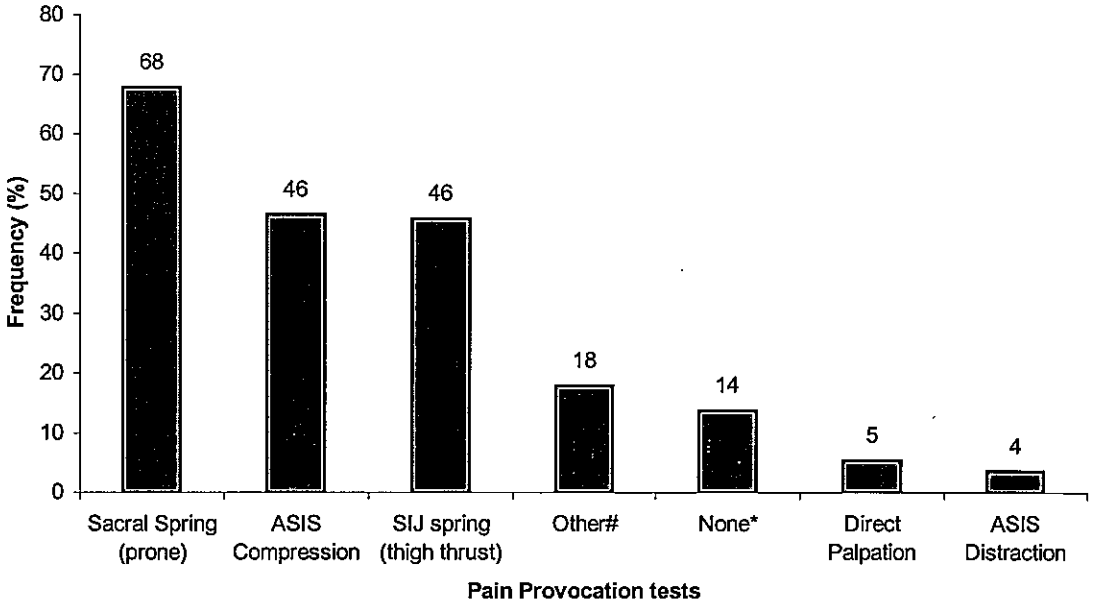


**Figure 8: Survey Question ~ SIJ Pain Provocation Tests**

* ~ Significant differences ($p<0.05$) occur with practitioner experience

# ~ Other includes individual assessment tests utilized by <1% of respondents

Pain provocation tests utilised by the practitioner, in descending order of percentage frequency response, is sacral spring (prone) (68%), followed by ASIS compression test (71%), and SIJ spring (thigh thrust) (60%). Of the pain provocation tests the only significant difference was apparent between practitioners who chose not to perform pain provocation testing (freq=14%, $p=0.019$). No correlation was apparent between experience and abstinence from pain provocation testing.

Clinical reasoning outcomes associated with SIJD returned no significant difference with regard to practitioner experience. Ninety percent of respondents were of the opinion that the SIJ can be mechanically dysfunctional but not necessarily symptomatic. Fifty-seven percent indicated that the SIJ might be symptomatic but not necessarily dysfunctional. Eighty-

six percent designated that the SIJ might produce reflex changes in the segmentally related viscera.

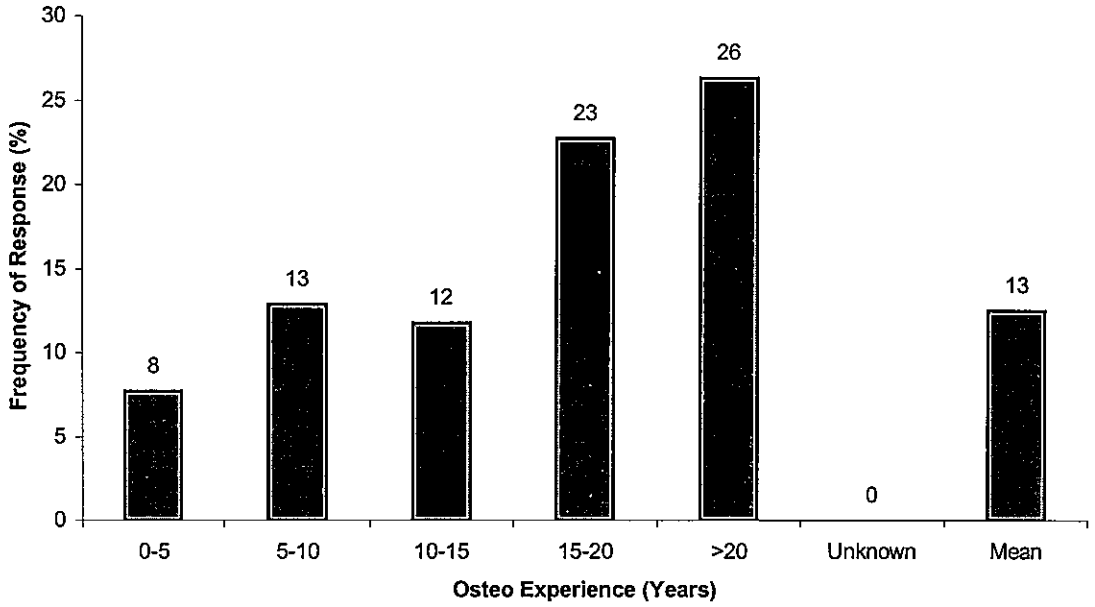


**Figure 9: Osteopathic Experience and Referral for Cortisone Injection Associated with SIJD**

Twenty-one (13%) of the practitioners surveyed have referred patients for a cortisone injection associated with suspected SIJD. Those practitioners with greater experience have a greater frequency of referral. Three practitioners claimed permanent resolution of the patient's pain following injection, nine were unaware of the outcome, three had no effect at all, and the remaining six reported resolution ranging from 7 days to two years.

## Discussion

This study examined the range and frequency of clinical diagnostic tests proposed to detect SIJD used by Australian osteopaths. To the authors' knowledge this is the first study that has attempted to determine what tests osteopaths actually use in practice, and whether this is influenced by practitioner experience. It appeared that many osteopaths used diagnostic procedures consistent with the model proposed by Mitchell and advocated by most American authors. The use of these tests declined with increasing experience, whereas the use of a wide range of "other" tests increased. It appeared that the majority of osteopaths use some form of pain provocation tests, that are not advocated by any osteopathic text but commonly suggested in the wider manual therapy literature.

Osteopathic authors have adapted several models to assess and diagnose the presence of sacroiliac dysfunction. The Mitchell model recommends static bony palpatory findings combined with motion tests as a basis for determining the presence and nature of SIJD. Mitchell (1999) views the soft tissue changes considered essential data in other modalities as an irrelevant distraction in administering MET.

Detection of static asymmetry was clearly the more popular of the four modalities investigated for the detection of SIJD. Thirteen areas were identified within the study that at least 21% of practitioners utilise in assessing for SIJD. Stone (1999) believes that the Mitchell model has become entrenched in much of osteopathic practice throughout Europe and America, although is not convinced British osteopaths adhere as closely. The

prevalence of static bony palpation in preference to assessing tissue texture change, motion testing or pain provocation would imply that within the Australian profession, practitioners are basing treatment fundamentally upon the Mitchell model.

Of the thirteen landmarks identified in figure 2, six areas were significantly different dependent upon practitioner experience (ASIS, ILA, sacral base, medial malleoli, ischial tuberosities and gluteal folds). Practitioners with greater than 15 years experience were less likely to employ assessment of the ASIS, ILA, sacral base and medial malleoli than their less experienced counterparts. These landmarks are critical areas within the Mitchell model and it could be hypothesised that the less experienced practitioners are more likely to incorporate the Mitchell model clinically. Further support of this argument is provided when comparing use of the ischial tuberosities and gluteal folds because these areas are not requisites for the Mitchell model and are relatively ignored by those practitioners with 0-15 years experience.

Palpation of bony landmarks has recognised limitations. Reliability may be reduced by anatomical variation of bony prominences from left to right,[18] obesity of patient, examiner skill and experience or the presence of pain.[10] The validity of static asymmetry as an indicator of dysfunction is uncertain, as no correlation between asymmetry and LBP has been found.[3]

Assessment of tissue texture change seems to be very much the domain of the osteopath and is yet to be the subject of much critical debate. Reliabilty and validity of tissue texture change tests relevant to SIJD have not come under the same scrutiny as bony landmark and motion testing assessment.

There were five areas assessed for tissue texture change by more than 50% of surveyed practitioners; piriformis, PSIS, gluteals, iliolumbar ligament and sacrotuberous ligament.

Springing of the SIJ was the most popular motion test. The same test was also the most popular pain provocation test. Significant differences were apparent when employing the standing flexion test, ASIS compression test, the Stork test and the collection of "other" tests. Consistent with earlier findings the more experienced practitioners put greater faith in idiosyncratic tests not widely utilised by the wider population of respondents. The exception was the Stork test. Much of the modern research of dynamic testing for SIJD has focussed upon the standing flexion test,[2,3,19] seated flexion test,[2,3] stork (Gillet, March Rucklauf, standing hip flexion) test,[2,7,20] and supine to sit test.[3] The clinical worth of these tests continue to be questioned due to a lack of reliability and validity.

The diligent practitioner must not be dogmatic and should keep in mind that asymmetric motion between left and right SIJs, even if palpable, may very well be a normal finding due to anatomical form development.[6] It has been found that 20% of asymptomatic patients return a positive finding in at least one of the standing flexion, seated flexion or stork test.[2]

Another author reported that a cluster of four motion tests were clinically useful to determine SIJD.[10] Only one of their four tests employed, the standing flexion test, is a recognised osteopathic test. Regardless, only four tests were used by more than 50% of respondents. This indicates that if practitioners are using a cluster of tests to aid in diagnosis those tests are

wide and varied. Tests should not be rejected because of a lack of testing standardization.[19] Further, it has been reported that the seated flexion, standing flexion or stork test were unable to predict, either as stand alone tests or as a cluster of tests, the presence of asymmetry of pelvic bony landmarks.[3]

Pain provocation testing has not been championed by contemporary osteopathic texts. Of note, only 14% of respondents indicated that they do not employ any pain provocation testing. Conversely, it appears that 86% of Australian practitioners seek to reproduce or provoke pain in the SIJ as a diagnostic aid. The only test employed by more than half of the respondents is that of sacral springing. In one study, sacral springing along with six other pain provocation tests, were shown to have no predictive value.[15] They propose that the soft tissues surrounding the joint, which are unavoidably stressed during SIJ stress testing, may well have a contribution to a patient's pain.

Three pain provocation tests were found to have a high degree of sensitivity and specificity for confirming diagnosis of SIJD.[17] This may be explained by the tests and exclusion criteria employed by the two studies. The two studies only had one test in common, the FABER test. However, one study included painful resisted external hip rotation as a pain provocation test.[15] Conversely, pain with internal or external hip rotation as an exclusion criteria, was included in the other study.[17] Injection of contrast media in to the SIJ has produced diverse pain referral; the only characteristic finding among all investigations was a lack of pain above the L5 level[6], which was an inclusion criteria in the afore mentioned study.[17]

The non-invasive tests for determining SIJD have become accepted according to one author, not because of scientific clinical studies, but because they have been continually propagated within orthopaedic, medical, manual medicine, osteopathic and chiropractic texts.[2] After a literature review of SIJD tests, another researcher concluded that tests and procedures for SIJD should not be taught in physical therapy colleges any longer.[6]

It appears that despite the evidence of poor reliability and lack of validity of assessment of static asymmetry and SIJ motion testing these tests continue to be used by the vast majority of osteopaths, and taught to the next generation of osteopaths at tertiary level.

## Conclusion

It appeared that many osteopaths used diagnostic procedures consistent with the model proposed by Mitchell and advocated by most American authors. The use of these tests declined with increasing experience, whereas the use of a wide range of "other" tests increased. It appeared that the majority of osteopaths use some form of pain provocation tests, which are not advocated by any osteopathic text but commonly suggested in the wider manual therapy literature.

**Acknowledgements**

The authors would like to thank Dr. Melainie Cameron (Osteopath) and Dr. Annie Carter for assessing the survey for validity. The authors would also like to thank the 168 osteopaths who took the time to complete and return the survey.

## Appendix

### *Raw Data Graphs:*

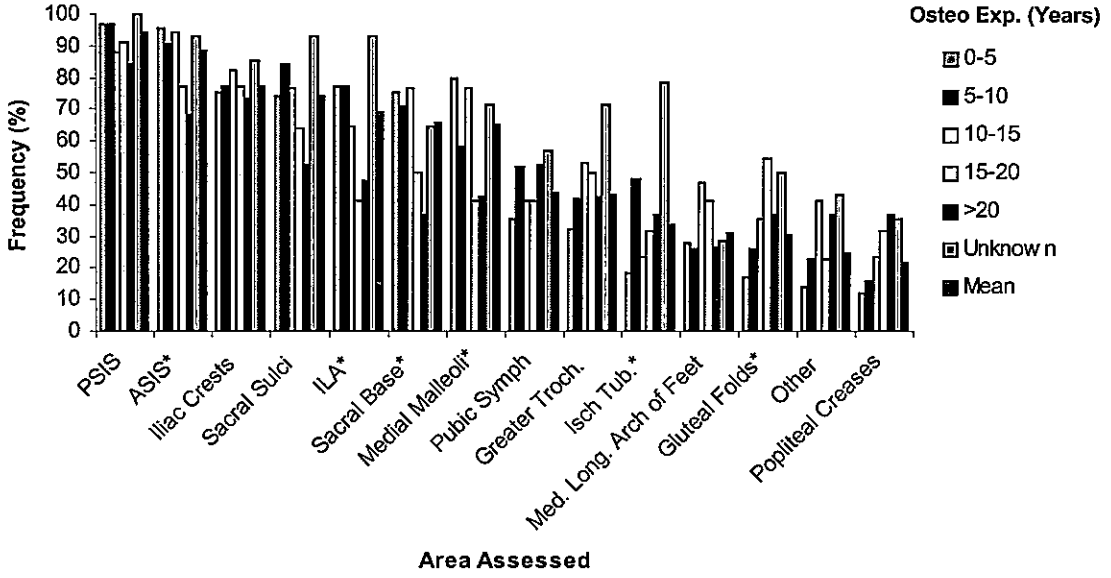


**Figure A1: Summary of Raw Data for Detection of Static Asymmetry (Survey Q1)**

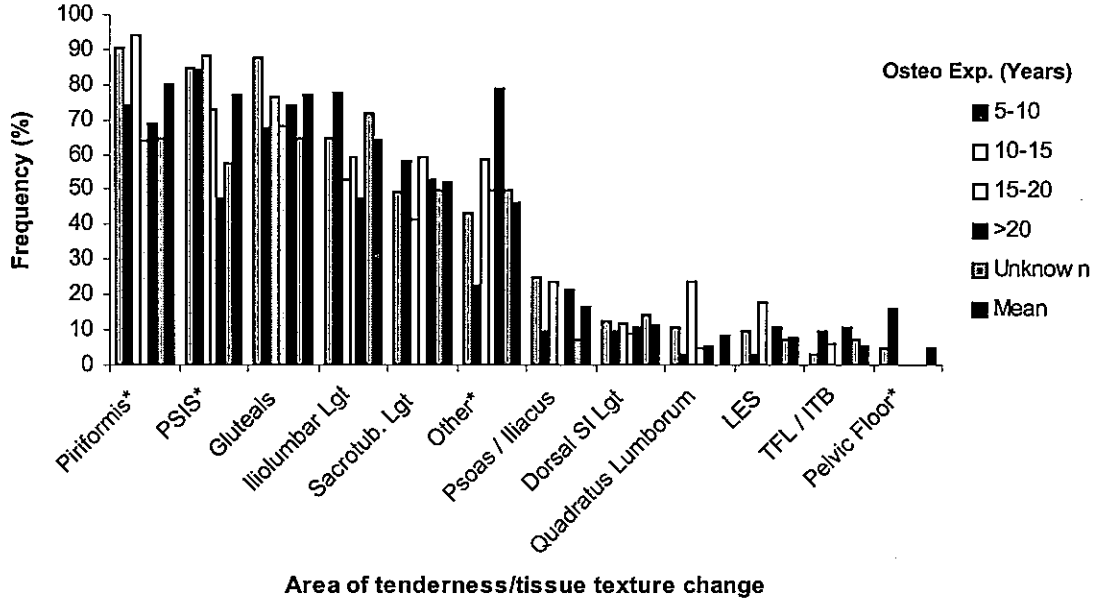


**Figure A2: Summary of Raw Data for tenderness and/or tissue texture change (Survey Q3)**

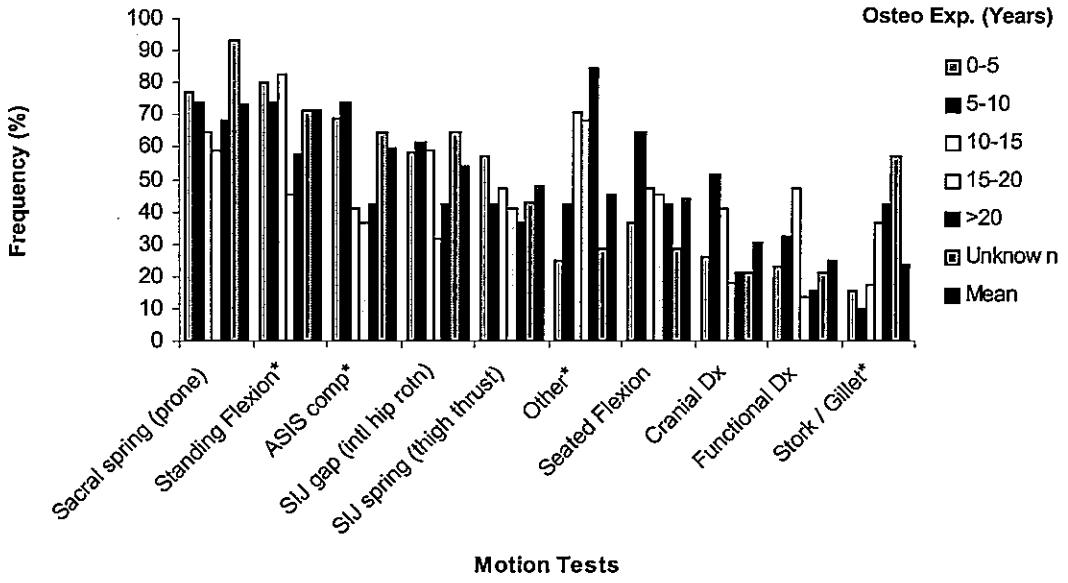


**Figure A3: Summary of Raw Data Motion Testing of Pelvis (Survey Q5)**

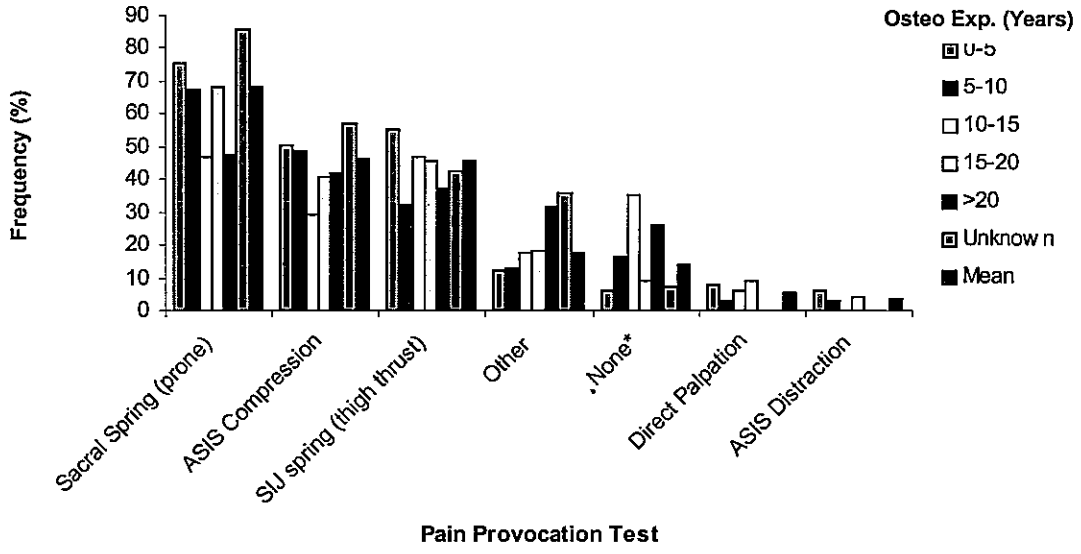


**Figure A4: Summary of Raw Data for Pain Provocation Testing of Pelvis (Survey Q7)**

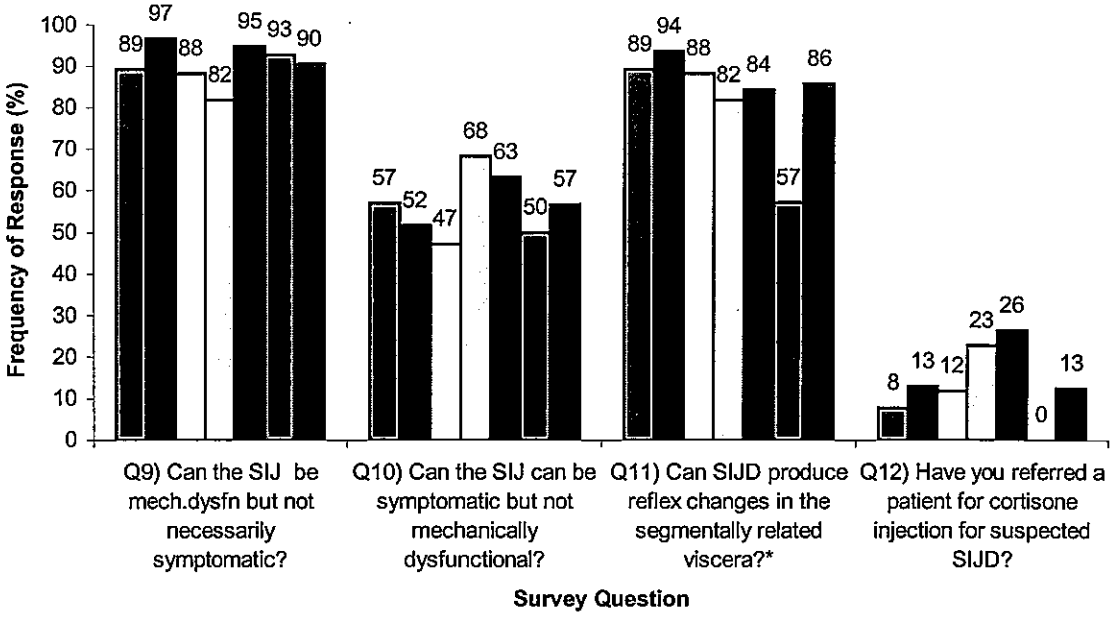


**Figure A5: Summary of Raw Data for SIJD Clinical Reasoning Questions (Survey Q9-12)**

***Survey:***

**Sacroiliac Joint Assessment within the Australian Osteopathic Profession – A Questionnaire**

Please list qualifications obtained, including year and place of graduation

_____
_____
_____
_____
_____
_____

**Osteopathic Assessment of the Sacroiliac Joint**

Please indicate (☒) which, if any, of the following tests you routinely employ when assessing the sacroiliac joint as a possible source of patient complaint or mechanical dysfunction.

1) Detection of asymmetry of pelvic bony landmarks:
   - Anterior Superior Iliac Spines (ASIS) ☒
   - Pubic Symphysis ☒
   - Posterior Superior Iliac Spines (PSIS) ☒
   - Sacral Sulci ☒
   - Sacral Base ☒
   - Inferior Lateral Angles (ILA) of the Sacrum ☒
   - Ischial Tuberosity ☒
   - Iliac Crests ☒
   - Greater Trochanters ☒
   - Gluteal Folds ☒
   - Popliteal Creases ☒
   - Medial Malleoli ☒
   - Medial Longitudinal Arches of feet ☒
   - Other (Please describe) ☒

_____
_____
_____
_____

2) Of the examinations in Q1, is there any landmark(s) that you find especially useful? Please list

_____
_____
_____
_____

3) **Detection of tenderness and/or tissue texture change:** Please indicate (🛏) which area***(s)*** you ***commonly*** assess to detect SIJD / pelvic dysfunction.

- Posterior Superior Iliac Spine (PSIS) ☒
- Iliolumbar ligament ☒
- Sacrotuberous ligament ☒
- Gluteal Muscles ☒
- Piriformis muscle ☒
- Other (Please describe) ☒

4) Of the locations listed in Q3, is there any finding***(s)*** that you find especially useful? Please list

5) **Motion testing of pelvis.** Please indicate which examination***(s)*** you ***commonly*** use to detect SIJD / pelvic dysfunction

- Standing Flexion Test ☒
- Seated Flexion Test ☒
- One-legged Stork Test / Gillet Test ☒
- Anterior Superior Iliac Spine (ASIS) compression test ☒
- Supine SIJ springing using femur as lever, *"thigh thrust"* ☒
- Sacral springing – patient prone ☒
- SIJ gapping using internal hip rotation as lever ☒
- Functional Diagnosis ☒
- Cranial Diagnosis ☒
- Other (Please describe) ☒

6) Of the examinations listed in Q5, is there any finding***(s)*** that you find especially useful? Please list

7) **Pain Provocation Tests**. Please indicate which examination***(s)*** you ***commonly*** use to detect SIJD / pelvic dysfunction.

- Anterior Superior Iliac Spine (ASIS) compression test ☒
- Supine SIJ springing using femur as lever, *"thigh thrust"* ☒
- Sacral springing – patient prone ☒
- Other (Please describe) ☒

8) Of the examinations listed in Q7, is there any finding***(s)*** that you find especially useful? Please list

9) Do you believe that the SIJ can be mechanically dysfunctional but not necessarily symptomatic (a direct source of pain)?

- Yes ☒
- No ☒

10) Do you believe that the SIJ can be symptomatic (a direct source of pain) but not mechanically dysfunctional?

- Yes ☒
- No ☒

11) Do you believe that SIJD may produce reflex changes in the segmentally related viscera?

- Yes ☒
- No ☒

12) Have you referred a patient for cortisone injection for suspected SIJD?

- Yes ☒
- No ☒

- If yes, approximately how many? _____

- Of these, what percentage had a resolution of their complaint? _____%

- Was resolution permanent?
  - ◊ Yes ☒
  - ◊ No ☒

- If resolution was not permanent, what was the average time of improvement?

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## ~ THE END ~

Any queries about your participation in this project may be directed to the researcher (Dr. Xxx Xxx ph. 03 9248 1210 , Xxx Xxx ph. 0412627725). If you have any queries or complaints about the way you have been treated, you may contact the Secretary, University Human Research Ethics Committee, Victoria University of Technology, PO Box 14428 MC, Melbourne, 8001 (telephone no: 03-9688 4710).