Sacroiliac dysfunction
SI joint (pain) syndrome, SI joint sprain, or Sacroiliitis

Ratko Matijevic
Definition

- pain in or around the region of the sacroiliac joint
- due to misalignment, abnormal movement, or trauma to the area
- pain between the posterior superior iliac spine and gluteal folds, particularly close to the sacroiliac joints
- main cause of pain in the lower part of the back
- the incidence from 14% to 75% during pregnancy

RM, 2019
Anatomy of SI joints

- Small joint that lies at the junction of the sacrum and the ilium.
- 2 IS ligaments
  - Anterior and posterior
- Little mobility
- Transfers load from upper body to the lower body.
- Provides shock absorption for the spine
SI joint motion

Three axes for angular and translational motion of innominate relative to the sacral segment (Hungerford et al., 2004)

- **Multi-planar motion (<4° in any plane)**
  Nutation / Counter nutation
  Males: 1 - 2° Females: 2 – 4°

- **Sacral Translation** (A-P motion) up to 1.6mm
Etiology

- SID during pregnancy is influenced by biomechanical and hormonal factors.

- **Constant uterine growth** is the main cause of changes in statics and dynamics during pregnancy.
  - The uterus moves proximal, anterior and lateral, changing the centre of gravity posteriorly and distally
  - anterior pelvic tilt and lumbar lordosis increase.

  increase in the pressure on the lumbosacral spine and the sacroiliac joints and the occurrence of sacroiliac dysfunction in pregnancy.

- **Increasing hormone levels** of relaxin and estrogen leads to ligamentous laxity, cartilage softening and proliferation of synovial fluid, which increases the load on the sacroiliac joints and causes a reduction in support and instability of the pelvis.

RM, 2019
Etiology (also)

- The causes of SID are multifactorial and often there is an obvious explanation.

- SID is more likely to be a combination of factors that include:
  - The sacroiliac joints moving asymmetrically
  - Abnormal pelvic girdle biomechanics from altered activity in the spinal, abdominal, pelvic girdle, hip and pelvic floor muscles

- A small member of women may have non biomechanical but hormonally-induced pain in the pelvic girdle. Occasionally the position of the baby may produce SID.
Symptoms and signs

Pain is key – from minimal discomfort to severe disability

Dull ache, sharp, or stabbing
Distribution to the buttocks, back of thigh, and lower back
Unilateral or bilateral
Worse
  When sitting for long periods of time
  When performing twisting/rotary motions
Morning stiffness
Resolves with exercise, depending on pain.
Pain over PSIS

RM, 2019
Symptoms and signs

Difficulty walking (waddling gait)

Pain on weight bearing on one leg i.e. climbing stairs, dressing)

Pain and/or difficulty in straddle movements e.g. getting in and out of bath, turning in bed

Clicking or grinding in pelvic area may be audible or palpable

Limited and pain full hip abduction difficulty lying in some positions e.g. supine – side lying
Pain during normal activities of daily life
Pain and difficulty during sexual intercourse

RM, 2019
The effect of SID

- Facilitate parturition (giving birth)
- SID:
  - reduction in activity in pregnancy (which increases the risk of varicose veins, deep vein thrombosis, weight gain, muscle reduction, etc.)
  - limitations in everyday activities, social and sex life
  - inability to professional work and a hobby that affects the quality of life of a pregnant woman
  - difficulty in labour and the inability to care for the child in the postpartum period.
Prognosis

- Symptoms of SID are reduced by 93% of pregnant women within three months postpartum
- Symptoms may last even 6 – 12 months postpartum in 1% to 2% of patients
- mainly in pregnant women who experienced intense pain and severe disability during pregnancy.
- Recurrence of SID is common in the following pregnancy (41% to 77%).

RM, 2019
Risk factors

- History of previous LBP
- History of previous trauma to the pelvis
- multiparty
- Poor work place ergonomics and awkward working conditions
- General joint hyper mobility
Diagnosis

- 3 of 5 positive clinical tests provides discriminative power for diagnosing SID

Patrick FABER test

- Flexion, abduction and external rotation

- Se=0.70; Sp=0.99; P=0.62
4P (posterior pelvic pain provocation) test

- Thigh thrust provocative test
- Se=0.93; Sp=0.98; P=0.70
- Axial pressure along the length of the femur
- To distinguish between pelvic girgle pain and LBP

RM, 2019
Distraction test

- Pressure on superior anterior iliac spines
- $Se=0.60; Sp=81; P=0.84$
Manipulation test (pubic)

- Pressure over pubic bone
- $O=0.81; S=0.99; P=0.89$
Sacral thrust test (modified)

- $O=0.63; S=0.75; P=0.76$
- Not on the stomach, left lateral
- Pressure on SI joints
Management options

Muscle Energy Techniques
Joint Mobilization Techniques
Stretching Techniques
Strengthening Techniques
Dynamic Lumbar Stabilization
Study 1

- Incidence, pain and mobility assessment of pregnant women with sacroiliac dysfunction


**Incidence, pain, and mobility assessment of pregnant women with sacroiliac dysfunction.**

Filipec M¹, Jadanec M¹, Kostovic-Srzentic M², van der Vaart H³, Matijevic R⁴,⁵.

**Author information**

**Abstract**

**OBJECTIVES:** To determine the incidence of sacroiliac dysfunction in pregnancy and assess its progress during the course of the pregnancy.

**METHODS:** The present prospective cohort study, performed between April 1, 2013, and May 31, 2016, enrolled primigravidae aged 25-35 years before 13 weeks of pregnancies who were experiencing back pain and did not have prior symptoms of sacroiliac dysfunction. Participants attended regular follow-up over 6 months and clinical functional tests were used to diagnose sacroiliac dysfunction. Women with sacroiliac dysfunction were assessed at 3-week intervals with a numeric pain rating scale (NPRS) and the pregnancy mobility index (PMI).

**RESULTS:** Among 1500 women who fulfilled the inclusion criteria, 1181 (78.7%) were diagnosed with sacroiliac dysfunction and 1143 completed all follow-up. Pain assessed by the NPRS gradually worsened from the first toward the third trimester (P<0.001). The level of disability assessed by the PMI also increased from the beginning to the end of pregnancy (P<0.001).

**CONCLUSION:** Sacroiliac dysfunction represents an important problem during pregnancy; pain severity and mobility problems increased during the course of pregnancy in the present study.

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**KEYWORDS:** Incidence; Mobility assessment; Pain; Pregnancy; Sacroiliac dysfunction
Hypothesis

- SID significantly influences pain intensity and degree of disability of pregnant woman
Methods

- Prospective study
- Primigravidae between 25 - 35 YOA with back pain, gestation age before 13 wks.
- Exclusion – spine surgery, previous SID out of pregnancy, spondylitis, symptoms suggestive of SID
- 3 of 5 tests positive
Assessment

- Numeric pain rating scale (NPRS) for pain intensity
- Pregnancy mobility index (PMI) for degree of disability
- In line with:
  - European guidelines for the diagnosis and treatment of pelvic girdle pain
  - Clinical practice guidelines for management of pelvic girdle pain in pregnancy and postpartum
  - Evidence-based diagnosis and treatment of painful sacroiliac joint
Study protocol and results

- FA in three weeks intervals by NPRS and PMI assessment till 37 wks.

0-13 weeks
- Assess for the presence of SD
- Measured pain (NPRS) and disability (PMI) (n=1181)

16 weeks
- Re-assess for the presence of SD
- Measured pain (NPRS) and disability (PMI) (n=1172)
- Excluded (vaginal bleeding n=9)

19 weeks
- Re-assess for the presence of SD
- Measured pain (NPRS) and disability (PMI) (n=1172)

22 weeks
- Re-assess for the presence of SD
- Measured pain (NPRS) and disability (PMI) (n=1172)

25 weeks
- Re-assess for the presence of SD
- Measured pain (NPRS) and disability (PMI) (n=1157)
- Excluded (vaginal bleeding n=4, uterine contractions n=11)

28 weeks
- Re-assess for the presence of SD
- Measured pain (NPRS) and disability (PMI) (n=1157)

31 weeks
- Re-assess for the presence of SD
- Measured pain (NPRS) and disability (PMI) (n=1149)
- Excluded (preterm labour n=8)

34 weeks
- Re-assess for the presence of SD
- Measured pain (NPRS) and disability (PMI) (n=1143)
- Excluded (preterm labour n=6)

37 weeks
- Re-assess for the presence of SD
- Measured pain (NPRS) and disability (PMI) (n=1143)
Results – pain intensity

Table 1. Percentage of participants with different levels of self-reported pain intensity assessed by Numeric Pain Rating Scale in first, second and third trimester (n=1143)

<table>
<thead>
<tr>
<th>Intensity</th>
<th>1st trimester</th>
<th>%</th>
<th>2nd trimester</th>
<th>Intensity</th>
<th>%</th>
<th>3rd trimester</th>
<th>Intensity</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>244</td>
<td>21.3</td>
<td>4</td>
<td>364</td>
<td>31.8</td>
<td>4</td>
<td>69</td>
<td>6.0</td>
</tr>
<tr>
<td>2</td>
<td>528</td>
<td>46.2</td>
<td>5</td>
<td>354</td>
<td>31.0</td>
<td>5</td>
<td>176</td>
<td>15.4</td>
</tr>
<tr>
<td>3</td>
<td>371</td>
<td>32.5</td>
<td>6</td>
<td>339</td>
<td>29.7</td>
<td>6</td>
<td>266</td>
<td>23.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1143</strong></td>
<td><strong>100.0</strong></td>
<td><strong>Total</strong></td>
<td><strong>1000</strong></td>
<td><strong>100.0</strong></td>
<td><strong>Total</strong></td>
<td><strong>1000</strong></td>
<td><strong>100.0</strong></td>
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</tbody>
</table>

RM, 2019
Results – mobility

Table 2. Mean scores of the Pregnancy Mobility Index (PMI) scale in first, second and third trimester of pregnancy (n=1143)

<table>
<thead>
<tr>
<th></th>
<th>First trimester</th>
<th>Second trimester</th>
<th>Third trimester</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMI (SD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily mobility</td>
<td>54.1 (5.08)</td>
<td>81.3 (8.83)</td>
<td>86.4 (6.63)</td>
</tr>
<tr>
<td>Household activity</td>
<td>47.4 (4.53)</td>
<td>79.7 (7.32)</td>
<td>87.6 (6.62)</td>
</tr>
<tr>
<td>Mobility outdoors</td>
<td>43.8 (4.47)</td>
<td>81.1 (7.78)</td>
<td>85.7 (6.95)</td>
</tr>
<tr>
<td>PMI total</td>
<td>48.1 (2.78)</td>
<td>80.6 (7.29)</td>
<td>86.6 (6.25)</td>
</tr>
</tbody>
</table>
Conclusion

- confirmed increase in SD symptoms during the course of pregnancy
- pain in the first trimester may be a strong predictor of pain in the third
- special attention needs to be made for women with high scores of pain and disability, and more positive diagnostic tests, both being predictive for SD persistence
Study 2

- The influence of advice on therapeutic exercise on reduction of sacroiliac dysfunction symptoms in pregnancy


- Mentor Ratko Matijevic
Hypothesis

- Expert advice about therapeutic exercise reduces the symptoms of SJD during pregnancy
Methods

- RCT
- Pregnant women 10 - 34 wks., 24 – 45 YOA
- Symptoms suggestive of SID, 3 of 5 diagnostic tests positive
- Exclusion
  - Spine surgery, previous SID out of pregnancy, spondylitis
### Assessment

**VAS (pain)**

<table>
<thead>
<tr>
<th><strong>PARAMETRI PROCJENE</strong></th>
<th><strong>0</strong> Bez ikakvih poteškoća</th>
<th><strong>1</strong> Uz minimalne poteškoće</th>
<th><strong>2</strong> Uz poneke poteškoće</th>
<th><strong>3</strong> Uz umjerenne poteškoće</th>
<th><strong>4</strong> Uz jake poteškoće</th>
<th><strong>5</strong> Nemogućnost izvedbe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Izlazak iz kreveta</td>
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<td>Spavanje noću</td>
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<td>Okretanje u krevetu</td>
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<td>Stajanje 20 – 30 min.</td>
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<td>Sjedenje nekoliko sati</td>
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<td>Seljena 300 – 400 m</td>
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<td>Seljena nekoliko km</td>
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<td>Bacišanje lopte</td>
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<td>Trčanje 100 m</td>
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<tr>
<td>Uzimanje hrane iz hladnjaka</td>
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<tr>
<td>Pospremanje kreveta</td>
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<td>Oblačenje čarapa</td>
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<tr>
<td>Sagibanje preko kade</td>
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<td>Pomicanje stoica</td>
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<tr>
<td>Guranje i otvaranje vrata</td>
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<tr>
<td>Nošenje dviju vrećica</td>
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<tr>
<td>Podizanje i nošenje predmeta</td>
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</tbody>
</table>

**QUEBEC (mobility)**


Study Group

- Expert advice on therapeutic exercise

Control Group

- Normal life habits
## Incidence of SID

<table>
<thead>
<tr>
<th></th>
<th>Total (N = 616)</th>
<th>Primip (N = 327)</th>
<th>Multip (N = 289)</th>
<th>Singleton (N = 512)</th>
<th>Multiples (N = 104)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>81%</strong></td>
<td><strong>277 (84.70)</strong></td>
<td><strong>223 (77.16)</strong></td>
<td><strong>410 (80.07)</strong></td>
<td><strong>90 (86.53)</strong></td>
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<tr>
<td>SID</td>
<td>N (%)</td>
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<td></td>
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<tr>
<td>Study</td>
<td>N (%)</td>
<td></td>
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<tr>
<td>N = 207</td>
<td><strong>123 (59.40)</strong></td>
<td><strong>84 (40.60)</strong></td>
<td><strong>176 (85.00)</strong></td>
<td><strong>31 (15.00)</strong></td>
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<tr>
<td>Control</td>
<td>N (%)</td>
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<tr>
<td>N = 201</td>
<td><strong>105 (52.20)</strong></td>
<td><strong>96 (47.80)</strong></td>
<td><strong>181 (90.00)</strong></td>
<td><strong>20 (10.00)</strong></td>
<td></td>
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</tbody>
</table>
Pain intensity

<table>
<thead>
<tr>
<th>VAS</th>
<th>Pain intensity at enrollment (N = 207)</th>
<th>Pain intensity 3 wks later (N = 207)</th>
<th>Pain intensity 6 wks later (N = 207)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Study</td>
<td>Control</td>
<td>Study</td>
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<tr>
<td></td>
<td>x ± SD</td>
<td></td>
<td>x ± SD</td>
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<tr>
<td></td>
<td>86,00 ± 6,35</td>
<td>84,57 ± 5,89</td>
<td>39,38 ± 18,94</td>
</tr>
<tr>
<td>p</td>
<td>0,928</td>
<td></td>
<td>0,001</td>
</tr>
</tbody>
</table>
Degree of disability

<table>
<thead>
<tr>
<th>Quebec-scale</th>
<th>Degree of disability at enrolment</th>
<th>Degree of disability after 3 wks</th>
<th>Degree of disability after 6 wks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Study (N = 207)</td>
<td>Control (N = 201)</td>
<td>Study (N = 207)</td>
</tr>
<tr>
<td></td>
<td>x̅ ± SD</td>
<td></td>
<td>x̅ ± SD</td>
</tr>
<tr>
<td></td>
<td>4.35 ± 0.57</td>
<td>4.53 ± 0.56</td>
<td>1.58 ± 1.20</td>
</tr>
<tr>
<td></td>
<td>0.45 ± 0.50</td>
<td>4.61 ± 0.52</td>
<td>0.45 ± 0.50</td>
</tr>
</tbody>
</table>

p-values:
- Degree of disability at enrolment: p = 0.495
- Degree of disability after 3 wks: p = 0.001
- Degree of disability after 6 wks: p = 0.001
Time interval regarding reduction of pain intensity and degree of disability

<table>
<thead>
<tr>
<th>Study group</th>
<th>Enrolemmt/3 weeks</th>
<th>3 weeks/6 weeks</th>
<th>Enrolement/6 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\bar{x} \pm SD$</td>
<td>$\bar{x} \pm SD$</td>
<td>$\bar{x} \pm SD$</td>
</tr>
<tr>
<td>VAS</td>
<td>86,00 ± 6,35</td>
<td>39,38 ± 18,94</td>
<td>6,77 ± 5,87</td>
</tr>
<tr>
<td>Quebec-scale</td>
<td>87,05 ± 11,42</td>
<td>31,69 ± 23,98</td>
<td>8,79 ± 9,95</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Control</th>
<th>Enrolelemnt/3 weeks</th>
<th>3 weeks/6 weeks</th>
<th>Enroelement/6 weeks</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>$\bar{x} \pm SD$</td>
<td>$\bar{x} \pm SD$</td>
<td>$\bar{x} \pm SD$</td>
</tr>
<tr>
<td>VAS</td>
<td>84,57 ± 5,89</td>
<td>86,62 ± 5,00</td>
<td>88,21 ± 4,05</td>
</tr>
<tr>
<td>Quebec-scale</td>
<td>90,65 ± 11,13</td>
<td>91,44 ± 11,06</td>
<td>92,24 ± 10,36</td>
</tr>
</tbody>
</table>
Regression analysis of the pain intensity and degree of disability in pregnant women with SID
Conclusion

- Higher incidence of SIJ in primps vs. mutips
- Higher incidence in multiple vs. singleton pregnancies
- Significant reduction in pain intensity and degree of disability related to expert advice about therapeutic exercise
Final conclusions

- SID is common problem in pregnancy
- SID is serious problem in pregnancy
- One of the most important reasons for sick-leave in pregnancy
- Significantly influence mobility and quality of life of pregnant woman
- Influence parturition
Final conclusions

- Physiotherapy and exercise - the first-line treatment of SID in pregnancy
- Focus on core stability of the trunk and pelvic girdle
- Sacro-iliac belt is prescribed to complement the core stability exercises and to give quick pain relief
- It is vital to engage a physiotherapist who is skilled in treating pregnancy-related pain
- Alternative treatments - anesthetic and steroidal injections into the SIJ (help in pain relief, which lasts from one day or much more long-term). Oral anti-inflammatory medications are often effective in pain relief as well. However, these two treatments may be contraindicated during pregnancy.