

# Primary care

## Effects of acupuncture and stabilising exercises as adjunct to standard treatment in pregnant women with pelvic girdle pain: randomised single blind controlled trial

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### Abstract

**Objectives** To compare the efficacy of standard treatment, standard treatment plus acupuncture, and standard treatment plus stabilising exercises for pelvic girdle pain during pregnancy.

**Design** Randomised single blind controlled trial.

**Settings** East Hospital and 27 maternity care centres in Gothenburg, Sweden.

**Participants** 386 pregnant women with pelvic girdle pain.

**Interventions** Treatment for six weeks with standard treatment (n = 130), standard treatment plus acupuncture (n = 125), or standard treatment plus stabilising exercises (n = 131).

**Main outcome measures** Primary outcome measure was pain (visual analogue scale); secondary outcome measure was assessment of severity of pelvic girdle pain by an independent examiner before and after treatment.

**Results** After treatment the stabilising exercise group had less pain than the standard group in the morning (median difference = 9, 95% confidence interval 1.7 to 12.8; P = 0.0312) and in the evening (13, 2.7 to 17.5; P = 0.0245). The acupuncture group had less pain in the evening than the stabilising exercise group (-14, -18.1 to -3.3; P = 0.0130). The acupuncture group had less pain than the standard treatment group in the morning (12, 5.9 to 17.3; P < 0.001) and in the evening (27, 13.3 to 29.5; P < 0.001). Attenuation of pelvic girdle pain as assessed by the independent examiner was greatest in the acupuncture group.

**Conclusion** Acupuncture and stabilising exercises are efficient complements to standard treatment for the management of pelvic girdle pain during pregnancy. Acupuncture was superior to stabilising exercises in this study.

### Introduction

Pelvic girdle pain is common among pregnant women, causing severe pain in one third of affected women.<sup>1,2</sup> Pain is experienced between the posterior iliac crest and the gluteal fold, particularly in the vicinity of the sacroiliac joints. The pain may radiate in the posterior thigh and can occur in conjunction or separately in the symphysis. After pregnancy, problems remain serious

in about 7%, causing severe discomfort and reducing ability to work.<sup>2,3</sup>

Pelvic girdle pain must be reproducible by specific pain provocation tests. The posterior pelvic pain provocation test and Patrick's fabere test have the best sensitivity if pain is evident in the sacroiliac joints.<sup>4,5</sup> Modified Trendelenburg's test and palpation of the symphysis have better sensitivity if pain is evident in the symphysis pubis.<sup>5</sup> These tests have high intertester reliability.<sup>4,5</sup>

Standard treatment may consist of a pelvic belt, a home exercise programme, and patient education. A systematic review has shown that the efficacy of these interventions remains questionable.<sup>6</sup> Current treatment increasingly includes stabilising exercises and acupuncture.<sup>7-9</sup> However, insufficient evidence is available to give strong recommendations for or against any particular treatment.<sup>10</sup> We compared the efficacy of acupuncture or stabilising exercises as an adjunct to standard treatment with standard treatment alone for the treatment of pelvic girdle pain in pregnant women.

### Methods

This was a randomised single blind trial at East Hospital, Sahlgrenska Academy, and at 27 maternity care centres in the hospital's reference area in Gothenburg, Sweden, from 2000 to 2002.

### Participants

Doctors and midwives at the 27 maternity care centres preselected consecutive patients. Participants filled in a previously validated questionnaire<sup>1</sup> and a diary for baseline information for one week before the inclusion visit. An independent physiotherapist then assessed patients. This included a detailed standardised physical examination and collection of baseline data. The tests used were the posterior pelvic pain provocation test, Patrick's fabere test, a modified Trendelenburg's test, Lasegue test, and palpation of the symphysis pubis.<sup>4,5</sup>

The main inclusion criteria were healthy women at 12-31 completed gestational weeks, well integrated in the Swedish language, with singleton fetuses and

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defined pregnancy related pelvic girdle pain. We excluded patients with other pain conditions, systemic disorders, or contraindications to treatment. Patients were randomised after baseline assessment.

### Treatment protocols

The study comprised a one week baseline period, six weeks of treatment, and follow-up one week after the last treatment. Patients were asked to avoid other treatments during the intervention period. Three experienced physiotherapists gave standard treatment, two experienced medical acupuncturists did acupuncture, and two experienced physiotherapists gave the stabilising exercises.

*Standard treatment*—General information was given about the condition and anatomy of the back and pelvis. Adequate advice was given about activities of daily living. The physiotherapist made sure that the patient understood and respected the relation between impairment, load demand, and actual loading capacity as well as the importance of necessary rest. The purpose of this information was to reduce fear and enable patients to become active in their own treatment. Patients were given a pelvic belt and a home exercise programme designed to increase strength in the abdominal and gluteal muscles.

*Acupuncture*—Patients received the same treatment as the standard group but in addition had acupuncture. Local acupuncture points were selected individually after diagnostic palpation to identify sensitive spots. A total of 10 segmental points and seven extrasegmental points were used (see bmj.com). Treatment was given twice a week over six weeks.

*Stabilising exercises*—Patients received the same treatment as the standard group but in addition did stabilising exercises modified because of the pregnancy (see bmj.com).<sup>11 12</sup> The training programme started by emphasising activation and control of local deep lumbopelvic muscles. Training of more superficial muscles in dynamic exercises to improve mobility, strength, and endurance capacity was gradually included. Patients received treatments individually for a total of six hours during six weeks. They were told to integrate the exercises in daily activities and to exercise in short sessions several times a day.

### Outcome measures

*Primary outcome measure*—Patients scored their current intensity of pelvic pain related to motion on a 100 point visual analogue scale every morning and every evening in the diaries.

*Secondary outcome measures*—The independent examiner assessed recovery from symptoms. Patients were asked not to reveal any information about their treatment.

### Statistical analysis

The statistician was blinded to group and treatment. In the analysis of the pain diaries we defined the median visual analogue scale baseline levels in the mornings and in the evenings for each patient by calculating the median for the days before treatment (five to seven days). The same calculations of median pain were done for the first week after the end of treatment. We calculated the medians, quartiles, means, and standard deviations when possible, and compared differences between the groups (see bmj.com).

## Results

### Randomisation and progress through the trial

Of 558 women referred for the first assessment, 172 did not meet the inclusion criteria; 386 women were included in the trial. Baseline characteristics were similar in the three treatment groups (see bmj.com).

### Primary outcome measure

Table 1 shows changes in pain scores. The reduction in pain was most pronounced in the evening in the acupuncture group one week after the end of treatment, compared with the other treatment groups.

### Secondary outcome measures

Table 2 shows that attenuation of pelvic girdle pain assessed by the independent examiner was greatest in the acupuncture group. Three of four subgroups of pelvic girdle pain improved after acupuncture compared with standard treatment and one of four subgroups improved compared with the stabilising exercise group.

**Table 1** Primary outcome measure: pain on visual analogue scale related to motion one week after treatment compared with baseline measurements

Pain	Standard group		Acupuncture group		Stabilising exercise group		Group comparisons		
	No	Median (25th-75th centile)	No	Median (25th-75th centile)	No	Median (25th-75th centile)	Comparison	Differences of medians (95% CI)	P values*
<b>Morning:</b>									
Baseline	131	23 (13-41)	125	23 (15-44)	130	22 (13-43)			
One week after treatment	108	27 (12-58)	107	15 (7-29)	106	18 (9-37)	S-ACU:	12 (5.9 to 17.3)	<0.001
							S-SE:	9 (1.7 to 12.8)	0.0312
							ACU-SE:	-3 (-7.8 to 0.3)	NS
<b>Evening:</b>									
Baseline	131	63 (49-75)	125	65 (47-76)	130	60 (4-73)			
One week after treatment	108	58 (40-74)	107	31 (12-58)	106	45 (21-68)	S-ACU:	27 (13.3 to 29.5)	<0.001
							S-SE:	13 (2.7 to 17.5)	0.0245
							ACU-SE:	-14 (-18.1 to -3.3)	0.0130

ACU=acupuncture; S=standard; SE=stabilising exercise. NS=not significant. Mann-Whitney U test. All original two tailed P values were multiplied by three (Bonferroni's correction).

**Table 2** Secondary outcome measure: assessment of severity of pelvic girdle pain by an independent examiner before intervention and at follow-up after last treatment. Values are numbers (percentages) unless stated otherwise

	Standard group		Acupuncture group		Stabilising exercise group		Group comparisons after treatment	
	Inclusion (n=130)	Follow-up (n=108)	Inclusion (n=125)	Follow-up (n=110)	Inclusion (n=131)	Follow-up (n=112)	Comparison	P value*
<b>Tests for assessment of pelvic girdle pain</b>								
Positive pain drawing	130 (100)	100 (93)	125 (100)	94 (85)	131 (100)	97 (87)		NS
Posterior pelvic pain provocation test	130 (100)	92 (85)	125 (100)	72 (65)	131 (100)	95 (85)	ACU-S	0.0021
							ACU-SE	0.0024
Pain when turning in bed	130 (100)	95 (88)	125 (100)	73 (66)	131 (100)	80 (71)	ACU-S	<0.001
							SE-S	0.0072
Palpation of pubic symphysis	47 (36)	50 (46)	51 (41)	32 (29)	62 (47)	39 (35)	ACU-S	0.0261
Patrick's fabere test	65 (50)	57 (53)	69 (55)	36 (33)	74 (56)	47 (42)	ACU-S	0.0084
Trendelenburg's test	51 (39)	43 (40)	52 (42)	30 (27)	45 (34)	30 (27)		NS
<b>Subgroups of pelvic girdle pain</b>								
Pelvic girdle syndrome	34 (26)	33 (31)	43 (34)	20 (18)	49 (37)	25 (22)		NS
Double sided sacroiliac pain	47 (36)	50 (46)	51 (41)	32 (29)	62 (47)	39 (35)	ACU-S	0.0261
One sided sacroiliac pain + symphysis pubis pain	49 (38)	45 (42)	51 (41)	23 (21)	63 (48)	36 (32)	ACU-S	0.0027
One sided sacroiliac pain	130 (100)	92 (85)	125 (100)	72 (65)	131 (100)	95 (85)	ACU-S	0.0021
							ACU-SE	0.0024

ACU=acupuncture; S=standard; SE=stabilising exercise; NS=not significant.

\*P values from  $\chi^2$  test. All original P values were multiplied by three (Bonferroni's correction).

## Discussion

Acupuncture or stabilising exercises as an adjunct to standard treatment offer clear clinical advantages over standard treatment alone for reduction of pain in pregnant women with pelvic girdle pain. This is supported by the patients' own estimates and by independent examiners. The findings are of particular importance because no previous study has shown such marked treatment effects among pregnant women with well defined pelvic girdle pain. Earlier findings show beneficial effects of stabilising exercises for women.<sup>7</sup> The training was aimed at affecting dysfunction of the muscle-tendon-fascia system that controls force closure of the pelvis.<sup>13</sup> Exactly how the exercises influence this system is unknown, but research has shown that contraction of the transversus abdominis decreases the laxity of the sacroiliac joint.<sup>11</sup> The exercises were intended to affect mainly the local stability system, but whether adding global stabilising muscle exercises could have provided the same effect is not known.

The stabilisation group also got additional treatment of stretching exercises of specific muscles plus massage. All treatment was more or less multifactorial, and massage as well as stretching may have had some contributory effect. The main training, however, was the stabilisation exercises that were done on several occasions during the day, in contrast to the stretching or massage that was done only at the visits.

Previous studies of acupuncture for low back pain in pregnancy reported pain relief.<sup>8,9</sup> However, these studies had methodological shortcomings, and the type of back pain was not clearly defined. Our findings are supported by physiological models explaining the mechanisms in the treatment of both acute and chronic pain conditions.<sup>14</sup>

Pain may be inhibited at the segmental level, and for this reason the acupuncture points were selected in muscle segments according to the patient's pain drawing, including diagnostic palpation to identify sensitive

spots. The aim was to establish control of pelvic pain to prevent dysfunction of muscles of the spine and pelvis. Speculatively, control of pelvic pain was achieved through activation of both the segmental pain inhibitory system, involving the so called gate control mechanism, and the central pain inhibitory system, involving secretion of endogenous opioids. Extra-segmental points to the lumbosacral area were used to strengthen and lengthen the effect of the central control systems. In addition, well known general pain relieving points were selected. Whether the choice of acupuncture points and the method of stimulation in this study are optimal remains to be elucidated.

Earlier research found that poor muscle function in the back and pelvis at the beginning of pregnancy is related to severe pain and disability throughout pregnancy.<sup>15</sup> The acupuncture treatment succeeded in establishing control of the pain, and this may have been important in preventing dysfunction of muscles.

### What is already known on this topic

No cure exists for pelvic girdle pain during pregnancy

No studies have been published on the effects of acupuncture on well defined isolated pelvic girdle pain during pregnancy

### What this study adds

This study shows large treatment effects on pain among pregnant women with well defined isolated pelvic girdle pain

Acupuncture was the treatment of choice for patients with one sided sacroiliac pain, one sided sacroiliac pain combined with symphysis pubis pain, and double sided sacroiliac pain

Our results are supported by earlier research on acupuncture for low back pain.<sup>16 17</sup>

A combination of several methods for treating pelvic girdle pain in pregnancy is probably better than individual treatments. Each method needs to be evaluated individually, however, before combinations can be recommended for future research and treatment.

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## A memorable patient

### Doing the kind thing

#### Physician's tale

Some years ago I was asked to visit a 62 year old man on hunger strike in a prison hospital. He was awaiting trial for murder. There was no physical reason for his not eating, and neither the prison doctor nor a psychiatrist could find any evidence of mental illness. The prisoner simply felt that only by ending his own life could he approach atonement for his sin. My opinion was that we should try to encourage him to change his aim but that he should be allowed to starve himself to death if he insisted. He seemed to me to be a man of honour who knew he had made a terrible mistake.

Over the next few days he was seen by several psychiatrists from around the country, and they all found him sane. He saw his solicitor and made an advance directive that he was not to have any investigations or medicines and that his family was not to be contacted at all. He had discussed with prison staff his care when death approached. He felt that it would be difficult for them to manage the situation and asked if he could come to hospital to be cared for towards the end.

I saw him three times and thought through the problems there would be for the nurses. I was blessed with ward staff who had coped successfully with other difficult situations. I agreed to admit him to a side room on a general medical ward accompanied by a prison officer.

He died 45 days later. In the interim he drank black coffee and other no-calorie drinks and, later on, agreed to be given pain relieving drugs. He was popular on the ward—for example, sending out for a birthday card for a nurse. He never wavered in his determination to kill himself. He finally died peacefully knowing he was respected by us all. I admired him for his courage and determination to see his aim achieved.

Was it right to admit him to occupy an expensive bed for so long? Should he have been able and entitled to have his own way? Was it cruel to the nurses to have to care for someone who "broke the rules" by wanting to die "unnecessarily"?

I never doubted that we did the right thing and was grateful for the wonderful principles and facilities of the NHS that allowed the kind thing to be done to a man otherwise suffering alone. A career in general medicine has produced many remarkable challenges but none more memorable than caring for this man. William Osler said, "Do the kind thing and do it now"—you can't do better than follow this advice.

#### Nursing sister's tale

I agreed to take the prisoner into our side room, with little idea of what it would entail. Having established that he was mentally capable of refusing treatment, I thought the situation straightforward—to provide nursing care until he died. However, he challenged many of our ideas and responses, both as nurses and as human beings. Initially, some of us felt that he was "taking the easy way out"—avoiding a long prison sentence for a crime that he admitted to. Then, as we came to know him, it became clear that he was no criminal but a man of principles and dignity.

Possibly the hardest thing was to see him in pain when we moved him. The nurse in each of us wanted to give him analgesia and see him comfortable. He did, later, agree to have oral morphine, but I am not sure whether this was for his benefit or ours. Perhaps it does not matter.

Throughout this time and after he died, we had the support of the hospital psychologist. Maybe more importantly, we helped each other to cope, and many were the coffee breaks spent talking about the effect of caring for someone in such an unusual situation.

After he died, we received several letters of thanks for our care from the prison staff. This reinforced my belief that we were right to share the privilege of helping this man, who had earned our respect and admiration.

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