Design	• RCT • Single blind • Stratified design based on pain location	**The Efficacy of a Treatment Program Focusing on Specific Stabilizing Exercises for Pelvic Girdle Pain After Pregnancy**
Evidence Level/Risk of Bias**[1]	• Evidence Level: 1B • Risk of Bias: 7/10	
N	• 81 at the beginning of the study • 78 at follow up	
Population	• Women with pelvic girdle pain during pregnancy or within 3 weeks of delivery who had given birth 6-16 weeks prior to the start of the study • Participants had to have a (+) Pelvic Pain Provocation and ASLR test unilaterally or bilaterally as well as pain at the pubic symphysis or at the long dorsal ligament	
Intervention	• 20-week intervention period • Average number of PT sessions over the study period: 11 for each group **Experimental group:** • Individual program with ergonomic advice, massage, manipulation, relaxation training and stretching • Exercises were progressed accordingly after 4 weeks • Participants were instructed to exercise for 30-60 minutes, 3 days/week for 20 weeks • Participants saw PT weekly for progression and modification of exercises • Participants recorded exercise in a diary **Control group:** • Individual program with ergonomic advice, massage, manipulation, relaxation training, stretching, and hot packs with NO stabilization exercises • Participants were evaluated biweekly by a physical therapist	
Outcomes	• Outcomes were assessed at baseline, 1 week after completing the intervention, and at 1-year post delivery • Demographic information was collected via questionnaire • Primary outcomes include pain (assessed via Visual Analogue Scale- VAS) and functional status (assessed via Oswestry Disability Index- ODI) • Health-related quality of life was assessed by the SF-36	
Results	• Groups were not significantly different at baseline • Compared to the control, those in the experimental group demonstrated significant improvements in ODI score, morning and evening pain measured by the VAS, and the physical functioning, physical role, and bodily pain domains of the SF-36 at one week and one year post intervention ($p < 0.001$) • Participants in the experimental group were significantly more likely to score less than 25 on the ODI, indicating minimal disability ($p < 0.001$) • Both groups reported 80% compliance with study protocol. Both groups also saw a PT an average of 11 times throughout the duration of the study	Stuge B, Lærum E, Kirkesola G, Vøllestad N. The Efficacy of a Treatment Program Focusing on Specific Stabilizing Exercises for Pelvic Girdle Pain After Pregnancy. *Spine*. 2004;29(4):351-359.

[1] Evidence Level evaluated using Portney and Watkins, 2009; Risk of Bias evaluated using the PEDro Scale

Design	• Follow up to a previous RCT • Single blind • Stratified design based on pain location	**The Efficacy of a Treatment Program Focusing on Specific Stabilizing Exercises for Pelvic Girdle Pain After Pregnancy A Two-Year Follow-up of a Randomized Clinical Trial**
Evidence Level/Risk of Bias**[2]	• Evidence Level: 1B • Risk of Bias: 7/10	
N	• 65 at the beginning of the study	
Population	• Women who participated in the previous study	
Intervention	• 20-week intervention period **<u>Experimental group:</u>** • Individual program with ergonomic advice, massage, manipulation, relaxation training and stretching • Exercises were progressed accordingly after 4 weeks • Participants were instructed to exercise for 30-60 minutes, 3 days/week for the intervention period • Participants saw PT weekly for progression and modification of exercises **<u>Control group:</u>** • Individual program with ergonomic advice, massage, manipulation, relaxation training, stretching, and hot packs with NO stabilization exercises. • Participants were evaluated biweekly by a physical therapist	
Outcomes	• Primary outcomes assessed after 2 years included pain (assessed via Visual Analogue Scale-VAS) and functional status (assessed via Oswestry Disability Index- ODI) • Health-related quality of life was assessed by the SF-36 • All outcomes were assessed via an independent investigator blinded to group allocation	
Results	• Groups were not significantly different at baseline • The significant improvements in functional status and morning and evening pain were maintained 2 years postpartum for the experimental group ($p < 0.005$) • In the experimental group, no significant changes in functional status were seen between years 1 and 2; the control group did experience significant changes in function ($p < 0.001$) but not in pain ($p > 0.12$) • 85% of women in the experimental group reported minimal disability on the ODI at 2 years compared to 47% in the control; 68% and 77% of the experimental group reported no or minimal evening or morning pain respectively • 23% and 45% in the control group reported no morning or evening pain • The physical functioning ($p < 0.002$), role physical ($p < 0.05$), and bodily pain ($p < 0.001$) domains of the SF-36 remained significantly improved in the experimental group as compared to the control • Those in the control group demonstrated significant improvements in the physicals function, role-physical, bodily pain, and vitality • Subscales of the SF-36 but continued to demonstrate significantly lower scores when compared to the experimental group	Stuge B, Lærum E, Kirkesola G, Vøllestad N. The Efficacy of a Treatment Program Focusing on Specific Stabilizing Exercises for Pelvic Girdle Pain After Pregnancy A Two-Year Follow-up of a Randomized Clinical Trial. Spine. 2004;29 (10): E197–E203

[2] Evidence Level evaluated using Portney and Watkins, 2009; Risk of Bias evaluated using the PEDro Scale

Design	• RCT • Assessor blind • Stratified based on number of previous births	**Effect of Three Different Physical Therapy Treatments on Pain and Activity in Pregnant Women With Pelvic Girdle Pain: A Randomized Clinical Trial With 3, 6, and 12 Months Follow-up Postpartum**
Evidence Level/Risk of Bias**[3]	• Evidence Level: 1B • Risk of Bias: 6/10	
N	• 118 at the beginning of the study • 89 at follow up	
Population	• Pregnant women prior to 35 weeks gestation who tested positive for pain at the pubic symphysis and on at least 3 of the following tests: palpation over the sacroiliac joints, iliac gapping or compression Patrick test, posterior pelvic pain provocation test, symphysis pubis pressure test, sacral apex test, and active straight leg raise • Participants were excluded if they had evidence of low back pain • On average, women were 21-25 weeks pregnant at the onset of the intervention period	
Intervention	• The intervention ran until the participant reached gestational week 38; duration varied based on gestational stage at inclusion **<u>Information group</u>:** • Received advice on ergonomics and a non-rigid sacroiliac belt **<u>Home Exercise:</u>** • Received the same as the first group plus 3 home exercises to help stabilize the pelvic girdle +stretching • Exercises involved holding a ball between the knees in sitting, standing, and quadruped while performing various movements of the arms and legs • Received one follow up visit with PT **<u>Outpatient PT:</u>** • Received the same education and sacroiliac belt as the other groups but participated in an individual training program using equipment in a PT gym (lateral pulls, curl ups, rowing, leg press) • Participants warmed up on a stationary bike and ended the session with stretching • Exercises were performed weekly until the 39th week of pregnancy • PT supervised first exercise session only	Nilsson-Wikmar L, Holm K, Öijerstedt R, Harms-Ringdahl K. Effect of Three Different Physical Therapy Treatments on Pain and Activity in Pregnant Women With Pelvic Girdle Pain: A Randomized Clinical Trial With 3, 6, and 12 Months Follow-up Postpartum. *Spine*. 2005;30(8):850-856.
Outcomes	• Groups were not significantly different at baseline • Pain intensity was measured using a Visual Analogue Scale and a body drawing to indicate location and type of pain • The Disability Rating Index (DRI) was used to measure activity • Outcomes were assessed at baseline, at 38 weeks gestation, and at 3, 6, and 12 months postpartum	
Results	• Groups were not significantly different at baseline • There were no significant differences between groups for any outcome measures at gestational week ~38 or at 3, 6, or 12 months postpartum • At 3, 6, and 12 months postpartum, all groups demonstrated significant reductions in pain intensity ($p = 0.00$) and location ($p = 0.00$-0.01), improvement in activity measured by the DRI ($p = 0.00$) • No patient reported being pain free at 38 weeks gestation	

[3] Evidence Level evaluated using Portney and Watkins, 2009; Risk of Bias evaluated using the PEDro Scale

Design	• RCT • Assessor blind • Stratified based on number of previous births	**Does regular exercise during pregnancy influence lumbopelvic pain? A randomized controlled trial**
Evidence Level/Risk of Bias**[4]	• Evidence Level: 1B • Risk of Bias: 7/10	
N	• 855 at the beginning of the study • 761 at follow up	
Population	• Women in weeks 18-22 of their pregnancy who were not carrying multiples • Anyone with a high risk pregnancy was excluded	
Intervention	• 12-week intervention period. **<u>Experimental group</u>:** • Standardized exercise program; aerobic, strength, and balance exercises were included • Participants engaged in a group exercise class (8-15 participants each) once a week between weeks 20 and 32 of pregnancy • Sessions were supervised by a trained PT and lasted 60 minutes • Participants also provided with advice on ergonomics and everyday activity performance • Participants were provided with home exercise program to perform 2x/week for 45 minutes (30 minutes of aerobic activity and 15 minutes of strengthening and balance activities) **<u>Control group:</u>** • Standard antenatal care provided by their practitioner with customized patient education on pelvic floor exercises • Participants were not discouraged from exercising	
Outcomes	• Data was collected at entry to the study (from 18-22 weeks of gestation) and again at 32-36 weeks of gestation • Primary outcomes were lumbopelvic pain and related sick leave (reported using a simple questionnaire) • Secondary outcomes included fear avoidance (measured via Modified Fear Avoidance Behavior Questionnaire- m-FABQ), disability (measured via Disability Rating Index- DRI), and pain intensity (measured via Visual Analogue Scale-VAS) • Adherence to protocol was defined as performing the home exercises 2x/week and participating in the group exercise class	Stafne SN, Salvesen KÅ, Romundstad PR, Stuge B, Mørkved S. Does regular exercise during pregnancy influence lumbopelvic pain? A randomized controlled trial. *Acta Obstetricia et Gynecologica Scandinavica*. 2012;91(5):552-559.
Results	• Groups were not significantly different at baseline • Participants in the experimental group were significantly more likely to exercise at moderate-high intensity 2 days/week when compared to the control ($p < 0.001$) • Those in the experimental group were significantly more likely to adhere to study protocol than those in the control group ($p < 0.001$) • There were no significant differences between groups for any of the outcomes after the 12-week intervention with the exception of sick leave reduction, which favored the experimental group ($p = 0.01$)	

[4] Evidence Level evaluated using Portney and Watkins, 2009; Risk of Bias evaluated using the PEDro Scale

Design	• RCT	**A randomized controlled trial comparing a multimodal intervention and standard obstetrics care for low back and pelvic pain in pregnancy**
Evidence Level/Risk of Bias**[5]	• Evidence Level: 1B • Risk of Bias: 4/10	
N	• 169 at the beginning of the study • 137 at follow up	
Population	• Pregnant women at 24-28 weeks of gestation • Diagnosed with low back or pelvic pain • Not carrying multiples	
Intervention	• 4-6 week intervention period **<u>Experimental group:</u>** • Received standard obstetric care plus multimodal musculoskeletal and obstetric treatment (MOM) • Participants visited chiropractor weekly until 33 weeks gestation for manual therapy including education, manual therapy (joint mobilization, myofascial and positional release), and stabilization exercises for the muscles of the core • Participants were provided with a home exercise program to perform 2x/day • Sacroiliac belts were provided in cases of severe pain or instability **<u>Control group:</u>** • Received standard obstetric care only. OB/GYN was to recommend at least one of the following as needed: rest, aerobic exercise, heating pad application, use of acetaminophen for mild pain, or narcotics for discomfort unrelieved by other measures	
Outcomes	• Primary outcomes include disability (assessed via Quebec Disability Questionnaire- QDQ), pain (assessed via numeric rating scale- NRS), and physical function (assessed via NRS) • Participants also underwent a physical examination for pain including the passive and active straight leg raise, Posterior Pelvic Pain Provocation test, and long dorsal ligament test • Participants were evaluated at baseline and again at 33 weeks gestation • At 33 weeks, participants also completed the Patient's Global Impression of Change survey to assess how they perceived their progress	George JW, Skaggs CD, Thompson PA, Nelson DM, Gavard JA, Gross GA. A randomized controlled trial comparing a multimodal intervention and standard obstetrics care for low back and pelvic pain in pregnancy. *American Journal of Obstetrics and Gynecology*. 2013;208(4).
Results	• Groups were not significantly different at baseline • From baseline to 33 weeks gestation, those in the experimental group saw significant reductions in pain on 7 pain measures (NRS, QDQ, passive and active SLR, long dorsal ligament test, and leg pain) • The control group only saw significant reductions in pain on one pain measure (leg pain) • Participants in the control group reported significantly increased pain on 5 pain measures (QDQ, bilateral active and passive SLR, and groin pain)	

[5] Evidence Level evaluated using Portney and Watkins, 2009; Risk of Bias evaluated using the PEDro Scale

Design	• RCT • Single blind	**Specific muscle stabilizing as home exercises for persistent pelvic girdle pain after pregnancy: A randomized, controlled clinical trial**
Evidence Level/Risk of Bias*[6]	• Evidence Level: IB • Risk of Bias: 6/10	
N	• 88 at the beginning of the study • 65 at 3-month follow up • 60 at six-month follow up	
Population	• Women with lumbopelvic pain who had given birth within the previous 3 months • Participants were randomly assigned to one of two groups after a baseline examination • All possible participants were evaluated by one of two trained PTs and the diagnosis confirmed using provocation testing • Participants were included if they had 2 or more positive tests. Women with lumbar pain in addition to pelvic pain were also included	
Intervention	**Experimental group:** • Participants were provided with an individualized home exercise program instructed to perform 10 repetitions of specific core stabilizing exercises at least 2x/day (including exercises for the pelvic floor). All exercises were centered on activities of daily living • Exercises were progressed through 3 stages: segmental control, closed chain, and open chain • Exercise difficulty was progressed according to each individual participant's needs • Participants met with PT every other week to modify and progress exercises • Participants instructed to keep activity diary **Control group:** • Single telephone conversation with PT to provide information about pelvic pain	
Outcomes	• Baseline demographic data was collected via questionnaire • The primary outcome was disability as measured by the Oswestry Disability Index (ODI) • Secondary outcomes included pain (measured via Visual Analogue Scale-VAS), health-related quality of life (measured via the EQ-5D), muscle function, satisfaction with symptom relief (measured via questionnaire), and wellbeing (measured via Visual Analogue Scale-VAS) • Pelvic floor muscle function was assessed using EMG • Hip extensor strength was assessed with handheld dynamometry • Isometric endurance of the abdominals and back extensors were tested using standard testing procedures	
Results	• Groups were not significantly different at baseline • There were no significant differences in disability score between groups at the 3 or 6 moth follow-ups ($p = 0.205$; $p = 0.358$). However, the experimental group showed significant improvement at both follow ups ($p < 0.05$) and the control group showed significant improvement at 6 moths ($p < 0.05$) • Those in the treatment group demonstrated significant improvements in pain frequency compared to the control at the 3-month follow up ($p = 0.011$) • There were no significant differences between groups for pain intensity, health related quality of life, wellbeing, or symptom satisfaction at either follow-up. However, both groups saw significant improvements in pain intensity at each follow up ($p < 0.001$). • The experimental group showed significant improvements in symptom satisfaction at each follow up and the control group demonstrated significant increases in satisfaction at 6 months. • The experimental group demonstrated significantly improved hip extensor strength at both follow ups. There were no	Gutke A, Sjödahl J, öberg B. Specific muscle stabilizing as home exercises for persistent pelvic girdle pain after pregnancy: A randomized, controlled clinical trial. *Journal of Rehabilitation Medicine*. 2010;42(10):929-935.

[6] Evidence Level evaluated using Portney and Watkins, 2009; Risk of Bias evaluated using the PEDro Scale

Design	• RCT • Single blind	**Can Supervised Group Exercises Including Ergonomic Advice Reduce the Prevalence and Severity of Low Back Pain and Pelvic Girdle Pain in Pregnancy? A Randomized Controlled Trial**
Evidence Level/Risk of Bias*[7]	• Evidence Level: 1B • Risk of Bias: 7/10	
N	• 257 at the beginning of the study • 210 at follow up	
Population	• Women with lumbopelvic pain who had given birth within the previous 3 months • Participants were randomly assigned to one of two groups after a baseline examination • All possible participants were evaluated by one of two trained PTs and the diagnosis confirmed using provocation testing • Participants were included if they had 2 or more positive tests. Women with lumbar pain in addition to pelvic pain were also included	
Intervention	**Experimental group:** • Received standard obstetric care, advice on ergonomics and posture for daily activities, and exercise • Participants were involved in weekly group exercise (8 women/group) plus a home exercise program focused on motor control and stabilization of the lumbopelvic hip complex • Exercises were individualized to meet individual needs and capabilities • Group exercise ran until the participant reached 36 weeks gestation (16-20 weeks) • Classes focused on aerobic activity and stabilization exercises and were supervised by a physical therapist • Each home program had approximately 3 exercises meant to build on exercises performed in the group classes **Control group:** • Received standard obstetric care only, but was not discouraged from exercising	
Outcomes	• Outcomes were assessed at baseline and again at 24, 28, 32, and 36 weeks • The primary outcome was the presence of lumbar or pelvic pain (assessed via questionnaire) • Secondary outcomes included pain (measured via a numeric rating scale-NRS) and disability (measured via Roland-Morris Disability Questionnaire- RMDQ) • The physical and mental components of the SF-8 were also used as outcome measures	Eggen MH, Stuge B, Mowinckel P, Jensen KS, Hagen KB. Can Supervised Group Exercises Including Ergonomic Advice Reduce the Prevalence and Severity of Low Back Pain and Pelvic Girdle Pain in Pregnancy? A Randomized Controlled Trial. *Physical Therapy*. 2012;92(6):781-790.
Results	• Groups were not significantly different at baseline • There were no significant differences between groups for any outcome measure at any time point	

[7] Evidence Level evaluated using Portney and Watkins, 2009; Risk of Bias evaluated using the PEDro Scale

Design	• RCT • Single blind	**Evaluation of the efficacy of an exercise program for pregnant women with low back and pelvic pain: a prospective randomized controlled trial**
Evidence Level/Risk of Bias**[8]	• Evidence Level: 1B • Risk of Bias: 7/10	
N	• 96 at the beginning of the study • 96 at follow up	
Population	• Women between weeks 20 and 35 of gestation • Did not have pelvic or back pain prior to pregnancy • Did not exercise regularly	
Intervention	• 4-week intervention period. **<u>Experimental group:</u>** • Received education on ergonomics, body mechanics, and exercise from a qualified nurse practitioner. • Participants were instructed to perform exercises for a minimum of 30 minutes/day, 3 days/week. • Participants could choose between a walking program or stretching and strengthening exercises depending on the weather. • Programs were individualized according to the patients needs and exercises were recorded in diaries. • Participants spoke to the nurse 3x/week via phone **<u>Control group:</u>** • Received routine care but were not discouraged from exercising. • Participants spoke to the nurse 1x/week via phone	
Outcomes	• Outcomes were assessed at baseline and after the 4-week intervention • The primary outcomes were pain and functional status • Pain intensity at rest and during activity was measured via Visual Analogue Scale (VAS) • Functional status was measured using the Oswestry Disability Index (ODI) • Exercise levels were measured using the participant's self-report exercise diary	Ozdemir S, Bebis H, Ortabag T, Acikel C. Evaluation of the efficacy of an exercise program for pregnant women with low back and pelvic pain: a prospective randomized controlled trial. *Journal of Advanced Nursing*. 2015;71(8):1926-1939.
Results	• Groups were not significantly different at baseline for any demographic characteristics or outcome measures • The experimental group demonstrated significant improvements in pain at rest and during activity ($p = 0.001$) • The control group demonstrated a nonsignificant increase in pain during the study period • There was a statistically significant difference in VAS scores between groups in favor of the experimental group ($p = 0.001$) • There was also a statistically significant difference in ODI scores in favor of the experimental group ($p = 0.001$) • The type of exercise used did not have a significant impact on pain or functional status at the conclusion of the intervention ($p > 0.05$)	

[8] Evidence Level evaluated using Portney and Watkins, 2009; Risk of Bias evaluated using the PEDro Scale

Design	• RCT • Single blind	**Management of Symphysis Pubis Dysfunction During Pregnancy Using Exercise and Pelvic Support Belts**
Evidence Level/Risk of Bias*[9]	• Evidence Level: 1B • Risk of Bias: 6/10	
N	• 90 at the beginning of the study • 87 at follow up	
Population	• Pregnant women with a diagnosis of pubic symphysis pain • Pain may or may not radiate to the groin • Participants had to have a positive Active Straight Leg Raise test on either the left of the right side	
Intervention	• 1 week intervention period **Exercise only:** • Received information about pelvic pain and education on ergonomics during everyday activities • Participants were instructed to perform five exercises 3x/day • Exercises aimed to address core strength and stability • Participants were instructed to record exercise in a diary provided by the researchers **Exercise plus non-rigid support belt:** • Received the same education and exercises as the exercise group • Participants were provided with a non-rigid neoprene support belt • Participants were instructed to record exercise and the number of hours they wore the belt in a diary provided by researchers • Participants were not instructed as to when they should wear the support belt **Exercise plus rigid support belt:** • Received the same education and exercises as the exercise group • Participants were provided with a rigid support belt • Participants were instructed to record exercise and the number of hours they wore the belt in a diary provided by researchers • Participants were not instructed as to when they should wear the support belt	
Outcomes	• Outcomes were assessed by a physical therapists who were unaware of group assignment • Outcomes were assessed at baseline and again after the one week intervention period • Function was assessed using a modified version of the Roland-Morris Disability Questionnaire (RMDQ) and the Patient Specific Functional Scale (PSFS) • Pain was measured using the Numeric Rating Scale (NRS)	Depledge J, McNair PJ, Keal-Smith C, and Williams, M. Management of Symphysis Pubis Dysfunction During Pregnancy Using Exercise and Pelvic Support Belts. *Physical Therapy*. January 2005.
Results	• Groups were not significantly different at baseline • All three groups demonstrated significant improvements in function, but there were no significant differences between groups ($p > 0.05$). RMDQ scores decreased by an average of 22.7% in the exercise group, 17.9% in the exercise plus non-rigid support belt, and 17% in the exercise plus rigid support belt group. PSFS scores decreased by 38.6%, 25.4%, and 30.4% respectively • Those in the exercise only and exercise plus rigid support belt demonstrated significant reductions in pain scores as measured by the VAS (31.8% and 29.2%, respectively; $p < 0.05$) • There were no significant differences in pain scores between groups ($p > 0.05$)	

[9] Evidence Level evaluated using Portney and Watkins, 2009; Risk of Bias evaluated using the PEDro Scale