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### Therapeutic Exercise as a Treatment Strategy for Pregnancy Related Pelvic Girdle Pain

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Therapeutic Exercise as a Treatment Strategy for Pregnancy Related Pelvic Girdle  
Pain  
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## **Abstract**

**Introduction:** Affecting up to 65% of the population, pregnancy related pelvic girdle pain (PGP) is one of the most common musculoskeletal complaints among women. It is defined as “pain experienced between the posterior iliac crest and the gluteal fold”. Women with PGP have a significantly reduced quality of life, experience higher levels of depression and anxiety, and are 85% more likely to develop recurrent lumbopelvic pain. One in ten women still experience severe consequences due to PGP over a decade postpartum. The pathogenesis of PGP is unknown, though it is thought to be caused by a combination of biomechanical and hormonal factors. Therapeutic exercise (Ther Ex) has been proposed as a non-invasive strategy to combat these factors by increasing joint stability and improving load transfer throughout the pelvis.

**Purpose:** The purpose of this review was to determine whether Ther Ex is an effective treatment strategy to reduce PGP and the effects it has on individuals’ daily lives.

**Recommendations:** Research showed that supervised, individualized exercise programs lasting longer than six weeks had the greatest success rate in reducing PGP. Ther Ex programs combining global strengthening and local pelvic stabilization exercises exhibited positive results. Habitual prenatal exercise is recommended whenever possible to reduce the severity of PGP.

**Conclusion:** Ther Ex is recommended as a prevention and treatment strategy for individuals with PGP, especially due to the proposed benefits of exercise in reducing perceived pain and depression rates. Further research consisting of larger sample sizes is needed in regards to PGP prevention and treatment, particularly surrounding specific exercise parameters.

**Key Words:** Therapeutic Exercise, Pregnancy Related Pelvic Girdle Pain

## **Introduction**

Pelvic girdle pain (PGP) is one of the most common musculoskeletal complaints during pregnancy with 10-65% of women stating that they experience it.<sup>1-3</sup> Women who experience PGP have a significantly reduced quality of life and ability to perform activities of daily living, increased levels of anxiety and depression, and work significantly fewer hours per week.<sup>2,4,5</sup> Sleep disturbance due to PGP has been reported by 70% of women.<sup>4</sup> Additionally, women experiencing PGP have reported pain during, as well as avoidance of, sexual intercourse, which can negatively impact their personal relationships.<sup>2</sup> Experiencing PGP can reduce the likelihood of women exercising during pregnancy, which could lead to further complications due to inactivity.<sup>3</sup>

Therapeutic exercise (Ther Ex) has been proposed as a strategy to manage PGP by increasing joint stability and improving load transfer throughout the pelvis.<sup>6</sup> Using Ther Ex as a treatment for PGP is particularly beneficial for Athletic Therapists (ATs) because it is non-invasive and is within their scope of practice. The aim of this literature review was to determine whether Ther Ex is an effective treatment strategy to reduce pregnancy related PGP and the effects it has on individuals' daily lives.

## **Pregnancy Related Pelvic Girdle Pain**

### *Defining Pregnancy Related Pelvic Girdle Pain*

Vleeming and colleagues suggest that PGP can be described as “pain experienced between the posterior iliac crest and the gluteal fold” with a specific focus towards pain in the sacroiliac joint (SIJ) region.<sup>7</sup> The pain may radiate to the posterior thigh, groin, or perineum.<sup>8</sup> Symptoms typically appear during the second half of gestation and tend to intensify between the sixth and ninth month of pregnancy.<sup>8</sup> At the 30th week of gestation, 63% of women report experiencing PGP.<sup>8</sup> Most women recover within one to six months postpartum, however 16-31% continue to suffer from persistent pain.<sup>2,9</sup> One in ten women go on to have PGP with severe consequences for over a decade postpartum.<sup>3,4</sup> These consequences include

disturbed sleep, reduced quality of life, and increased rates of depression and anxiety.<sup>3,4</sup> Once an individual has experienced PGP, they are 85% more likely to develop some form of recurrent lumbopelvic pain in the future.<sup>6</sup>

### *Pathogenesis*

The exact pathogenesis of PGP remains unclear; however, the cause is thought to be due to a combination of hormonal and biomechanical factors.<sup>3,6,8,9</sup> Increased joint laxity and axial loading during pregnancy, displacement of the individual's centre of gravity, and vascular changes are some of the factors theorized to lead to PGP.<sup>6</sup> The release of the hormone relaxin during pregnancy results in increased laxity in the ligaments of the pelvic girdle.<sup>8,9</sup> Women with PGP have been found to have greater movement in their pelvic joints, which can lead to shearing.<sup>8</sup> This excessive stress being placed on the pelvic joints, as well as the surrounding tissues, is thought to result in PGP.<sup>8,9</sup>

### *Diagnosis*

A mixture of subjective and objective factors are used to diagnose PGP because a gold standard test has yet to be identified.<sup>8</sup> Visual analogue scales, such as the Numeric Pain Rating Scale, and self-reported questionnaires, like the Oswestry Disability Index, are used to clinically evaluate PGP severity.<sup>5,8,10</sup> Risk factors that predispose individuals to developing PGP are also used for screening. One of the main risk factors is a high BMI, both before and during pregnancy.<sup>3,8</sup> General hypermobility, daily smoking, a history of low back pain, and depression are also shown to increase the risk of experiencing pregnancy related PGP.<sup>3,4,8</sup> Multiparous women, as well as women with a history of pelvic trauma, have an increased risk of developing PGP.<sup>3,8</sup> The posterior pelvic pain provocation (P4) test, MAT-test, FABER test, modified Trendelenburg test, and bilateral pain provocation tests are all thought to be predictors of PGP.<sup>4</sup>

## **Exercise During Pregnancy**

### *Benefits*

Exercise during pregnancy has been shown to be valuable for most women and is accompanied with minimal risks for both the mother and baby.<sup>11,12</sup> Research has shown that physical activity has not been associated with miscarriage, still-birth, or any other birth complications.<sup>12</sup> Over the last three decades, there have been higher rates of pregnancy complications due to the rising rates of maternal obesity.<sup>12</sup> Physical activity is considered to be a useful treatment strategy to lower the incidence of excessive gestational weight gain.<sup>11,12</sup>

Furthermore, exercise has been shown to help prevent postpartum depression, reduce the risk of preterm birth, and decrease rates of gestational diabetes and hypertensive disorders.<sup>11,12</sup> Women who have higher overall physical fitness levels during pregnancy have reported experiencing reduced bodily pain and less disability due to pain.<sup>11</sup> Compared to other forms of intervention, exercise is easily accessible, does not require much equipment, and can be performed from the comfort of the individual's home.<sup>6</sup>

#### *Considerations for Prescription*

Before prescribing exercise to a pregnant patient, it is important that they receive a thorough medical evaluation to screen for any of the contraindications outlined in Mottola et al.'s 2019 Guidelines.<sup>12</sup> Women without contraindicated pregnancies are encouraged to participate in aerobic and resistance training before, during, and after pregnancy.<sup>11,12</sup> Programs that combine resistance and aerobic exercises seem to have better outcomes than aerobic programs alone.<sup>12</sup> Activities that have been proven safe to participate in during pregnancy include: walking, stationary cycling, aerobic and resistance exercises, dancing, stretching, and water aerobics.<sup>11</sup> Pelvic floor (PF) muscle training can also be a beneficial addition to the exercise program.<sup>12</sup> It is recommended that pregnant women exercise at a moderate intensity at least 150 minutes per week spread out over a minimum of three days, with a minimum of 20-30 minutes per day being encouraged.<sup>11,12</sup> The

Borg rating scale and “talk test” can be used to determine appropriate exercise intensity.<sup>11</sup>

Experts suggest that exercises requiring the supine position for an extended period of time should be minimal and be discontinued if the individual experiences light-headedness, nausea, or feels unwell while performing the exercise.<sup>12</sup> Activities that cause imbalance or could lead to abdominal impact or trauma should also be avoided.<sup>11</sup> Exercise should be terminated if the individual presents with vaginal bleeding, abdominal pain, regular painful contractions, amniotic fluid leakage, dyspnea that does not resolve with rest, dizziness, headache, chest pain, muscle weakness affecting balance, and calf pain or swelling.<sup>11,12</sup> Individuals who were sedentary before pregnancy should follow a more gradual exercise progression than those who participated in exercise regularly.<sup>11</sup>

### **Exercise to Reduce Pelvic Girdle Pain**

#### *Theory*

Non-invasive treatment is preferable during pregnancy, which is one of the main reasons why Ther Ex has been encouraged as a treatment strategy for pregnancy related PGP.<sup>8</sup> It is thought that Ther Ex can help combat the biomechanical changes that occur due to pregnancy by decreasing the load on the spine, increasing joint stabilization, and promoting better spinal alignment and segmental motion.<sup>6</sup> The SIJ resists shearing through form closure (the closely fitting surfaces of the joint) and force closure (the dynamic process where muscles, ligaments, and fascia provide additional compressive force to provide pelvic stability).<sup>5,9</sup> Relaxin released during pregnancy results in increased laxity in the ligaments assisting with force closure, which in conjunction with inadequate activation of the lumbopelvic muscles, results in impaired load transfer throughout the pelvis.<sup>5,8,9</sup> Ther Ex addresses muscle imbalances and ensures that the pelvis is getting the required dynamic support to reduce shearing and pain.<sup>5,6</sup>

Stabilizing exercises are thought to assist with PGP related disability by reducing avoidance behaviour due to pain-related fear.<sup>9</sup> Exercise has been shown to lead to an endorphin release, which can decrease an individual's sensitivity to pain and increase relaxation.<sup>3,13</sup> The pain desensitization that occurs during exercise could result in an increased pain threshold, therefore reducing the perceived PGP they are experiencing.<sup>6</sup>

### *Exercise Type*

Local stabilizing exercises have been widely recommended as a treatment for PGP even though their effectiveness is still unknown.<sup>8</sup> Contracting transverse abdominis (TrA) in conjunction with the lumbar multifidus (LM) and PF is thought to provide the best force closure of the SIJ.<sup>8,9,14</sup> ElDeeb et al. found that TrA and LM stabilization programs with and without PF training reduced PGP and functional disability.<sup>9</sup> However, interventions that included PF training had more of an effect.<sup>9</sup> In contrast, Mens et al. found that even though the TrA thickness in individuals with PGP increased by 31% during contraction, the pain experienced during an active straight leg raise was not reduced.<sup>14</sup> This could be due to a delayed contraction of TrA, recruitment of surrounding muscles in an effort to avoid anticipated pain resulting in inefficient stabilization of the pelvis, or contraction of TrA leading to an increase in intra-abdominal pressure.<sup>14</sup>

Interventions that trained both global and local systems produced the most effective results. Treatment programs focused on co-activation of TrA, LM, and the PF, while additionally training the gluteus maximus, latissimus dorsi, oblique abdominal muscles, erector spinae, quadratus lumborum, and hip abductors and adductors.<sup>5,10</sup> Programs completed both during pregnancy and postpartum included pelvic tilts, glute bridges, wall squats, bird dogs, wall push-ups, and stretching.<sup>5,10,15</sup> Exercises were mostly body weight with the addition of resistance bands, Swiss balls, and hand-held weights.<sup>15,16</sup> Stuge et al. included suspension training in their postpartum home program since instability was not a concern.<sup>5</sup>



Most exercises were performed for three sets of 10-15 repetitions.<sup>1,16</sup> Additionally, Sklempe Kotic and colleagues included 20 minutes of aerobic exercise, as well as daily 30 minute brisk walks, into their intervention and observed that the women in their exercise group were able to cope with their PGP better.<sup>16</sup>

#### *Type of Intervention*

Supervised exercises appeared to elicit better results than home-based and group exercise programs since personalized adjustments to the program could be made.<sup>5,8,15</sup> Supervised programs ensured that all exercises were performed properly due to thorough instruction, which meant that the patient achieved the proper muscle contraction and intended outcome.<sup>5,9,15</sup> Supervision allows for patient compliance to be monitored, while also allowing the therapist to immediately adapt the program to the needs of the patient.<sup>5,8</sup> Being able to adjust the program to ensure the patient was not experiencing pain while exercising increased program compliance, while also building trust between the therapist and patient.<sup>5,8</sup> Stuge et al.'s intervention with individualized instruction resulted in a 75% improvement on the disability questionnaire for the exercise group.<sup>5</sup> This improvement was maintained up to one year postpartum.

#### *Length and Timing of Intervention*

Due to PGP reducing the likelihood of women exercising during pregnancy, prenatal exercise is thought to be one of the best strategies for reducing PGP.<sup>3</sup> Davenport and colleagues concluded that even though prenatal exercise levels did not lower the odds of PGP during pregnancy, it was able to decrease the severity of PGP.<sup>6</sup> Owe et al.'s 2016 cohort study found that women who exercised three to five times per week prior to pregnancy were 14% less likely to experience PGP.<sup>3</sup> Additionally, 90% of those women indicated that they were still exercising in week 17 of pregnancy.<sup>3</sup> Finally, they suggested that performing prenatal high-impact exercises, such as running, jogging, and high-impact aerobics, decreased the occurrence of participants reporting PGP during pregnancy.<sup>3</sup>

Results were better when exercise was habitual because an increased adherence to the intervention ensured that the patient was getting the full effect of the exercise.<sup>1</sup> There was a great deal of variance in exercise frequency, but multiple programs were completed three times per week. Interventions lasting longer than six weeks tended to elicit positive results.<sup>1,8</sup> Shiri and colleagues' meta-analysis of randomized control trials (RCTs) concluded that exercise beginning during the second trimester or later had no effect on PGP during pregnancy, but it was suggested that exercise initiated prenatally or during the first trimester may have had an effect on PGP.<sup>1</sup> This highlights the importance of initiating Ther Ex as early as possible in treatment.

## **Recommendations**

### *Clinical Applications for Athletic Therapy*

Even though Ther Ex's effect on reducing the severity of PGP remains somewhat unclear, exercise during pregnancy is still recommended. It is able to lessen the biomechanical changes that occur due to pregnancy by helping to increase joint stability, improve spinal alignment, and segmental motion.<sup>6</sup> Given the complexity and unpredictable course of PGP, it is recommended that ATs focus their Ther Ex programs on reducing the impact of PGP on individuals' lives instead of PGP prevention.<sup>6</sup> To elicit the best results in reducing PGP, exercise programs should include global strengthening and local stabilization with the addition of PF training.<sup>5,9</sup> ATs should prepare interventions that are individualized, supervised, and a minimum of six weeks in duration to improve the program's ability to reduce the symptoms of PGP.<sup>5,8,10</sup>

Initiating exercise pre-pregnancy has one of the best success rates for reducing the severity of PGP during pregnancy. ATs need to be aware of the signs and symptoms of PGP so that it can be identified and managed as early as possible. It is important that ATs assess their patients' goals, particularly around family plan-

ning, and ensure that they are participating in an exercise program regularly before becoming pregnant. This habit has been shown to increase patients' adherence to the program once they are pregnant. When prescribing home-based exercises, it is recommended that the patient keep a training diary to increase compliance.<sup>5,8</sup>

#### *Depression, Exercise, and Pelvic Girdle Pain*

With emotional distress having an effect on the physical symptoms being experienced in conjunction with PGP, it is important to consider a bio-psychological model of pain management when developing treatment strategies.<sup>2</sup> Depression, which is experienced in 10-30% of pregnancies, could intensify PGP because it facilitates pain nociception.<sup>4,13,17</sup> Sleep disturbance can also play a role in chronic pain and depression. Sleep disturbance is reported in 70% of individuals experiencing PGP, which could be another factor that contributes to higher depression rates.<sup>4</sup> A patient's belief that they will be healthy and pain free has been shown to reduce the effect that pain has on their mood, and having an exercise program that they can turn to may help to improve their perception of the pain that they are feeling.<sup>2</sup> ATs should employ a multidisciplinary approach, including referring to mental health support if required, to ensure patients are getting well-rounded care that is specific to their needs.

#### *Future Research*

There are limited RCTs exploring the effect of Ther Ex on PGP. The current RCTs have small sample sizes, which results in a poor statistical power for findings. Further research is needed into the optimal timing to initiate the intervention as well as the specific exercise protocols. Many of the RCTs that have been completed lack information on the specific parameters implemented within the intervention, which makes it difficult to apply their findings in a clinical setting. Another consideration for future research is ensuring that the study is specific to PGP instead of combining it with low back pain and lumbopelvic pain. Future research

to determine a gold standard test for PGP is required as most RCTs relied on self-reported PGP to determine the effectiveness of their interventions.

### **Conclusions**

While some evidence supports Ther Ex reducing PGP and increasing quality of life in both pregnant and postpartum women, regular prenatal exercise has been identified as the best strategy for reducing PGP severity. Ther ex programs for PGP management should be supervised, individualized and include a combination of local stabilization and global strengthening exercises. Even though further research is required, Ther Ex has been demonstrated as a valuable treatment strategy when managing PGP, and ATs should continue to include it in their practice.

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