

Effect of Foot Manipulation on Pregnancy-Related Pelvic Girdle Pain: A Feasibility Study

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ABSTRACT

Objective: The objective of this study was to investigate if the research process to evaluate the effect of foot manipulation on pregnancy-related pelvic girdle pain (PPGP) is feasible.

Methods: A randomized, single-blind (patients and evaluators) pilot trial was performed to compare foot manipulation to a comparative group at 6-weekly treatment sessions at 5 physiotherapy outpatient clinics in Skaraborg primary care (Skövde, Sweden). Women at 12 to 31 weeks of pregnancy with well-defined PPGP (n = 97) and joint dysfunction or decreased range of movement in the feet were included. Women with a twin pregnancy, low back pain, rheumatoid arthritis, or other serious diseases and those who had previous foot manipulation were excluded. Visual analog scale scores were recorded before study start, before and after each treatment session, and 3 months after delivery.

Results: One-hundred and two women were eligible, and 97 were included (group 1: foot manipulation, n = 47; group 2: comparative treatment, n = 50); 40 and 36 in the foot manipulation and comparative treatment groups, respectively, completed the study. The foot manipulation group had a nonsignificant pain relief score compared with that of the comparative group, which had higher pain relief scores. The difference was most pronounced at the first and second treatment sessions. A power analysis showed that at least 250 individuals would be needed in each group to confirm the effect of foot manipulation.

Conclusions: This study showed that it is feasible to assess the effect of foot manipulation on PPGP in a multicenter physical therapy outpatient clinic setting. A new larger study should choose a different comparative method and test this hypothesis in a full-scale trial. (*J Chiropr Med* 2017;xx:1-9)

Key Indexing Terms: *Primary Health Care; Physiotherapy; Osteopathic Manipulation; Ankle Joint; Pregnancy Pelvic Girdle Pain; Randomized Clinical Feasibility Study*

INTRODUCTION

Pregnancy-related pelvic girdle pain (PPGP) is a common problem caused by changes in mechanical loading conditions during pregnancy.¹ The hormone relaxin increases the elasticity of the pelvic joints to facilitate the birth of the infant. It is thought that the increase in elasticity, which seems to be greater in women with PPGP,² may elicit pain as a result of mechanical stress from load on the tissues around the vertebrae of the lumbar spine and pelvic joints. The pain is localized around the posterior pelvic crest, pelvic joints, and buttocks and can radiate as far as the knee joints. Pregnancy-related pelvic girdle pain causes pain and mobility problems during pregnancy and can lead to sick leave.^{3,4}

Pregnant women with PPGP are at risk of becoming physically inactive, and this could cause other medical problems during pregnancy. In most women, PPGP spontaneously disappears soon after delivery, but some continue to have residual problems in the pelvis and lower back for a long time.⁵

It is important to distinguish between lumbar pain and PPGP because the conditions are treated differently. The prevalence rates of PPGP, lumbar pain, and the combination of PPGP and lumbar pain vary greatly among reports because currently no clear definitions of the different conditions exist.⁶ Lumbar pain in pregnant women has been shown to be similar to lumbar pain in nonpregnant women, suggesting that PPGP is a condition of other pathogenesis.⁷ In the European guideline on pelvic girdle pain (PGP), the conclusion was that PGP can occur separately or in conjunction with low back pain (LBP) and is a specific form of LBP.⁸ There are descriptions of tests for PGP, such as pain provocation tests of the sacroiliac joint and of the symphysis as well as a functional test of the pelvic girdle. A pain location diagram is recommended for the localization of pain areas and for a more distinct diagnosis.

To our knowledge, the role of foot position in PPGP has been reported before, but one author (C.M.) has considerable experience in treating pregnant women with satisfying results,

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although this has not been tested in a clinical trial. The association between foot position and back pain in nonpregnant individuals has been demonstrated previously,⁹ including an interaction between the feet and pelvic positions.^{10,11} For instance, one-leg standing in 28 healthy males in different calcaneal wedges of 0°, 5°, and 10° eversion produced a significant increase in hip flexion and medial rotation, as well as pelvic anterior tilt.¹² Pelvic joints are also linked in this interaction, and movements in the talocrural and subtalar joints and in the more distal transverse tarsal joints in the foot have an important impact on pelvic position.^{7,9-12} Asymmetric pronation in the subtalar joints, as well as asymmetric rotation of the feet and hips, results in an asymmetric pelvis and leads to asymmetric movements and locking of the sacroiliac joints. The transverse tarsal joints rotate in opposition to the subtalar joint,¹³ and mobility in these joints is crucial for foot stability in standing and weight bearing and for mobility during walking.¹⁴ Decreased mobility in all 3 joints leads to external hip and foot rotation to perform the swing phase of the gait circle. Furthermore, internal rotation of the feet causes anterior tilting of the pelvis, and external rotation causes posterior tilting of the pelvis.¹⁵ Rotation of the foot also results in a functionally shorter leg and pelvic tilts in the coronal plane.¹⁶ If asymmetric, these tilting movements could elicit pain in the pelvic joints and may contribute to PPGP. However, some studies have suggested that there are fewer cases of LBP related to the pes cavus¹⁷ and some others have suggested that flat feet are not the reason for LBP.^{18,19}

In a Cochrane review²⁰ of pelvic pain and back pain during pregnancy, it was found that acupuncture reduced pelvic pain better compared with exercise, and that compared with usual care, both acupuncture and training were better. However, 1 of the studies showed that compared with nonpenetrating acupuncture, acupuncture did not have a significant difference in effect on pain but improved the performance of daily activities.²¹ Pelvic belt, physiotherapy, osteopathic manipulative treatment and multimodal intervention also seemed to relieve pelvic pain or back pain better than usual care.²⁰ Some outcomes had low quality of evidence, and the effect on pain was variable. One conclusion of the Cochrane report was that further research on prevention or treatment of pelvic pain and back pain during pregnancy is likely to change the results.

Osteopathic manipulative treatment of back pain and related symptoms during the third trimester of pregnancy seems to lower or halt the deterioration of back-specific functioning.²² Chiropractic high-velocity, low-amplitude manipulation on female athletes with talocrural joint dysfunction has been shown to result in an increase in vertical jump height.²³

Pregnancy-related pelvic girdle pain is a common condition during pregnancy and causes suffering for the patient and her family and sometimes results in disability and absence from work. Only around 50% of women get treatment to relieve the pain.⁴ Treatments for pain relief have shown inconsistent results. There is a need for treatments that can be easily accessed and applied in the

care of pregnant women. Therefore, the purpose of this study was to investigate the feasibility of the research process to evaluate the effect of foot manipulation on PPGP in a multicenter physical therapy outpatient clinic setting.

METHODS

Study Population

The study included cases from September 2009 to August 2011, and comprised women with suspected PPGP who had been referred by midwives or physicians or who had contacted physiotherapists directly. Inclusion criteria were Swedish-speaking women in weeks 12 to 31 of pregnancy who had PPGP as determined by specific provocation tests, including the posterior pelvic pain provocation test, Patrick (FABERE [flexion, abduction, external rotation]) test, active straight leg raise test, modified Trendelenburg test, and palpation of the symphysis pubis.⁶ The precise area of pain was indicated on an anatomic pain drawing, and women with only LBP were excluded. Women with twin pregnancies, lumbar pain, rheumatic disease, or other serious diseases; non-Swedish-speaking women; and those who had been treated with foot manipulation earlier were also excluded. The feet were inspected with the patient in the standing position to estimate whether they were straight, whether they were rotated outward or inwards from the hip, and if the load was flat, pronated, or supinated. Movement in the subtalar joints, as well as the mobility of the tarsal bones and the lateral malleoli, was investigated manually. All movements between the right foot and the left foot were compared both visually and manually. However, a goniometer was not used. Those participants with identified joint dysfunction or decreased range of movement (ROM) in the feet were included in this study.

Study Procedure

Patients were randomized to either a foot manipulation group or a comparative treatment group, by using sealed envelopes (n = 150; 75 for each treatment). The opaque envelopes, concealing the allocation to foot manipulation or comparative treatment, were mixed centrally and distributed to the physiotherapy clinics in appropriate numbers, depending on the size of the clinic. Ten physiotherapists participated pair-wise in the treatments—1 of them drew the sealed envelope and treated the patient according to the allocation (physiotherapist not blinded, patient blinded), and the other physiotherapist was blinded to the allocation of the patient and made the evaluation (both physiotherapist and patient blinded). The patient's treatment allocation was concealed throughout the study, and the study documentation was kept in separate locked drawers by both physiotherapists. All patients received the same information about PPGP, 6 visits once a week for 6 weeks, and follow-up visits 1 week after end of treatment and 3 months after delivery. All patients

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