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CLINICAL EVIDENCE

Pregnancy, sacroiliac joint laxity, and the SOT category two pelvic distortion:

A case series

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Introduction: Sacroiliac (SI) joint laxity associated with pregnancy and delivery is purported to cause objective findings of an sacro occipital technique (SOT) category two pelvis. SOT describes a category of pelvic girdle pain and/or low back pain (PLPP) associated with increased posterior SI joint motion or ligamentous laxity called category two. This retrospective case series study involved 103 pregnant women age range from 21-32 years old were seen at this clinic from 1979-83.

Methods: Patients were evaluated via SOT diagnostic protocol, which included the SOT arm fossa test, increased unilateral or bilateral iliopsoas tension, palpation for pelvic torsion, leg length differentials, and Moiré contour photography.

Results: Using SOT's arm fossa test as a method to evaluate clinically active category two or sacroiliac joint laxity, a large percentage of the patients (95%) had Arm Fossa Test positive (AFT+) findings, with 5 of the 103 patients having an Arm Fossa Test negative (AFT-). AFT- findings were associated with reduction or elimination of pelvic or inguinal pain, improvement of muscle strength and ability to rise from seated position as well as lift or carry objects, and improved sleeping and restfulness.

Discussion: Further study would be of value to determine if the AFT can become part of a series of tests used to assess the need for care of PPLP as well as if there is successful patient response to treatment. While pain during pregnancy is of great concern it is also of interest to determine whether proper sacroiliac joint juxtaposition may be related to foetal head position and birth outcome.

Conclusion: The biological plausibility of the treatment and the low force nature of the pelvic block placement offer a low risk procedure for pregnant patients that warrant a call for greater study and research investigation.

Indexing Terms: Chiropractic, Sacro-Occipital Technique (SOT); Arm Fossa Test; LBP; Pregnancy

Introduction

Does sacroiliac (SI) joint laxity associated with pregnancy and delivery cause objective findings of a sacro occipital technique (SOT) category two pelvis? Pelvic insufficiency or SI ligament laxity, which can occur during pregnancy '*is defined as a condition with pain at the pubic symphysis and/or the sacroiliac joint developing in connection with pregnancy or delivery*'. (1)The frequency is 7.6-18.5 per 1000 deliveries. The incidence is increased in multiparae and women with occupations, which strain the back. Recurrence is 41-77%.

'... The Arm Fossa Test (AFT) as used in SOT is a useful clinical indicator of pelvic issues, especially during pregnancy. Here we present the results of using the test in 103 patients ...'

The condition appears for the first time usually in the 5th to 8th months of pregnancy. The majority of patients recover shortly after delivery but in some a

condition of prolonged pain persists. (1)

Mens et al reported '*about 45% of all pregnant women and 25% of all women postpartum suffer from pelvic girdle pain and/or low back pain (PLPP)*'. (2) They concluded that '*during the last months of pregnancy and the first 3 weeks after delivery, motion of the pelvic girdle joints is 32-68% larger in patients with PLPP than in healthy controls*.' (2) Ultimately their '*findings support the idea that enlarged motion is one of the factors that causes PLPP and justifies treatment with measures to reduce this motion*.' (2) Damen et al found that while SI joint ligamentous laxity is common in pregnant subjects a particular relationship was only noted between asymmetric laxity of the SI joints and pregnancy-related pelvic pain. (3)

SOT describes a category of PLPP associated with increased posterior SI joint motion or ligamentous laxity called category two (4, 5, 6, 7) '*Since load transfer from spine to pelvis passes through the sacroiliac (SI) joints, effective stabilisation of these joints is essential. The stabilisation of the SI joint can be increased in two ways. Firstly, by interlocking of the ridges and grooves on the joint surfaces (form closure); secondly, by compressive forces of structures like muscles, ligaments and fascia (force closure)*'. (8)

Patient histories of females presenting symptoms whose onset began during pregnancy or after delivery are common and upon clinical examination at this office a very high percent of these patients suffering chronic conditions '*since I gave birth to my child*' were found to have indications of an SOT category two. This retrospective case series study involved 103 pregnant women whose SOT category two pelvic findings (4, 5, 6, 7) were neutralised before delivery, and then were reevaluated after delivery for SOT category two findings.

One hundred and three pregnant women age range from 21-32 years old were seen at this clinic from 1979-83. The majority of the patients were referred to this clinic by nearby *Bradley and Lamaze Birthing Classes* and *La Leche League* facilities. The preponderance of the patients (75%) began their evaluation and treatment in their third trimester with the rest (25%) began their evaluation and treatment in their first two trimesters. This retrospective review study was IRB approved by *Cleveland Chiropractic College*'s IRB in 2009.

Methods

Patients were evaluated via SOT diagnostic protocol, which included the SOT arm fossa test (AFT), (9) increased unilateral or bilateral iliopsoas tension, palpation for pelvic torsion, leg length differentials, and Moiré contour photography. Frequency of evaluations was generally monthly during the first trimester, bi-weekly during the second trimester, weekly during the final trimester. This method of evaluation and treatment was a standard procedure at this office during that period of time. Post delivery visits were 2-3 times per week until their arm fossa test was negative.

Treatment with category two blocking was performed in the presence of a positive arm fossa test (AFT+) with the patient supine, the superior block placed on the side of the posterior ilium, and on the contralateral side a block placed through the acetabulum superior-ward at 45° until the arm fossa test was negative (AFT-), usually less than two minutes. The goal of the process was to '*clear*' the category two before the delivery and evaluate after delivery for the presence of category two indicators of arm fossa test positive, leg length differential and pelvic torsion. (4) Cervical stair step evaluation and treatment procedures (10) were used when indicated and reciprocal temporal rocker technique (RTRT) or alternating mastoid compression synchronised to patient respiration was also performed.

Results

Using SOT's AFT as a method to evaluate clinically active category two or sacroiliac joint laxity, a large percentage of the patients (95%) returned AFT+ findings, with 5 of the 103 patients having an AFT-. Moiré contour photography showed posterior ilium rotation of the pelvis in all cases of AFT+ however the posterior rotation of the pelvis was not always on the short leg side upon supine evaluation. Posterior rotation of the pelvis corresponded ipsilaterally with side of AFT+ findings. Sensitivity of the inguinal ligament to palpation was not necessarily related to side of AFT+. Restricted SOT (over the head arm stretch) *iliopsoas test* was most often on the short leg side. SI joint sensitivity or side of sensitivity was not always related to side of AFT+.

Of the 98 patients who had an AFT+ with the treatment all but 15 became AFT- before delivery. Of the 98 patients with an AFT+ ten patients did not achieve an AFT- status after delivery. AFT- patients showed pelvis rotation on Moiré and short leg on supine evaluation in the same proportions as the AFT+ patients. AFT- findings were associated with reduction or elimination of pelvic or inguinal pain, improvement of muscle strength and ability to rise from seated position as well as lift or carry objects, and improved sleeping and restfulness.

Post delivery AFT- was achieved within 5-7 visits, which was greater than the clinic's average of 3-5 visits for AFT- in non-postpartum patients. Of interest women who birthed in the squatting position returned to AFT- faster than typical supine delivery. Women who became ambulatory sooner and walked also had better return to AFT- than the patients who did not walk as soon. Women were more prone to re-injury (return of AFT+) if they did not walk daily soon after delivery.

Discussion

The ligament about the SI joints naturally become lax in preparation for the birthing process and while essential for delivery this condition can sometimes lead to a loss of juxtaposition of the pubic symphysis and sacro-iliac joints. It is postulated that category two pelvis distortion or sacroiliac joint dysfunction uncorrected may lead to chronic pelvic pain and dysfunction. (11) With the high percentage of participant's delivery leading to SI laxity it is reasonable to assume a subset of pregnant patients may likely have a category two presentation during pregnancy and delivery. (12, 13)

SOT practitioners have used the AFT for 4 decades to evaluate posterior SI joint laxity and pelvic torsion. The reliability and validity of the AFT was discussed by Hestœk and Leboeuf-Yde (9) and '*results from the different reliability studies varied widely with some evidence favoring the validity of the arm-fossa test …*' (9) '*Two intraexaminer reliability studies of sacro-occipital technique tests both scored greater than 80% (88% and 100%). One examined the AFT and demonstrated excellent agreement, whereas the other examined a variety of tests with good results for one examiner and poor for the other*'. (9) '*Two studies were found of the validity of the arm-fossa test (80% and 90%), both demonstrating some validity of the method.*' (9) Another preliminary study found that a positive arm fossa test might help differentiate between SI joint laxity and a negative *Gillet* test, which is associated with sacroiliac joint fixations. (14)

Purportedly the AFT can evaluate various levels of SI dysfunction from joint laxity affecting joint form closure and its ability to sustain sufficient supportive capacity. The AFT incorporates:

i) The relationship between the SI joint imbalances associated with secondary inguinal ligament (lowered threshold) sensitivity

ii) The testing of an arm muscle which is simultaneously causing the lumbodorsal fascia to tense, and

iii) The patient's ability to respond without a delay to when inguinal ligament and lumbodorsal fascia are challenged. (3)

Therefore this allows the AFT to be considered a sensitive test so that SI dysfunction might be found sub-clinically, particularly when there is force closure dysfunction secondary to joint hypermobility, pelvic torsion, and joint dysrelationship. This would explain why sometimes the AFT could be found positive with patients who are not exhibiting SI joint pain or apparent discomfort, such as the some of the pregnant patients in this study.

Category two supine block placement facilitates both form and force closure of the SI joint by reducing pelvic torsion and compressing the posterior SI joint. The compression helps reduce the secondary swelling in the joint capsule allowing the joints to come into better juxtaposition. Theoretically the reduction of ligament laxity reduces proprioceptive excitation and therefore has a positive neuromuscular effect. (15) While the chiropractic profession may have methods of treating pregnant patients with SI laxity (16) the face validity and safety aspects for SOT pelvic block treatment of this specific subset of the patient population appears reasonable. (5, 6, 7)

It would appear that a supine treatment that applies a low continual force with pelvic blocks that can be modified based on specific assessment indicators as found with the SOT approach would be preferable method of care for a pregnant patient. This compression does appear to have a therapeutic effect and often times sacroiliac support belts, while they are not facilitating joint position, do sustain joint compression and can help with PPLP. (17, 18, 19)

Of interest in the county where this retrospective case series took place during the era (1979-1983) over 30% of pregnancies ended in cesarean section. Of the women in this study only 3% (n=4) ended in cesarean section. Of the women in this case report only three previously had cesarean sections yet their pregnancies (associated with the case report) ended in a natural birth which was atypical at that time since there was a common policy of '*once a cesarean, always a cesarean.*' Not all women in the pregnancy program decided to carry on with recommended post-delivery treatment plan of 2-3 times per week. The reasons given were that they were (i) too busy with child and (ii) not able to afford the care. (Visits and treatment during pregnancy at the clinic were no charge, as well as the follow up visit after delivery and the first treatment if AFT+.)

It is clear that sacroiliac joint dysfunction is believed to be a significant source of low back and posterior pelvic pain. However, there are no widely accepted guidelines in the literature for the diagnosis and treatment of sacroiliac instability. (20) There are some studies that are attempting to bridge this gap particularly investigating sacroiliac joint hypermobility. (21) Since ligamentous laxity is relatively common with pregnancy it is of particular note that '*this ligamentous system associated with the sacroiliac joint serves to enhance stability and offer proprioceptive feedback in context with the rich plexus of articular receptors*'. (22)

While one study found poor inter-tester reliability of 3 tests to determine asymmetric mobility of the SI joints to study pregnancy-related pelvic girdle pain (23) another earlier study found some degree of reliability in clinical tests used to study classifications in pregnancy related pelvic joint pain. (24)

Some self-assessment tests for PPLP such as supine 'bridging' as a guide to help pregnant women determine if care may be needed for their PPLP and whether the treatment was successful. (25) Further study would be of value to determine if the AFT can become part of a series of tests used to assess the need for care for PPLP as well as successful patient response to treatment. While pain during pregnancy is of concern it is also of interest to determine whether proper sacroiliac joint juxtaposition may be related to foetal head position and birth outcome.

Limitations to this study involve the reliability and validity of the arm fossa test (9, 14) and that the patients were relatively young, 21 to 32 y. No control group was used and the majority of

patients were receiving training with *Lamaze, Bradley*, and *La Leche League* which suggests patients familiar with wellness behaviour and pregnancy.

Conclusion

Of significance is the relationship between category two AFT findings and pregnant patients. Studies need to be performed to determine what percentage of patients, male or female have this finding in the general population to do an adequate comparison study.

Greater study into the AFT is needed to determine its accuracy in determining SI joint laxity in pregnant patients as well as the use of pelvic blocks to reduce pelvic torsion and improve form and force closure of the SI joints. It would seem that since pregnant patients have difficulty being treated prone or on their side a supine form of evaluation and treatment would be preferred.

The biological plausibility of the treatment and the low force nature of the pelvic block placement offer a low risk procedure for pregnant patients that warrant a call for greater study and formal research inquiry.

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