Lumbopelvic presentations in pregnancy through the lens of Sacro Occipital Technique

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ABSTRACT

Chiropractic care is commonly sought by women during pregnancy. While many motivating factors exist for seeking care, a common one is the desire to have a pregnancy that is comfortable and allows for life's activities without pain and limitations. Of added concern is the desire to have care that is both gentle and efficacious. As such, practitioners must remain vigilant with the rapid and natural biomechanical changes that occur in the lumbopelvic and sacroiliac regions during pregnancy. This due diligence must include the awareness of the relevant neuromusculoskeletal structures as well as the chiropractic technique approaches that best suit the individual pregnant patient. Sacro Occipital Technique (SOT®) is a low force chiropractic technique that addresses the unique biomechanical sequelae of the pregnant pelvis. Presentations like lumbar facet syndrome with iliopsoas hypertonicity, gluteus medius instability, and piriformis syndrome are common concomitant presentations that manifest during pregnancy. These clinical presentations not only warrant the need for chiropractic care, but also, the consideration of SOT® as a methodology that is well positioned to palliate these specific concerns. The goal of this article is to present SOT in its foundational context and provide clinical relevance for its specific use during pregnancy.

Key words: Sacro Occipital Technique, SOT, pregnancy, instability, pelvic girdle dysfunction, low back pain, facet syndrome, piriformis syndrome, iliopsoas, gluteus medius, Category II.

Introduction

The art and science behind the principles and practice of Sacro Occipital Technique (SOT®) are the life's work of Major Bertrand DeJarnette. Born in Greenridge, MO in 1899, Dr. DeJarnette spent the bulk of his lifetime in Nebraska City, NE where the confluence of his education and clinical practice brought SOT® to the chiropractic profession.[1] With a penchant for mechanical engineering, Dr. DeJarnette worked in the automotive industry in Detroit, MI. Occupational injury led to his need to rehabilitate and heal and to a fascination with the intricacies of human structure and function. Upon completing his D.O. degree in 1922 from Dearborn College of Osteopathy in Elgin, IL, Dr. DeJarnette also completed his D.C. education from Nebraska Chiropractic College.[1]

In his lifetime of practice, Dr. DeJarnette made clinical observations in the areas of vasomotor changes, visceral pain patterns, postural distortions, and pain localization. It is the elaboration and organization of these observations that have created the foundation of the functional principles of SOT®.

SOT® Methods and Patterns

With an original twenty-one diverse categories of presentation, Dr. DeJarnette effectively distilled patterns of clinical presentation into three main clinical categories. These categories were threaded together with the physiologic interplay of the sacro-occipital relationship, flow of cerebrospinal fluid, and the load-bearing adaptability of the sacroiliac joint. The critical component of this physiologic thread is the connectedness of the primary respiratory mechanism (inhalation/exhalation cycle) with the secondary respiratory mechanism. The secondary respiratory mechanism relies upon the cranio-sacral pump as it mobilizes cerebrospinal fluid from the cranial vault to the sacrum. In the SOT® practice paradigm, corrections of all three categories address the function of these mechanisms.

Three Clinical Categories in SOT®

Each of the three categories have characteristic symptoms that provide the chiropractor with crucial clinical signs that direct care and intervention (Table 1). In pregnancy, biomechanical changes commonly cascade into a Category II type of presentation. Pursuant to these changes, patients can often present with low back pain that can be attributed to gluteus medius weakness, changes in iliopsoas tonicity, lumbar facet dysfunction, and/or piriformis syndrome.

It is imperative that the practitioner be familiar with the clinical presentation of these concomitant conditions to appropriately utilize the SOT® Category II corrections

Category I	Torsion/misalignment of the sacrum around the Y-axis Vasomotor/circulatory changes noted at specific segmental levels CSF stagnation owing to cranio-sacral pump dysfunction Palpatory hypertonicity in scalene musculature Bilateral rib head pain or fixation A-P postural sway Increased heel tension
Category II	Instability of the articulations of the pelvis Hypertonicity of the pelvic stabilizing muscles Increased global postural tone — lumbar, thoracic, and cervical Unilateral rib head pain or fixation Lateral postural sway
Category III	Due to an unresolved Category II Mechanical stress transferred to lumbar spine anatomy Facet syndrome Discogenic pathology Antalgic posture

Table 1: Overview of categories.

(Figure 1). In addition to preventing injury and pain, chiropractic care focused on stabilizing the pregnant pelvis may contribute to overall better pregnancy outcomes and support optimal fetal positioning.[2]

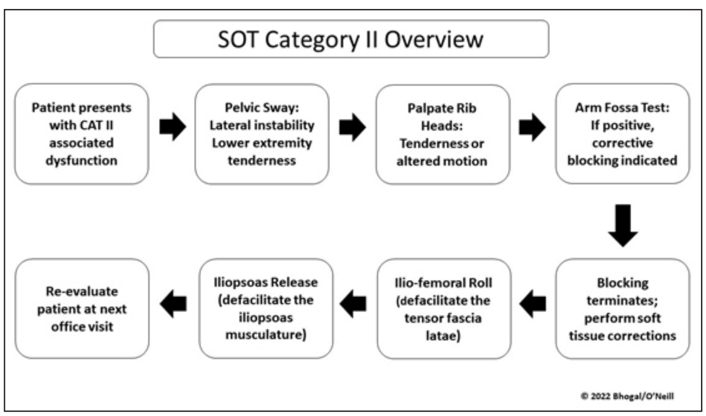

Figure 1.

Associated Lumbopelvic Presentations in Pregnancy

Low back pain (LBP) is commonly experienced during pregnancy and can interfere with a patient's quality of life.[3] LBP may present as one of two different patterns commonly described as pelvic girdle pain (PGP) and lumbar pain (LP), though some patients present with both.[4]

Many factors contribute to pregnancy-related LBP. It is commonly accepted that biomechanical factors such as weight gain, increased abdominal diameter, and the anterior shift of the body's center of gravity increase stress on the lumbar spine and pelvis. Axial loading of the intervertebral discs leads to decreased height and compression of the spine.[5] This, in conjunction with postural adaptations, including lumbar lordosis, can increase the stress placed on lumbar facet joints.[4]

Additionally, LBP has been correlated to weakness and dysfunction of core muscle groups, including changes in the abdominal wall musculature, weakness of the gluteus medius and pelvic floor dysfunction.[5,6] This muscle weakness, commonly seen in pregnancy and post-partum, alters body mechanics and increases the risk of injury as atrophied tissues are less tolerant of physical stresses.[7]

Gluteus Medius Weakness in Pregnancy

In addition to hip abduction, the gluteus medius assists with hip internal rotation and hip external rotation when the knee is in extension. Gluteus medius acts from the femur to stabilize the pelvis and maintain the trunk upright when standing on one leg, running, and walking when one leg is off the ground.[8]

Gluteus medius weakness is common in pregnancy and may present with trendelenburg gait.[6] A trendelenburg gait results from a defective hip abductor mechanism that causes drooping of the pelvis to the contralateral side while walking. This lateral shifting of forces, affectionately referred to as a "pregnancy waddle," not only stresses the sacroiliac and lumbar facet joints but also results in postural compensations throughout the body. These compensations often manifest symptomatically in the thoracolumbar, cervicothoracic, and craniocervical junctions.

Gluteus medius strain can present as low back pain either due to facet joint irritation relating to a trendelenburg gait or it can present as referred pain from the gluteus medius itself.[6] Referred pain from the gluteus medius may present with a myotogenous pain pattern in the lumbosacral region, posterior iliac crest and into the buttocks and the posterior lower extremity.

In some cases, however, despite gluteus medius weakness, there is no observable alteration in gait. Instead, ankle plantar flexors, hip abductors, and hip extensors compensate for the weak gluteus medius.[9] Additional stress on these structures often presents with clinical symptoms. Hypertonicity of the tensor fascia latae is commonly present and often reported by the patient as lateral "hip pain."

Iliopsoas Muscle in Pregnancy

What we commonly refer to as the iliopsoas muscle is made up of three separate structures: the major and minor psoas muscles and the iliacus muscle. Proper neuromechanical function of this complex is essential for maintaining correct lumbar posture as well as stabilizing the hip and pelvis through gait.[10] The iliopsoas flexes the hip and externally rotates the femur as well as influences the lordotic curve. Contraction of the iliopsoas muscle flexes the trunk and inclines it from the contraction side.[11]

In pregnancy, as the center of gravity shifts forward and the pelvis tilts anteriorly, the iliopsoas engages to stabilize the lumbar spine and pelvis. Resultant hypertonicity of the iliopsoas muscle is common. Subluxations in the lumbar spine or pelvis may result in asymmetric hypertonicity which contribute to postural distortions and increased stress on intervertebral discs and lumbar facets.

Facet Syndrome in Pregnancy

Facet joints resist much of the intervertebral shear force and share in resisting the intervertebral compressive force, especially in lordotic postures. In rotation, the facet capsular ligaments undergo significant strain as they protect the intervertebral discs by preventing excessive movement.[12]

Lumbar facet syndrome occurs secondary to repetitive overuse and microtrauma, spinal strains, torsional forces, poor body mechanics, obesity, and intervertebral disc degeneration.[13] It is a common cause of low back pain in pregnancy due to increased weight gain, changes in posture, and altered muscle patterns, which frequently result in sub-optimal compensatory biomechanics. Clinically, lumbar facet syndrome may vary in its presentation. The patient may report localized pain and/or pseudo-radicular pain with variable referral patterns.[12] Examination may reveal decreased extension and/or lateral flexion and a positive Kemp's test.[14]

Piriformis Syndrome in Pregnancy

The piriformis muscle originates from the anterior sacrum and then crosses through the greater sciatic notch before attaching to the greater trochanter of the femur. The piriformis acts primarily as an external rotator when the hip is extended and adducts the hip when it is flexed. In pregnancy, the piriformis, along with other hip stabilizers, must compensate for the weakened gluteus medius and resultant lateral sway. Hypertrophy and hypertonicity result, and piriformis syndrome may develop. When the piriformis muscle is overused, irritated, or inflamed, it can lead to irritation of the adjacent sciatic nerve.[15] This is known clinically as piriformis syndrome.

Piriformis syndrome has been defined as a quartet of symptoms and signs: buttock pain aggravated on sitting, external tenderness near the greater sciatic notch, pain on any maneuver that increases piriformis muscle tension, and limitation of straight leg raising.[16] While piriformis syndrome is frequently underdiagnosed in the obstetric population, it should be suspected in any patient with symptoms of hip or sciatic pain.[17]

Category II Evaluation

Pelvic Sway:

One of the first components the practitioner will assess is pelvic sway.[18] Due to the pelvic instability commonly associated with the pregnant pelvis, a lateral or "side to side" sway is prevalent. This can manifest as restlessness while the patient is seated or shifting positions while standing. Historically the patient will report an inability to sit still or stand still.[18] In the acute phase of a Category II presentation, while standing, patients will present with a rapid or jerking correction to a proprioceptive center and in chronic cases, a presentation of muscle fatigue or discomfort will be notable. This presentation may present with gluteus medius weakness and/or a trendelenburg gait. Additionally, lateral pelvic sway can result in medial knee and lateral leg tenderness, also assessed as part of a complete SOT® clinical evaluation.

Rib head Tenderness:

With the patient seated or standing, the practitioner will palpate for quality and quantity of motion of the first rib/ thoracic vertebra. Owing to pelvic destabilization and lateral shifting of forces, biomechanical compensation patterns are noted as cephalad as the cervicothoracic junction. In the acute phase of a Category II, the practitioner will note a hypermobility of the rib head articulation and in chronic cases, unilateral fixation is often present.[18] Palpatory tenderness is notable in all phases of dysfunction. It is important to note that in the spectrum of these cephalad dysfunctions, patients may present with scalene hypertonicity, thoracic outlet syndrome, glenohumeral dysfunction, or temporomandibular pain.

Arm Fossa Test:

This provocative test is neurologically reflexive in nature and is performed with the patient supine and with the practitioner visualizing the anterior pelvis in four functional quadrants. These quadrants are designated as upper and

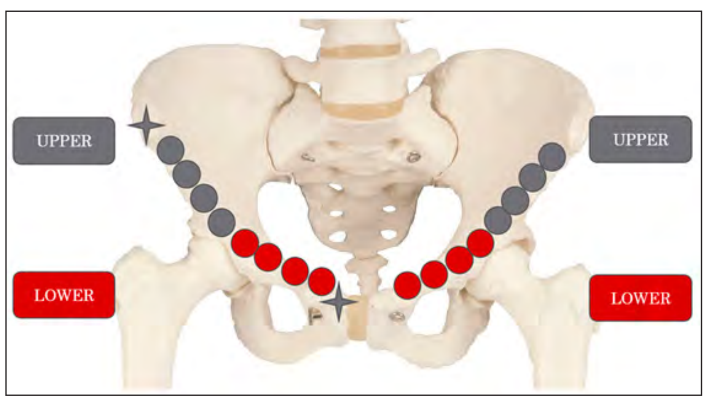

Figure 2: Four Functional Fossae.

lower fossae of the pelvis bordered superiorly by the anterior superior iliac crest and inferiorly by the pubic symphysis (Figure 2). While standing on the ipsilateral side and with the patient's arm raised ninety degrees to their trunk, the practitioner applies a quick and even four finger pressure to each fossa and thereby stimulating the inguinal ligament.[19] As this pressure is applied, the patient's raised arm is simultaneously challenged in the caudal direction with a synchronized burst of light pressure. Also synchronized with these actions, the practitioner delivers an auditory stimulus in the form of a command such as, "hold" (Figure 3). The patient is instructed to resist the light burst of caudal arm pressure and maintain their arm at ninety degrees. All four functional quadrants are assessed with this procedure. This test is noted as positive if a physical lag is noted in the patient's response to the reflexive challenge in any number of the functional fossae and suggests the presence of a Category II pelvic dysfunction. It is important to note that muscle strength is not being assessed, but rather, the speed of the patient's response.[19]

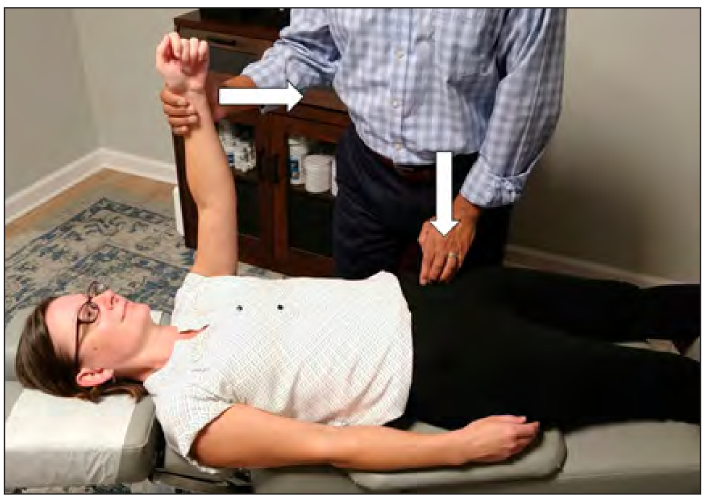

Figure 3: Arm Fossa Test.

Corrective Blocking:

Once the presence of a Category II dysfunction has been established, corrective pelvic blocking is indicated. If indicated, as per SOT® methodology, cervical subluxations are also to be corrected in conjunction with pelvic blocking. This allows cephalad dysfunctions to better respond to the pelvic correction.[19] The practitioner must then assess for the postural leg length deficiency in the supine position as this directs the placement of the corrective blocks. A table board should be placed under the patient's pelvis to provide an even foundation for the corrective blocks. On the side of leg length deficiency, a block is placed 90 degrees to the sagittal plane, 50% under the iliac crest and 50% under the lower lumbar musculature. On the contralateral side, a block is placed obliquely under the acetabulum, aimed at the medial edge of the opposing block (Figures 4a-c).[19] All four functional fossae are retested while the patient is actively being blocked and the procedure is terminated when the arm fossa test is negative bilaterally.

Figure 4a: Corrective blocking on the side of leg length deficiency. Block is placed 90 degrees to the sagittal plane.

Figure 4b: Corrective blocking on the contralateral side. Block is placed obliquely under the acetabulum, aimed at the medial edge of the opposing block.

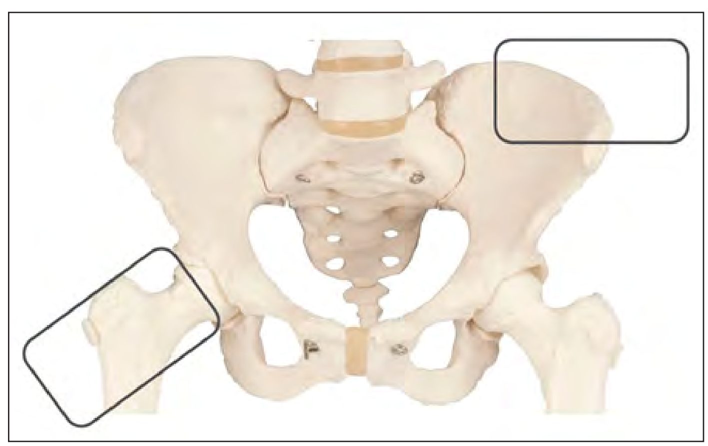

Figure 4c: Corrective Blocking Schematic.

Soft Tissue Corrections:
As an integral ancillary, facilitation of the tensor fascia latae and the iliopsoas musculature are to be addressed. A cross friction method referenced as the ilio-femoral roll procedure is utilized to ease tension in the hypertonic tensor fascia latae and sustained pressure upon the hypertonic iliacus/psoas musculature is employed as indicated.

Summary

As patients navigate the biomechanical changes associated with pregnancy, they may seek chiropractic care with the hope of being more comfortable and experiencing a healthy birth. It is important that practitioners are knowledgeable and proficient in technique approaches that cater to their patients' expectations while being gentle, safe, and effective. Understanding the biomechanical complexity of the lumbopelvic region and its stabilizers through pregnancy is imperative. With knowledge of SOT® and Category II presentations, practitioners are better positioned to improve structural and functional outcomes for their patients throughout pregnancy and birth.

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