

Biomechanical and treatment considerations for the pregnant patient

D. Bruce Fligg DC*

Introduction

It is well recognized that the last trimester of pregnancy is often complicated by lower back pain.^{1,2} The biomechanical and hormonal changes that have taken place resulting in this pain are most obvious. It is important for the clinician to understand these changes and to therefore apply the most appropriate technique. This article will then review some of the more significant biomechanical changes and the most important treatment considerations that have to be made.

Biomechanical considerations

The overall postural effect of pregnancy by the final month is as follows:

- anterior tilt of pelvis with hyperextended knees
- accentuated lumbar lordosis with a short radius curve
- posterior gravity line
- hyperkyphosis of the upper thoracics
- protracted shoulders
- anterior angulation of the cervical region
- extension of the occiput on atlas

(See Figure one).

Associated with these postural changes is a waddling gait pattern.



Figure 1: (adapted from Blankenship). This figure illustrates the most common postural changes associated with the third trimester of pregnancy.

Usually throughout these postural changes the areas of the spine most commonly affected are: sacroiliacs, lumbosacral, thoracolumbar region (L1-T12), floating ribs (R10-12), T6-8, C6-T2, CO-C2. Other major concerns are: hips, psoas and piriformis muscles, and the diaphragm.

The increasing anterior pelvic angulation and the resulting short radius curve is initially observed throughout the second

trimester. These postural changes along with the increased activity of the psoas muscle and multifidus muscle can result in the following pain syndromes; sacroiliac syndrome, lumbosacral facet syndrome, and sciatica. As the fetal development reaches the diaphragm, usually by the seventh month, the following two conditions are often noted; diaphragm spasms and failure of the floating ribs to caliper open resulting in intercostal myalgia, neuralgia and costovertebral pain at the thoracolumbar region. As the postural decompensation continues with the increasing kyphosis of the upper thoracic region and the increasing weight of the breasts, cervical-thoracic syndromes often result (i.e. cervical dorsalgia; thoracic outlet syndrome). The occiput then extends in reaction to this progressing postural decompensation and suboccipital neuralgia-myalgias often occur.

It is not unusual for females with previous spinal pain and postural decompensation to experience spinal problems earlier in their pregnancy than those who haven't.

Treatment considerations

The main consideration during the first trimester is a history of previous miscarriages or spotting. These patients should either be adjusted extremely lightly or not at all in the lumbar pelvic region during this time. The next major consideration is usually made by the fifth month, when at this time the average patient is unable to lie prone on the table. Therefore alternative manipulative procedures such as the knee-chest and sitting posture procedures are utilized. The sitting procedures are extremely effective for the patient with dyskinesia of the thoracolumbar, lower floating ribs and mid-thoracic regions (see Figures 2-4). Another good alternative for the floating rib caliper fixation is the lateral recumbent rib adjustment³ (see Figure 5). The upper thoracic region, during the last trimester is a difficult region to mobilize. A gentler thoracic extension mobilization procedure as seen in Figure six is often beneficial, providing it meets with the patient's tolerance.

Occasionally the psoas requires stretching and this can be achieved utilizing a lateral recumbent position.⁴ Likewise same with the piriformis muscle.⁵

The most important consideration is insuring that the sacroiliacs remain mobile during the last month in preparation for labor and delivery. Great care must be taken during this stage when manipulating this region especially utilizing lateral recumbent procedures. The patient must not experience any increase of pressure on the fetus while performing these procedures. Three modifications should be made to achieve this (see Figure 7). First, palpate the position of the fetus, especially during the last three weeks when the baby has dropped, while flexing the patient's hip; secondly, reduce the amount of hip flexion; and thirdly, have the patient positioned closer to the outside of the table, away from the doctor. This will give the patient more support for the abdominal region. These last two considerations usually put the doctor in a decreased mechanical advantage. However the effects of Relaxin compensates by making the joints easier to mobilize.

*Assistant professor, Division of Chiropractic Sciences, Canadian Memorial Chiropractic College, 1900 Bayview Avenue, Toronto, Ontario M4G 3E6
© DB Fligg 1986



Figure 2: This adjustment demonstrates a typical sitting lumbar adjustment. This adjustment can also be modified for the lower six ribs and the lower thoracic region. This procedure can be either a singular high velocity short amplitude adjustment applied through either the mamillary process for the lumbar, TVP for the thoracics, or non-articulating tubercle for the ribs. It can also be applied as a mobilization technique using the previously mentioned contacts with repetitive mobilizations of four to eight times utilizing a low velocity low amplitude type of thrust.



Figure 3: This figure demonstrates mobilization of the thoracic region. The doctor uses the indifferent hand aided by supporting the patient's upper body on the thigh to produce a gentle extension motion which is enhanced and focused through the desired motion segments by the contact hand. The contact can be either a pisiform or hypothenar contact on the spinous process or TVP. The thrust is of a repetitive nature (four to eight times) utilizing a low velocity low amplitude type of thrust.



Figure 4: This figure demonstrates a mobilization procedure that restores bucket handle motion for the lower three ribs. The upper body of the patient (arms folded across the head) is supported by the flexed leg of the doctor placed on the treatment table. The doctor wraps the outside arm around the patient and places the hand on the lateral margin of the lower three ribs. The inside arm and hand is angled such that the head contacts the lower three ribs on the ipsilateral side. The patient is laterally flexed towards the doctor using the outer arm. The hands isolate this lateral flexion motion to the lower three ribs. The ribs on the outer side are stretched in a bucket handle open fashion, while the ribs on the inner side are closed.

Concluding remarks

There are usually two types of patients that will present: a previous patient who is now pregnant, and a new patient presenting with pain, most commonly in the last trimester of her pregnancy. The later the patient is initially seen in the pregnancy, especially with symptoms, the harder it is to control the symptom picture. Therefore, it is important for patient education in the initial stages of the pregnancy. Patients should



Figure 5: This figure demonstrates the procedure used to correct a lower rib fixation. This procedure allows the doctor to adjust the ribs without creating P to A pressure on the abdominal region and allows better control of the patient as compared to the sitting posture.



Figure 6: This figure demonstrates the mobilization procedure used to produce thoracic extension. With the patient's hands clasped behind their head, the doctor reaches through the patient's arms and contacts the hands on the lower thoracic region. The knee of the doctor is placed on the table and is flexed to support the patient's thoracic spine, which produces a fulcrum to create the extension desired. The doctor then uses his arms to place pressure on the patient's shoulders to enhance the extension over the flexed leg on the table. A gentle cephalad traction is applied at the same time as the extension mobilization is produced.



Figure 7: This figure demonstrates the modifications necessary to adjust the pelvis and lower lumbar region during the last stages of the pregnancy. The indifferent hand is initially used to palpate the position of the fetus to ensure that the flexed upper leg of the patient does not create pressure on the fetus. When the leg of the patient is used as a lever, the amount of flexion at the hip is decreased. As well, the patient is positioned on the table away from the doctor to ensure that the fetus is adequately stabilized prior to the manipulation. A preliminary set-up should be taken and the patient asked whether or not pressure is felt in the abdominal region. Although the doctor is at a decreased mechanical position, the hormone, relaxin should compensate by making the mobilizing or manipulating force less.

be educated, not only in postural awareness, but enhancing exercises and diet programs.^{6,7,8} Again the old cliché holds, "An ounce of prevention is worth a pound of cure."

Acknowledgement

I would like to acknowledge the following people; Mrs. Lynn Price, photographer, Mrs. C. Logan and Mrs. L. Fletcher, my patients, and the following doctors; Drs. Bayfield, Brownhill, Buna, Cochlan, Daien, Dawydiak, Dormon, Degruchy, Gadsby, and Godry, who as undergraduates assisted in the initial preparation of this article.

References

- 1 Blankenship T. Biomechanics of back pain in the gravid female. *ACA J Chiropractic* 1980; 17(11).
- 2 Kelsey J et al. Pregnancy and the syndrome of herniated lumbar intervertebral disc; an epidemiological study. *Yale J Bio Med* 1975; 48: 361-368.
- 3 Fligg DB. Lateral recumbent rib adjustment. *JCCA* 1984; 28(2): 277-278.
- 4 Fligg DB. Psoas technique. *JCCA* 1985; 29(4):207-210.
- 5 Fligg DB. Piriformis technique. *JCCA* 1986; 30(4):87-88.
- 6 Tyler RH. Conservative obstetrical procedures Part Two. *Digest Chiropractic Economics* 1983; 25(5): 18-19.
- 7 Moore PR. Chiropractic care for the pregnant patient. *Digest Chiropractic Economics* 1983; 25(6): 60-61.
- 8 Hitchcock ME. Osteopathic care in pregnancy. *Osteopathic Annals*. December 1976; 504/19-511/29.