

Musculoskeletal changes and pain during pregnancy and postpartum

Author: [Bonnie L Bermas, MD](#)

Section Editor: [Charles J Lockwood, MD, MHCM](#)

Deputy Editor: [Kristen Eckler, MD, FACOG](#)

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INTRODUCTION — Pregnancy is a time of many physical and physiological changes. The gravida must nurture and host the fetus, but also adapt to a new body habitus and alterations in the hormonal milieu. Not surprisingly, these changes impact the musculoskeletal system, which can develop a variety of problems, such as back pain, separation of the pelvic bones, transient osteoporosis, and tendonitis.

Pain related to the musculoskeletal system in pregnant women will be reviewed here. Neurological disorders, myopathies, and inflammatory muscle diseases are discussed separately. (See "[Neurologic disorders complicating pregnancy](#)".)

NORMAL PREGNANCY CHANGES — During pregnancy, women gain 25 to 35 pounds, on average, and undergo multiple hormonal changes and biomechanical alterations that strain the axial skeleton and pelvis. (See "[Maternal endocrine and metabolic adaptation to pregnancy](#)".)

Musculoskeletal consequences that ensue as a result of weight gain and hormonal changes include:

- Force across some joints is increased up to two-fold [1].
- Exaggerated lordosis of the lower back, forward flexion of the neck, and downward movement of the shoulders typically occur to compensate for the enlarged uterus and change in center of gravity. Stretching, weakness, and separation of abdominal muscles further impede neutral posture and place even more strain on paraspinal muscles.
- Joint laxity in the anterior and posterior longitudinal ligaments of the lumbar spine creates more instability in the lumbar spine and can predispose to muscle strain.
- There is widening and increased mobility of the sacroiliac joints and pubic symphysis in preparation for the fetus' passage through the birth canal.
- Vaginal lengthening, genital hiatal widening, and posterior vaginal relaxation occur [2].
- A significant increase in the anterior tilt of the pelvis occurs, with increased use of hip extensor, abductor, and ankle plantar flexor muscles [3]. Stance is widened to maintain trunk movement [4].
- Fluid retention can cause compression of certain vulnerable structures such as the median nerve.

Relaxin is a hormone produced by the corpus luteum, decidua, and placenta. The concentration peaks during the first trimester, when relaxin is thought to be involved with placental implantation and growth. Later in pregnancy, relaxin contributes to relaxation of the myometrium, separation of the symphysis pubis and softening of the cervix [5]. Laxity in the joints of the extremities, however, appears to be due to other factors. This was illustrated in a study of joint laxity during pregnancy in which 19 of 35 women (54 percent) demonstrated a ≥ 10 percent increase in wrist laxity from the first to the third trimester, but the increase did not correlate with relaxin levels [6]. Subjective joint pain was associated with increased estradiol and progesterone levels, but not with elevated relaxin concentrations.

LOW BACK PAIN AND DISC DISEASE

Incidence and epidemiology — Low back pain is a common problem among pregnant women [7-10]. Risk factors include preexisting back pain, back pain in a previous pregnancy, and multiparity.

Etiology — In most cases, back pain is due to mechanical factors resulting from altered posture, muscle weakness, joint laxity, and/or vertebral facet joint irritation. Fluid retention within connective tissue can also contribute [11]. Degenerative spondylolisthesis (ie, the slipping forward of the body of one lumbar vertebrae on the vertebrae below) is aggravated by pregnancy. The L4 to L5 level is particularly vulnerable in women who have been pregnant [12].

Disc herniation is rarely the cause of back pain during pregnancy [13]. About 10 percent of nonpregnant women of childbearing age without back pain have asymptomatic lumbar disc herniation visible on magnetic resonance (MR) imaging of the lumbosacral spine, and 40 percent have disc bulges [14]. The incidence of these abnormalities appears to be the same in nulliparous nonpregnant, multiparous nonpregnant, and pregnant women [15].

Neuraxial anesthesia for labor and/or delivery does not cause long-term back pain. (See "[Adverse effects of neuraxial analgesia and anesthesia for obstetrics](#)", section on 'Backache'.)

History and physical examination — Back pain may occur at any time during the gestation, but is most prevalent in the second half of pregnancy. The woman usually describes pain that is aggravated by activity and relieved by rest. It occurs in the lower back, but may radiate down the back of the thighs, or, less often, over the lower part of the abdomen and anterior thighs [16]. The pain is often worse at night, especially with turning, and may interfere with sleep.

On physical examination, palpation of the lower spine, paraspinal muscles, sciatic notches, and sciatic nerve may reveal tenderness, muscle spasms, or radiating pain. Nerve root irritation may be associated with muscle tenderness: S1 irritation affects calf muscles, L5 irritation affects the extensor hallucis muscle (which affects the toe walking test) and the anterior tibial muscles, and L4 irritation affects the quadriceps and the anterior tibialis (which affects heel walking with foot dorsiflexion) [17]. Physical examination should also evaluate for the presence of significant muscle weakness, sensory impairment, or deep tendon reflex changes suggesting radiculopathy.

Low back pain is characterized by lumbar pain above the sacrum, which is made worse by pregnancy-associated forward flexion of the waist, and decreased range of motion of the lumbar spine. In contrast, sacroiliac pain is made worse by hip rotation. With the patient supine, compression of the iliac crests may reproduce pain related to sacroiliac joint dysfunction (see "[Pregnancy related pelvic joint pain](#)" below). By comparison, discogenic pain is worse on flexion of the back, such as when touching the toes from a standing position. Chronic discogenic pain worsens with flexion, but with an acute herniation, the individual can rarely even stand up straight, as the herniation protrudes posteriorly and is compressed by extension. In facet pain, the pain is worse when the spine is extended and is localized to the level of the irritated facet.

A detailed description of the physical examination in patients with back pain can be found separately. (See "[Evaluation of low back pain in adults](#)", section on 'Physical examination'.)

Diagnostic evaluation — In most cases, the definitive physiologic cause of back pain symptoms cannot be established. Laboratory tests are not useful and imaging studies are not generally indicated. Magnetic resonance imaging (MRI) is usually performed if an invasive intervention, such as epidural steroid injection or surgery, is contemplated and in complicated cases. The indications for MRI of the lumbosacral spine in pregnant women with low back pain are the same as in nonpregnant women. (See "[Evaluation of low back pain in adults](#)", section on 'Imaging'.)

Management — The American College of Obstetricians and Gynecologists (ACOG) suggests the following interventions to ease back pain during pregnancy [18]:

- Wear low-heeled (but not flat) shoes with good arch support.
- Get help when lifting heavy objects.
- Place a board between the mattress and box spring if your bed is too soft.
- Squat down, bend knees and keep the back straight when lifting.
- Sit in chairs with good back support, or use a small pillow to provide support.
- Sleep on the side with pillows between the knees for support.
- Apply heat, cold, or massage to the painful area.

In addition, if it is necessary to stand or sit for a prolonged period, taking breaks and placing one foot on a low stool relieves pressure on the lower back. (See "[Treatment of acute low back pain](#)".)

Additional interventions have been tried; a multimodal approach is probably best [19].

- Rest: Periods of rest with hip flexion can reverse the lordosis and temporarily decrease pain. The woman should lie in the lateral recumbent position, with her knees and hips bent. A pillow can be used to support the weight of the uterus or placed between the knees to reduce the mechanical burden on the back [20].
- Exercise: A meta-analysis of 34 trials that included over 5100 pregnant women with back and pelvic pain reported that exercise may reduce pregnancy-related low back pain and improve functional disability [21]. A different meta-analysis of four trials (n = 566 subjects) found that exercise, support belts, and acupuncture may be helpful [22]. The purpose of back exercises is to strengthen the trunk muscles to stabilize the spine. Back flexion exercises strengthen the abdominal muscles and also reduce the lumbar lordosis, while extension exercises strengthen the paraspinal muscles. Walking is generally prescribed to relieve some of the hamstring tightness and to lessen chronic discogenic symptoms. (See "[Patient education: Low back pain in adults \(Beyond the Basics\)](#)".)
- Complementary medicine: A systemic review of eight trials on complementary and alternative medicine for low back pain and/or pelvic pain in pregnancy reported reduced visual analogue pain scores for women treated with acupuncture based on three trials [23]. However, variations in the duration of treatment, gestational age at treatment, and control groups limit the ability to make definitive conclusions or practice recommendations. In the same systematic review, osteopathy and chiropractic modalities were not associated with pain reduction, but the data were based on one trial for each treatment group. Other trials have reported that acupuncture appears to be more beneficial than physiotherapy, but both can be effective [24-27]. Additionally, water therapy has shown some benefit [28,29]. (See "[Acupuncture](#)", section on '[Low back pain](#)' and "[Spinal manipulation in the treatment of musculoskeletal pain](#)", section on '[Low back pain](#)' and "[Treatment of acute low back pain](#)", section on '[Acupuncture](#)'.)
- Medication: If a short course of an analgesic is indicated, [acetaminophen](#) has the best safety profile in pregnancy. (See '[Pharmacologic treatment of pain during pregnancy](#)' below.)

Management of disc herniation — In women with symptomatic disc disease, indications for disc surgery during pregnancy are incapacitating pain, progressive neurologic deficits, and bladder or bowel dysfunction [30]. There is no contraindication to epidural or spinal anesthesia; antenatal consultation with an anesthesiologist may be helpful in allaying patient concerns. Cesarean delivery is required only for the usual obstetric indications, but instrumental vaginal delivery may be useful to avoid increased intrathecal pressures associated with the Valsalva maneuver.

Prognosis — In 80 to 95 percent of cases, back pain resolves postpartum [31-33]. At two to three years after delivery, about 20 percent of patients continue to experience back pain [33,34]. In a study that followed 303 women with back pain during pregnancy, the prevalence of back pain six years postpartum was 16 percent, comparable to the prepregnancy prevalence of 18 percent in the same group [31].

An elevated body mass index (BMI) appears to be a separate variable that impacts back pain after pregnancy. A study from the Danish National Birth Cohort that included nearly 80,000 women reported that elevated BMI, both pre-pregnancy and postpartum, increased the risk for later development of degenerative musculoskeletal conditions such as osteoarthritis and low back pain [35]. Overweight and obese women had a nearly 30 percent risk of developing musculoskeletal conditions after pregnancy when compared with normal-weight women.

Screening for depression may be helpful in women with persistent pain [36].

POSTPARTUM LOW BACK PAIN — Postpartum coccydynia (pain in the coccyx, sometimes called coccygodynia, or pain in the tailbone) may be caused by pressure on the coccyx during childbirth. Pain and tenderness typically become prominent the day after delivery and are well localized to the coccyx. Patients complain of pain in the tailbone on sitting, especially when leaning back, and pain on rising and with prolonged standing. Defecation and sexual intercourse may also be painful. (See "[Coccydynia \(coccygodynia\)](#)".)

SCOLIOSIS — Pregnancy does not appear to affect curve progression, nor does scoliosis appear to affect pregnancy outcome when scoliosis has been treated or is mild. (See "[Adolescent idiopathic scoliosis: Management and prognosis](#)", section on 'Outcome'.) Respiratory failure and an increase in pulmonary hypertension during the second and third trimesters have been reported in rare cases of pregnancy in women with severe curvature, particularly when there is a coexisting muscular disorder (eg, muscular dystrophy, spinal muscular atrophy) [37-39]. Most patients can receive neuraxial anesthesia successfully during labor [40].

PREGNANCY RELATED PELVIC JOINT PAIN — Increased mobility and/or asymmetry of pelvic joints make the pelvic area vulnerable to pain during pregnancy and/or postpartum. As noted, the symphysis pubis widens at the 10th to 12th week of gestation in response to high relaxin concentrations. This widening allows increased mobility of the pubic symphysis, which can be painful. Mechanical strain may also play a role [41]. In observational studies, magnetic resonance (MR) imaging of postpartum women at high risk of pubic injury (eg, second-stage labor >150 minutes, third- or fourth-degree lacerations, instrument assisted delivery, infant birth weight >4000 g) commonly showed bone marrow edema, pubic bone fractures, levator ani tears and abnormal widening or capsular distension of the pubic symphysis [42,43].

Other pregnancy related painful pelvic joint conditions include pelvic girdle syndrome (pain in all three pelvic joints) and unilateral or bilateral sacroiliac joint pain [44,45]. In a prospective Danish study, 293 pregnant women (20 percent) were found to have pelvic joint pain, which could be classified into four types: pelvic girdle syndrome 6.0 percent, symphysiolysis 2.3 percent, one-sided sacroiliac syndrome 5.5 percent, and double-sided sacroiliac syndrome 6.3 percent [44].

Pelvic girdle pain — Posterior pelvic pain related to the sacroiliac joint is common and often included under the broad classification of low back pain. Risk factors include increased parity, previous low back pain, emotional stress, obesity, young maternal age, low educational level, early menarche, physically demanding work, and cesarean delivery [46-49].

Pelvic girdle pain (PGP) is a stabbing pain that occurs between the posterior iliac crest and the gluteal fold, especially in the vicinity of the sacroiliac joint [50]. The pain may radiate to the posterior thigh and can occur with or separately from pain in the symphysis. The pain may worsen with weight-bearing, but prolonged sitting can also be painful. Pelvic floor tenderness may be present [51] but pelvic floor function does not appear to be affected [52]. The diagnosis is made after exclusion of lumbar causes of pain.

Posterior pelvic joint pain is assessed by the posterior pelvic pain provocation (p4) test [53]. With the patient supine and her hip flexed 90 degrees, the examiner exerts pressure on the knee and along the femur to the hip, while stabilizing the pelvis with a hand on the opposite anterior iliac spine. A positive test elicits pain in the ipsilateral buttock. In addition, palpation of the sacroiliac (SI) joints, specifically the long dorsal ligament (dimples of venus) may demonstrate nodules or tenderness to palpation. The Faber test (forward bending

and hip rotation) may aggravate SI joint pain on the affected side. There is normal range of motion at the hips and spine. The active straight leg raise (ASLR), a test of function whereby the patient lifts her leg, finds it difficult, yet with compression finds greater ease in performing the task, has been associated with PGP [54,55].

A brace or girdle provides compression and stability to the sacroiliac joints and improves disbursement of weight-bearing forces in the pelvis, back, hips, and legs. It appears to be useful for management of posterior pelvic pain [56]. The nonelastic device should be placed to lie over the greater trochanters.

Pregnancy-related pelvic joint pain has been treated with acupuncture, with inconsistent results [57-59]. One trial randomly assigned 386 pregnant women with PGP to standard treatment or standard treatment plus stabilizing exercises or acupuncture [59]. The addition of acupuncture to standard treatment resulted in significantly lower pain scores at six weeks; stabilizing exercises [60,61] also improved the efficacy of standard therapy. However, another randomized trial that compared standardized therapy alone to standardized treatment plus stabilizing exercises or standardized treatment plus acupuncture found no differences in recovery among the three treatment groups [57]. Stabilizing exercises are targeted to the muscles supporting the pelvic girdle (eg, hip adductors and abductors, gluteus maximus, transverse abdominal muscles) and are supervised by a physical therapist [62].

About 80 percent of women fully recover within six months of delivery [48]; however, recovery from pelvic girdle syndrome can be prolonged (over two years) [63]. A variety of treatments are available for women with chronic pain after delivery. As an example, slow-release corticosteroid injection to the insertion of the sacrospinous ligament on the ischial spine was effective in a randomized trial [64]. (See "[Subacute and chronic low back pain: Nonsurgical interventional treatment](#)".)

Appropriate options for antepartum analgesia are discussed below (see '[Pharmacologic treatment of pain during pregnancy](#)' below). Sacral stress fracture should be considered in the differential diagnosis of severe PGP that does not improve with focused PT, either in pregnancy or postpartum. Cesarean delivery does not seem to protect from, or minimize, PGP, and is associated with higher rates of persistent pain postpartum [49].

Pubic symphysis separation — Peripartum pubic symphysis separation (pubic diastasis, symphysiolysis, osteitis pubis) is uncommon, but not rare; inconsistent definitions and sporadic reporting prevent an accurate estimate of incidence. Purported risk factors include fetal macrosomia, precipitous labor or rapid second stage of labor, intense uterine contractions, previous pelvic pathology or trauma to the pelvic ring, multiparity, and forceps delivery [65].

Clinical manifestations of pubic symphysis separation include suprapubic pain, tenderness, swelling, and edema with pain radiating to the legs, hips, or back [65]. The pain is often potentiated by weight-bearing, especially with walking and climbing stairs. Turning in bed, lifting, or getting up from a chair may also cause pain. Some women report waking up during the night because of pain [66]. Pain can also be evoked by bilateral pressure on the trochanters or by hip flexion with the legs in extension. Rarely, a palpable groove at the level of the symphysis may be detected by internal or external examination.

In a nonpregnant woman, the normal symphysis gap is 4 to 5 mm; with pregnancy, the gap increases by at least 2 to 3 mm [67]. The diagnosis of diastasis is based on the persistence of symptoms and a separation of more than 10 to 13 mm on imaging; however, radiographic imaging is not necessary, as the diagnosis can be made clinically on the basis of symptoms and response to therapy. Furthermore, the amount of symphyseal separation does not necessarily correlate with severity of symptoms or the degree of disability. One study that performed X-rays of the pelvis and lower spine, magnetic resonance imaging, urine dipstick, and blood tests (erythrocyte sedimentation rate, C-reactive protein, complete blood count, creatinine, rheumatoid factor, antinuclear antibodies) in women with transient or persistent pelvic joint pain and controls did not find any of these tests to be useful diagnostically [68].

Standard treatment of pubic symphysis separation is conservative: bedrest in the lateral decubitus position, pelvic support with a brace or girdle, ambulation with a walker or crutches, and a graded exercise protocol [69]. It is unclear whether combination therapy speeds recovery. Safe options for analgesia antepartum are more limited than after delivery (see '[Pharmacologic treatment of pain during pregnancy](#)' below). Nonsteroidal antiinflammatory medications are helpful for controlling pain postpartum. Opiates and intrasymphyseal injections with various medications have also been effective [65]. Open reduction and internal fixation has been performed in women with separation of ≥ 4 cm and those with persistent pain, but this is rarely necessary [70,71]. (See "[Osteitis pubis](#)".)

The pelvis usually returns to normal by 4 to 12 weeks postpartum. Pain resolves in the majority of patients within a month [44,57], but can take much longer. In a group of nine women with atypical pubic pain after childbirth, a large interpubic gap (greater than 21 millimeters) measured sonographically was associated with a delayed recovery; two of the nine patients were still disabled 36 weeks postpartum [15]. Severe diastasis (>25 mm) may require surgery. Symptoms may recur in subsequent pregnancies and may be worse, but this does not preclude vaginal birth [65,72].

HIP PAIN

Osteonecrosis of the femoral head — Osteonecrosis of the femoral head during pregnancy is rare. The etiology is unclear, but may be secondary to weight gain, endogenous production of glucocorticoids by the adrenal gland [73], or a hypercoagulable state [74]. Patients usually present with hip pain radiating to the groin or lateral thigh, particularly with weight-bearing, but not necessarily related to activity [74]. Limitation of motion is a late event. In one series, 13 of 13 patients had involvement of the left hip and 4 had bilateral involvement [74].

Physical findings are largely nonspecific. (See "[Evaluation of the adult with hip pain](#)".) The diagnosis is made by imaging studies. The plain radiograph can remain normal for months after symptoms of osteonecrosis begin; the earliest findings are mild density changes, followed by sclerosis and cysts as the disease progresses. The pathognomonic crescent sign (subchondral radiolucency) is evidence of subchondral collapse. Later stages reveal loss of sphericity or collapse of the femoral head. Ultimately, joint-space narrowing and degenerative changes in the acetabulum are visible. MRI is the most sensitive imaging method for making this diagnosis.

Osteonecrosis can be a progressive disease leading to collapse of the articular surface and degenerative joint disease. Restricted weight-bearing has generally been ineffective at halting the progression of disease, thus justifying aggressive therapy. Treatment options include osteotomy, core decompression, and grafts [74]. (See "[Osteonecrosis \(avascular necrosis of bone\)](#)", section on '[Clinical manifestations](#)' and "[Osteonecrosis \(avascular necrosis of bone\)](#)", section on '[Treatment options](#)'.)

Safe options for analgesia antepartum are more limited than after delivery (see '[Pharmacologic treatment of pain during pregnancy](#)' below).

Transient osteoporosis of the hip — Transient osteoporosis of the hip also presents with pain with activity and limitation of motion of the hip. The diagnosis can be made by plain radiographs, which show generalized osteopenia [75], or MRI, which shows a diffuse bone-marrow-edema-pattern signal with an increased signal intensity on T2-weighted images and a decreased intensity on T1-weighted images [74]. MRI is useful for distinguishing between transient osteoporosis and osteonecrosis.

The treatment is generally conservative with prevention of weight-bearing (use of crutches) in order to circumvent femoral fracture. There have also been case reports of treating patients with bisphosphonates [76]; however, human data on the safety of bisphosphonates in pregnancy are anecdotal and sparse. (See "[Evaluation and treatment of premenopausal osteoporosis](#)", section on '[Bisphosphonates](#)'.) Safe options for analgesia antepartum are more limited than after delivery (see '[Pharmacologic treatment of pain during pregnancy](#)' below).

In contrast to osteonecrosis, transient idiopathic osteoporosis resolves by six to eight months postpartum with conservative therapy; fractures or other serious sequelae are rare [74].

Other — A variety of other orthopedic conditions can cause hip pain in pregnant and postpartum women. Some, such as acetabular labral tear, may be related to maternal position during delivery [77]. (See "[Evaluation of the adult with hip pain](#)" and "[Imaging evaluation of the painful hip in adults](#)", section on '[Imaging exams for specific clinical settings](#)'.)

Osteomalacia in pregnant women may present with persistent and non-specific musculoskeletal pain and inability to bear weight. (See "[Clinical manifestations, diagnosis, and treatment of osteomalacia](#)", section on '[Pregnancy](#)'.)

KNEE PAIN — Knee pain is not uncommon in pregnant women. Postural changes, increase in weight, and increased laxity of ligaments can all contribute to pain in the knee. Ligamentous laxity in the knee occurs during the second half of pregnancy, and is not exacerbated by exercise programs with minimal to moderate weight-bearing [78]. Significant improvement occurs by four months postpartum. (See "[Approach to the adult with unspecified knee pain](#)".)

Patellofemoral disorder — Patellofemoral disorder usually manifests itself as pain behind or around the patella, especially when going up and down stairs or with prolonged sitting. Quadriceps strengthening exercises can help the patella track correctly, and patella sleeves can also be helpful [79]. The diagnosis and treatment of patellofemoral pain are discussed in more detail separately. (See "[Patellofemoral pain](#)".)

LEG CRAMPS — Leg cramps are common, usually occurring during the latter half of pregnancy. The cramps are due to painful muscle contractions and are generally experienced in the calves at night. They are thought to be secondary to a buildup of lactic and pyruvic acids leading to involuntary contraction of the affected muscles, but the exact etiology is unknown [80].

A Cochrane review found that the only placebo-controlled trial of calcium treatment showed no evidence of benefit in the treatment of leg cramps, but placebo controlled trials of magnesium supplementation suggested a possible benefit (odds ratio 0.18, 95 percent CI 0.05 to 0.60) [80]. This was a small trial of 69 pregnant women with persistent leg cramps. The preparation used was magnesium lactate or citrate 5 mmol in the morning and 10 mmol in the evening [81].

Stretching exercises may be an effective preventive measure. These can be performed in the weight-bearing position; they are held for 20 seconds and repeated three times in succession, four times daily for one week, then twice daily thereafter ([picture 1](#)).

If a cramp occurs, calf stretches (toe raises), walking, or leg jiggling followed by leg elevation may be helpful. Other nonpharmacologic remedies include:

- A hot shower or warm tub bath
- Ice massage
- Regular exercise for conditioning, calf strengthening and stretching
- Increased hydration
- Use of long-countered shoes and other proper foot gear. (See "[Joint protection program for the lower limb](#)".)

THIGH PAIN — Meralgia paresthetica is a sensory neuropathy that occurs when the lateral femoral cutaneous nerve is compressed as it penetrates the tensor fascia lata at the inguinal ligament. Symptoms include dysesthesias in the upper and middle part of the lateral thigh and are probably caused by the expanding abdominal wall and increased lumbar lordosis. Symptoms occur late in pregnancy, typically resolve within three months postpartum, and rarely require treatment. (See "[Meralgia paresthetica \(lateral femoral cutaneous nerve entrapment\)](#)".)

HAND AND WRIST PAIN

De Quervain's tenosynovitis — de Quervain tendinopathy affects the abductor pollicis longus and extensor pollicis brevis tendons in the first extensor compartment at the styloid process of the radius ([figure 1](#)). Patients describe pain at the radial side of the wrist that is exacerbated by thumb and wrist movement. Some patients may also notice some swelling and tenderness on the radial side of the wrist. Difficulty holding or gripping objects with the affected side is also common. The pain may radiate to the thumb or forearm.

Treatment is similar to that in nonpregnant women, but nonsteroidal antiinflammatory drugs should be avoided in pregnancy after about 30 weeks of gestation. (See ["de Quervain tendinopathy"](#) and ["Use of antiinflammatory and immunosuppressive drugs in rheumatic diseases during pregnancy and lactation"](#).)

Carpal tunnel syndrome — (see ["Neurologic disorders complicating pregnancy"](#), section on 'Carpal tunnel syndrome').

FOOT PAIN — Pregnant women appear to have significantly more foot pain than nonpregnant nulliparous women. In one study, foot pain tended to be self-limited; in most patients, it resolved in less than four months [\[82\]](#). Potential causes of foot pain include weight gain, peripheral ligamentous laxity, and changes in posture and pedal pressure points [\[82,83\]](#). These changes can lead to over-pronation [\[84\]](#). Peripheral edema also contributes to foot discomfort in pregnancy. Treatment of foot pain is supportive: well-fitting shoes, rest and elevation, massage, stretching exercises, foot baths.

CHEST WALL PAIN — Chest wall changes that occur during pregnancy include increases in the subcostal angle, the anterior-posterior and transverse diameters of the chest wall, and the chest wall circumference. These changes compensate for the elevation of the diaphragm during pregnancy and preserve total lung capacity, and are not associated with pain. There are no causes of musculoskeletal chest pain specific to pregnancy other than fractures of the ribs that may occur with the rare disorder 'pregnancy associated osteoporosis' [\[85-89\]](#). (See ["Epidemiology and etiology of premenopausal osteoporosis"](#), section on 'Pregnancy and lactation associated osteoporosis'.)

Anecdotally, pregnant women, especially those who have a short torso or a very large uterus, near term may complain of discomfort (soreness, tenderness) in lower rib area, often on the right. This is presumed to be due to pressure from the uterus in this area and may be relieved by wearing loose clothing and changes in position to provide more room.

The painful rib syndrome is characterized by discomfort in the lower chest or upper abdomen, tenderness over the costal margins, and reproduction of the pain by pressure on the ribs [\[90\]](#). This syndrome accounts for as many as 3 percent of new referrals to surgeons for the evaluation of upper abdominal pain. It is most common in women, usually unrelated to pregnancy. The syndrome has a benign outcome and is important to recognize and diagnose to avoid unnecessary testing and treatment and to provide reassurance to the patient. In one review, 8 of 76 patients underwent noncurative cholecystectomy [\[90\]](#).

ABDOMINAL WALL PAIN AND MASS — Deep musculoskeletal fibromatosis (ie, desmoid tumor) is due to focal proliferation of fibrous tissue within muscles. Pregnancy and trauma are the main risk factors for the disease. The classic presentation is that of a minimally painful abdominal mass that is separate from the uterus. (See ["Desmoid tumors: Epidemiology, risk factors, molecular pathogenesis, clinical presentation, diagnosis, and local therapy"](#).)

ARTHRITIS — Pregnancy related changes in circulating hormones may contribute to alterations in the immune system that may impact the activity of autoimmune diseases associated with arthritis. Patients with rheumatoid arthritis are particularly at risk of flaring in the postpartum period. (See ["Rheumatoid arthritis and pregnancy"](#) and ["Pregnancy in women with systemic lupus erythematosus"](#) and ["Management of psoriasis in pregnancy"](#).)

Other less common causes of postpartum arthritis include septic arthritis caused by mycoplasma (see ["Mycoplasma hominis and Ureaplasma urealyticum infections", section on 'Arthritis'](#)) and rubella vaccine associated arthropathy (see ["Specific viruses that cause arthritis", section on 'Rubella and rubella vaccine virus'](#)).

PHARMACOLOGIC TREATMENT OF PAIN DURING PREGNANCY — If drugs are needed to relieve pain during pregnancy, [acetaminophen](#) is probably the safest choice. The use of nonsteroidal drugs and opioids are discussed separately. (See ["Use of antiinflammatory and immunosuppressive drugs in rheumatic diseases during pregnancy and lactation"](#) and ["Prenatal care: Patient education, health promotion, and safety of commonly used drugs", section on 'Pain and fever medications'](#).)

INFORMATION FOR PATIENTS — UpToDate offers two types of patient education materials, “The Basics” and “Beyond the Basics.” The Basics patient education pieces are written in plain language, at the 5th to 6th grade reading level, and they answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials. Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are written at the 10th to 12th grade reading level and are best for patients who want in-depth information and are comfortable with some medical jargon.

Here are the patient education articles that are relevant to this topic. We encourage you to print or e-mail these topics to your patients. (You can also locate patient education articles on a variety of subjects by searching on “patient info” and the keyword(s) of interest.)

- Basics topic (see ["Patient education: Nocturnal \(nighttime\) leg cramps \(The Basics\)"](#))

SUMMARY AND RECOMMENDATIONS

- Pregnancy-related changes in body weight, shape, and hormones are associated with musculoskeletal consequences, including lordosis and joint laxity. (See ["Normal pregnancy changes"](#) above.)
- [Acetaminophen](#) may be used throughout pregnancy. Nonsteroidal antiinflammatory drugs may be used after a confirmed pregnancy test until the 24th week of gestation. (See ["Use of antiinflammatory and immunosuppressive drugs in rheumatic diseases during pregnancy and lactation"](#).)
- Low back pain is a common complaint during pregnancy. It usually is caused by mechanical factors, rather than disc herniation. We suggest nonpharmacologic interventions for management of low back pain in pregnancy, rather than surgery or medication. If medication is needed, [acetaminophen](#) appears to be a safe and effective initial choice. (See ["Low back pain and disc disease"](#) above.)
- For pain related to the pubic symphysis, we suggest conservative interventions (rest in the lateral decubitus position, pelvic support with a brace or girdle, ambulation with a walker, and a graded exercise protocol). (See ["Pregnancy related pelvic joint pain"](#) above.)
- Pregnancy does not appear to affect curve progression, nor does scoliosis appear to affect pregnancy outcome when scoliosis has been treated or is mild. (See ["Scoliosis"](#) above.)
- Hip pain may be related to osteonecrosis, which is a chronic progressive disease potentially requiring aggressive therapy, or transient idiopathic osteoporosis, which typically resolves in 8 to 12 months and should be treated conservatively. (See ["Hip pain"](#) above.)
- Leg cramps are common in pregnant women. We suggest nonpharmacologic interventions such as calf stretching. (See ["Leg cramps"](#) above.)
- De Quervain's tenosynovitis is frequent and most commonly occurs in the postpartum period when lifting the infant causes the initial irritation. (See ["De Quervain's tenosynovitis"](#) above.)

- Carpal tunnel syndrome is a common complication in pregnancy. (See "[Neurologic disorders complicating pregnancy](#)", section on 'Carpal tunnel syndrome'.)

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Topic 427 Version 31.0

GRAPHICS

Posterior leg stretch, wall

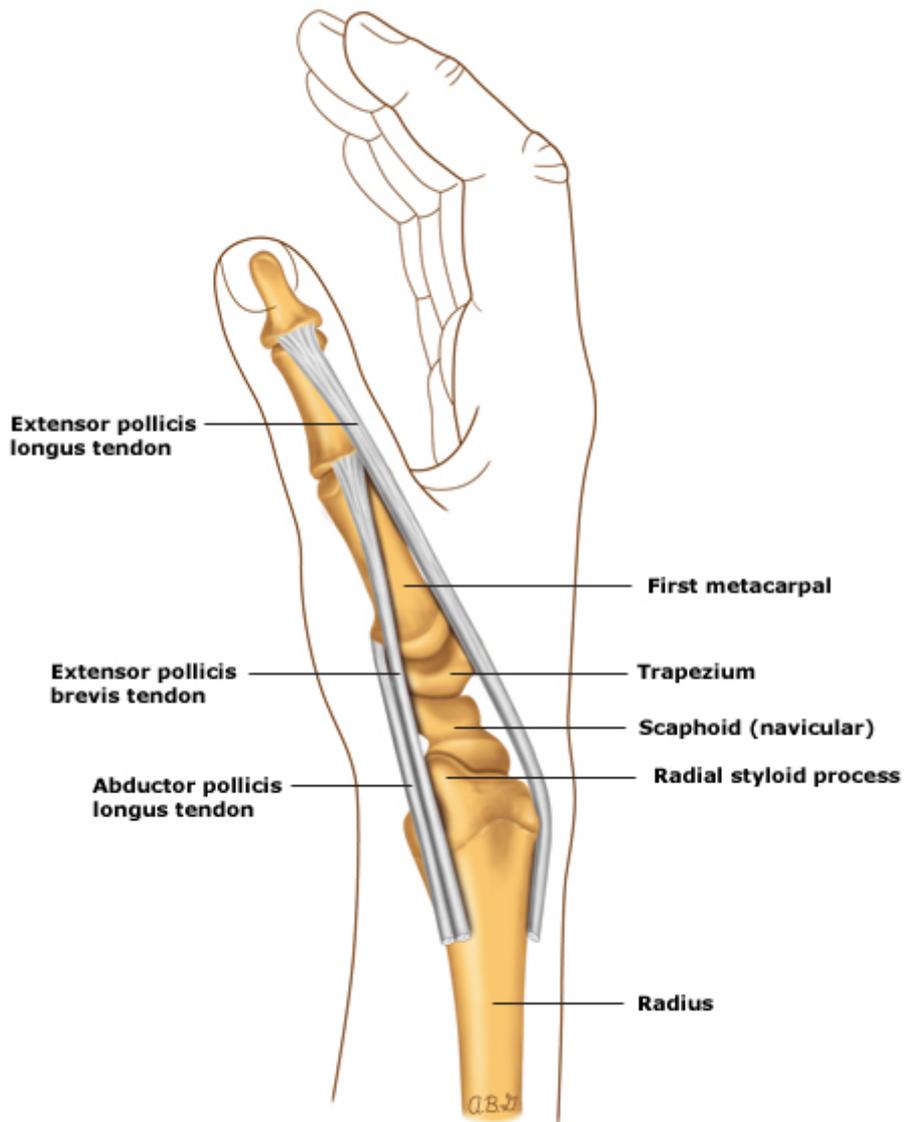


Stand facing the wall, feet together, about 24 inches from the wall. With the heels firmly on the floor and the body aligned straight at the hips and knees, lean forward to the wall, stretching the posterior leg tissues. Hold this position for 10 to 30 seconds. Repeat five times per session, at least two sessions daily.

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Graphic 70744 Version 1.0

Anatomy of the radial aspect of the wrist



Graphic 56302 Version 2.0

Contributor Disclosures

Bonnie L Bermas, MD Consultant/Advisory Boards: UCB [Pregnancy (Certolizumab)]. **Charles J Lockwood, MD, MHCM** Consultant/Advisory Boards: Celula [Aneuploidy screening (No current products or drugs in the US)]. **Kristen Eckler, MD, FACOG** Nothing to disclose

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