

Management of symphyseal dysfunction in pregnancy and post-partum period: A review

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Key content

- Symphyseal separation is thought to be due to placental Relaxin, Oestrogen and Progesterone mediated changes in joint microstructure.
- Primiparity, multiple gestations, macrosomia, prolonged or precipitate labour, history of athletic activities, shoulder dystocia managed by Mc Robert's maneuver and supra-symphyseal pressure are known risk factors for symphyseal separation.
- Straight leg raising test, Trendelenburg test, Patrick Fabere test and imaging modalities such as ultrasound, X-ray, computed tomography and MRI have a role in diagnosis of symphyseal separation.
- Principles of management are early recognition, treatment, planned delivery and prevention in future pregnancies.
- Treatment options include physiotherapy, stabilization of pubic symphysis and analgesia.

Learning objective

- To improve knowledge of the pregnancy related changes in pubic symphysis in view of understanding the pathophysiology of pubic symphyseal separation.
- To improve awareness of clinical presentation and management strategies of pubic symphyseal separation to ensure early detection, effective management and prevention.

Key words: pubic symphyseal separation / pregnancy related changes in musculoskeletal system / trendelenburg test / thromboprophylaxis / strengthening abdominal and pelvic muscles

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Introduction

Dysfunction of the pubic symphysis is an uncommon, underreported, and underdiagnosed condition with an incidence between 1 in 300 to 1 in 30000¹.

Symphysis pubis dysfunction (SPD) occurs when the joint becomes sufficiently relaxed to allow instability in the pelvic girdle. In severe cases of SPD, the symphysis pubis may partially or completely rupture which is known as diastasis of the symphysis pubis (DSP)².

It is thought to be due to the abnormal action of pregnancy-related hormones on the joint with the contribution of other aetiological factors³.

Symphysial dysfunction presents with lower abdominal pain, back pain exacerbated by weight bearing, walking, climbing stairs and causes significant restriction of activities of daily living. The severity of symptoms and signs may vary significantly and may be severe enough to be devastating to mental and social health.

Management requires multidisciplinary collaboration between obstetrician and gynaecologists, physicians, orthopaedic surgeons, and physiotherapists, without which the recovery may be delayed, and residual morbidity may remain long-term.

Pregnancy-related anatomy, physiology of pubic symphysis and pathophysiology of dysfunction

The pubic symphysis is a fibrocartilaginous or secondary cartilaginous joint formed by the union of the medial surfaces of the two pubic bones with its intervening inter-pubic disk. The inter-pubic disk consists of peripheral fibrous tissue and a central fibrocartilaginous mass. There is a slit like inter-pubic cleft occupying the postero-superior region of fibrocartilaginous central mass of the disk⁴. Superior, inferior, anterior and posterior pubic ligaments fuse with and strengthen the fibrous periphery of the inter-pubic disk⁵ (Figure 1).

Pubic branch of obturator artery, a branch from inferior epigastric artery, contributions from internal and external pudendal arteries, medial circumflex femoral arteries provide a rich network of vascular connection to the joint⁴. Its innervation is from pudendal, genitofemoral, iliohypogastric and ilioinguinal nerves arising from the lumbar plexus⁵.

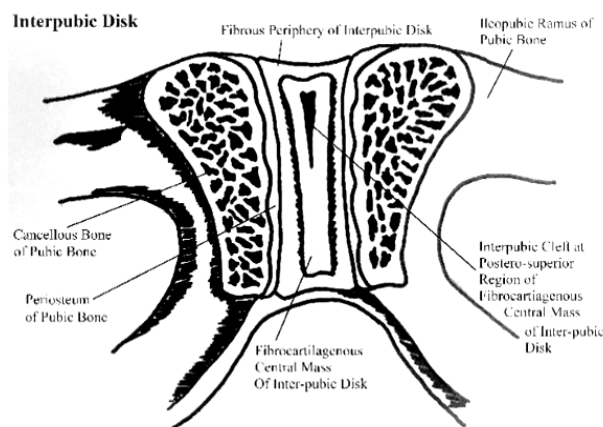


Figure 1. Inter-pubic disk⁵.

Aetiology and pathophysiology

During pregnancy, the symphysis pubis widens. The non-pregnant woman's symphysis pubis gap is 4-5 mm and it may widen 2-3mm without discomfort during the last trimester of pregnancy. This increases the diameters of the pelvic brim and cavity outlet to facilitate delivery of the fetus. The average symphysis pubis gap during the last two months of pregnancy is 7.7 mm².

It is thought to be due to hormonal, metabolic, and biomechanical changes during pregnancy while a direct pathophysiological link is not yet established. Anatomical and genetic variations of individuals may also contribute⁶. Metabolic, enzymatic, traumatic and degenerative factors have also been implicated (Table 1)².

Table 1. Possible aetiological factors for SPD²

Pelvic instability	Asymmetric pelvis, lumbar lordosis
Hormonal	Increased estrogen, progesterone, and relaxin levels
Metabolic	Low Calcium and Vitamin D levels
Enzymatic	Increased hyaluronidase and decreased collagen levels
Traumatic	Parturition
Inflammatory	Sacroiliitis, pubic symphysitis
Degenerative	Arthritis of pubic symphysis

In 30-40% of women in late pregnancy and the immediate post-partum period, radiographs demonstrate a central streak of gas within the joint which is asymptomatic and disappears soon after delivery⁷. In addition, there can be osteoclastic bone resorption at medial margins of pubic bones, thickening and increased vascularity of pubic ligaments, development of a retropubic eminence, and bleeding into the disk during delivery^{8,9} (Figure 2).

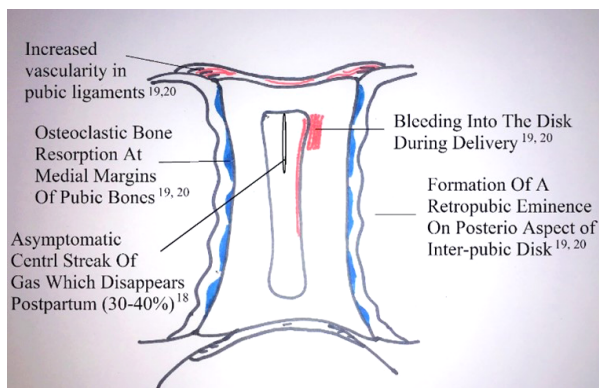


Figure 2. **Pregnancy related changes in the symphysis pubis⁹.**

Genetic or acquired abnormalities in mechanisms of hormonal action on pubic symphysis such as altered expression of matrix metalloproteinases leading to collagen remodeling and reduction in total collagen content increase susceptibility to injury^{10,11,12,13,14}. Thus, rotational, tractional, and compressional forces the pubic symphysis withstands in day-to-day life of a non-pregnant woman can damage the joint easily in pregnancy and delivery^{15,16}.

Clinical presentation and diagnosis

Lower abdominal pain, pain in buttocks, pain during walking, weight bearing, climbing stairs and turning over in bed are the commonest presenting complaints in symphyseal separation. Symptoms usually start and worsen progressively throughout the third trimester and disappear soon after parturition. However, in some instances pain and disability may persist up to 6 months post-partum¹⁷.

Occasionally there may be associated voiding difficulties, unmotivated fatigue, or sexual difficulties⁶.

Primiparity, multiple gestations, macrosomia, prolonged or precipitate labour, history of athletic activities, shoulder dystocia managed by Mc Robert's maneuver and supra-symphysial pressure are known risk factors^{18,19,20}.

Complications of symphyseal separation include involvement of sacroiliac joints, chronic debilitating pain, difficulties in caring for the family, social isolation, and psychiatric morbidity^{21,22,23}.

On examination, tenderness is usually present over the pubic symphysis. Palpation of the entire anterior surface of the symphysis pubis with the woman supine, typically elicits pain that persists for more than five seconds after removal of the examiner's hand⁶. Palpation may elicit a lateral displacement of pubic tubercles.

Anterior straight leg raising test may elicit pain or she may be unable to perform the maneuver (Figure 3). She may be unable to maintain her pelvis horizontally when standing on one leg (A positive Trendelenburg test) (Figure 4). Patrick Faber's test may be positive. In this test, woman is placed supine, ipsilateral iliac spine held fixed by the examiner, contralateral knee flexed and heel placed on ipsilateral knee and leg is allowed to fall lateral passively. The test is positive if pain flares up (Figure 5)²⁴.

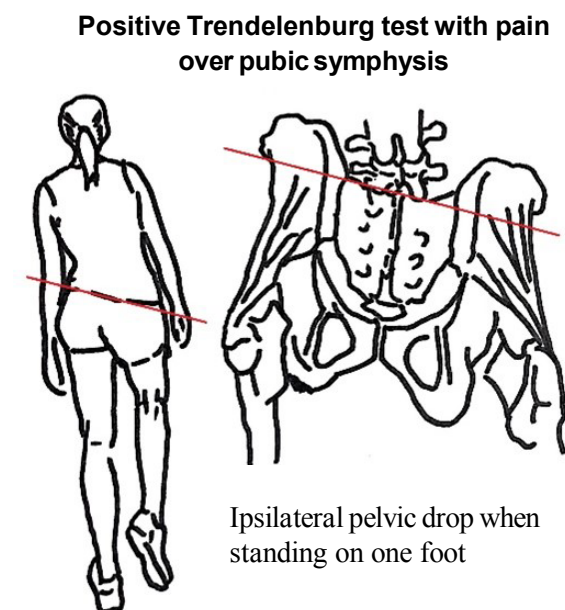


Figure 3. **Trendelenburg test²⁴.**

Straight leg raising test causes pain over pubic symphysis

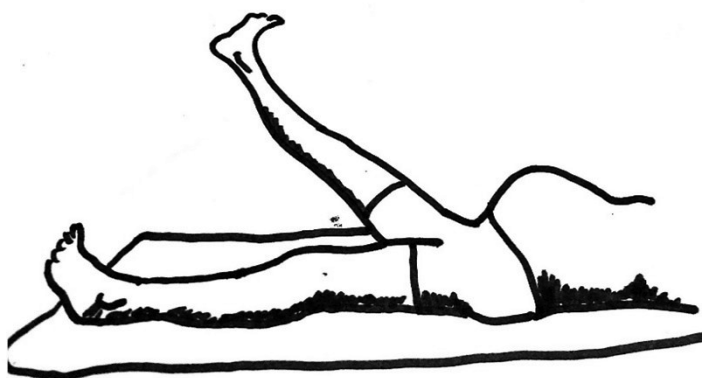


Figure 4. Straight leg raising test²⁴.

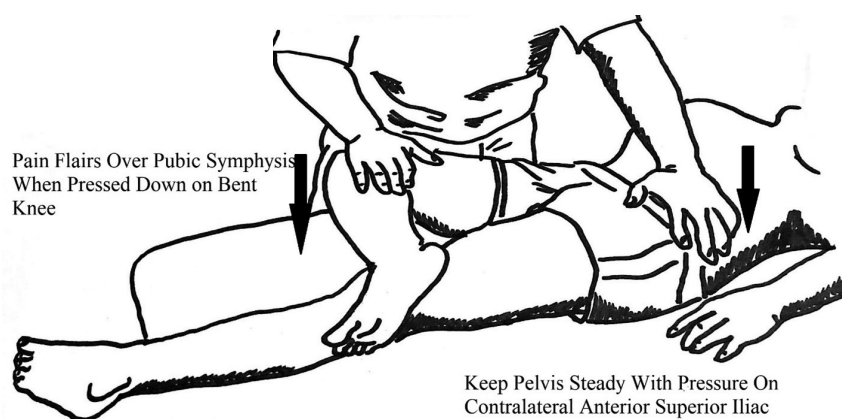


Figure 5. Patrick Faber test²⁴.

Essential imaging for diagnosis of symphyseal separation includes X-ray and magnetic resonance imaging. The width of pubic symphysis varies according to age²⁵. The normal distance between the two pubic bones never exceeds 10mm at any given age²⁶. The normal transverse distance between two pubic bones is 4.9 +/- 1.1mm in adult non-pregnant females²⁷. Williams et al. reported that the average distance between the two pubic bones in pregnancy is 7.1mm²⁸. In the third trimester, the symphyseal width varies between 3-20mm²⁹. However several studies have failed to show any correlation between the symphyseal gap and severity of SPD⁶.

A standing anteroposterior X-ray of pelvis with a transverse distance more than 10 mm is diagnostic of symphyseal separation. It is vital to remember that 24% of women in the third trimester may have a symphyseal

width more than 9mm²⁹. Instability and malalignment may be exaggerated when standing on one leg (flamingo position). If transverse displacement exceeds 20mm, most often there is Sacro-Iliac joint involvement²⁷. In addition to clear visualization of bones, MRI better demonstrates soft tissue injuries in cartilaginous regions of the joint and bone marrow³¹. Ultrasound has a role in assessing symphyseal widening especially during pregnancy³².

Radiography has been used to confirm the separation of the symphysis pubis, although it is not considered the method of choice because of the danger of exposing the fetus to ionizing radiation⁶.

Differential diagnosis includes nerve compression (e.g. intervertebral disc lesion), symptomatic low back pain (lumbago and sciatica), pubic osteolysis, osteitis pubis,

bone infection (osteomyelitis, tuberculosis, syphilis), urinary tract infection, round ligament pain, femoral vein thrombosis and obstetric complications. These need to be excluded through clinical history, physical examination, and appropriate investigations².

Management

Principles of management of symphyseal separation are early recognition, treatment, planned delivery in current pregnancy, planned prevention and delivery in future pregnancies. Treatment options include physiotherapy, stabilization of the pubic symphysis and analgesia.

Regular antenatal clinic follow-up, detailed history taking, examination can help recognize pubic symphyseal dysfunction early.

Physiotherapy is the main component of prevention and conservative management. Strengthening key muscles that support the pelvis with exercises appears to be responsible for the excellent outcome of conservative management. Sitting rowing, lateral pulls, leg press and curl ups strengthen lateral posterior abdominal wall muscles to create a muscular brace for the pelvis^{33,34}. Kegel pelvic exercises improve pelvic stability in pregnant women³⁴. If adopted around 20 weeks of gestation or earlier, these exercises can prevent symphyseal dysfunction and its complications^{35,36}. Mobilization under observation, pelvic binders and decubitus bed rest can reduce the joint width to less than 1.5cm in 2-6 weeks making the patient completely symptom free in 3 months³⁷.

Conservatively, pelvic binders, decubitus bed rest and progressive mobilization exercises can stabilize the pubic symphysis and internal fixation with reconstruction plates and cortical screws is the surgical option. Surgical management is reserved for severe symphyseal separation more than 4cm, symphyseal separation persistent beyond 6 months. Surgical management is significantly more effective than conservative methods in those patients³⁸.

Analgesic options are non-steroidal anti-inflammatory drugs (NSAIDs), opioids and transcutaneous electrical nerve stimulation (TENS)³⁹. NSAIDs should be avoided until after delivery.

External heat or ice application, gentle massage, and acupuncture are reported means to limit discomfort⁶.

Crutches or a wheelchair may be necessary to prevent pain and provide mobility. In severe pain and for surgical interventions general and regional anaesthesia may be required.

Vaginal delivery is suitable for most women and there is no evidence for caesarian section unless hip abduction is severely limited. Anecdotal evidence reporting less post-partum discomfort if delivered via caesarian section may be due to regular administration of analgesics and not due to the mode of delivery³⁶.

Induction of labour is occasionally offered to those who are in extreme pain or who are severely limited in their daily activity or mobility. The risks of induced labour often outweigh the benefit⁶.

In preparation for vaginal delivery, the range of motion of hips and lower back without pain should be assessed. It is better to avoid keeping the woman beyond these predefined limits for long periods of time as it can worsen the dysfunction. Two attendants should move the woman's legs passively into and out of Lithotomy position, maintaining the position for the shortest duration possible⁴⁰. One-to-one care in labour, adopting a comfortable position in labour will make the delivery experience more pleasant.

Mobilization as early as possible, thromboprophylaxis in the form of compression stockings, anticoagulants and hydration should be administered in women with additional risk factors.

The risk of recurrence of any degree of symphyseal dysfunction in future pregnancies varies between 68-85%⁴¹. Early antenatal booking, exercise and physiotherapy will reduce severity and prevent complications in future pregnancies.

Symptoms were found to recur premenstrually or during the first days of menstruation⁶.

Conclusion

Symphyseal dysfunction is an underdiagnosed, potentially debilitating, easily treatable condition with excellent post-treatment outcome. If not recognized it can drastically reduce the quality of life. Local protocols geared towards early recognition and multi-disciplinary care will improve the quality of maternal care significantly.

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