Piriformis syndrome & Coccydynia

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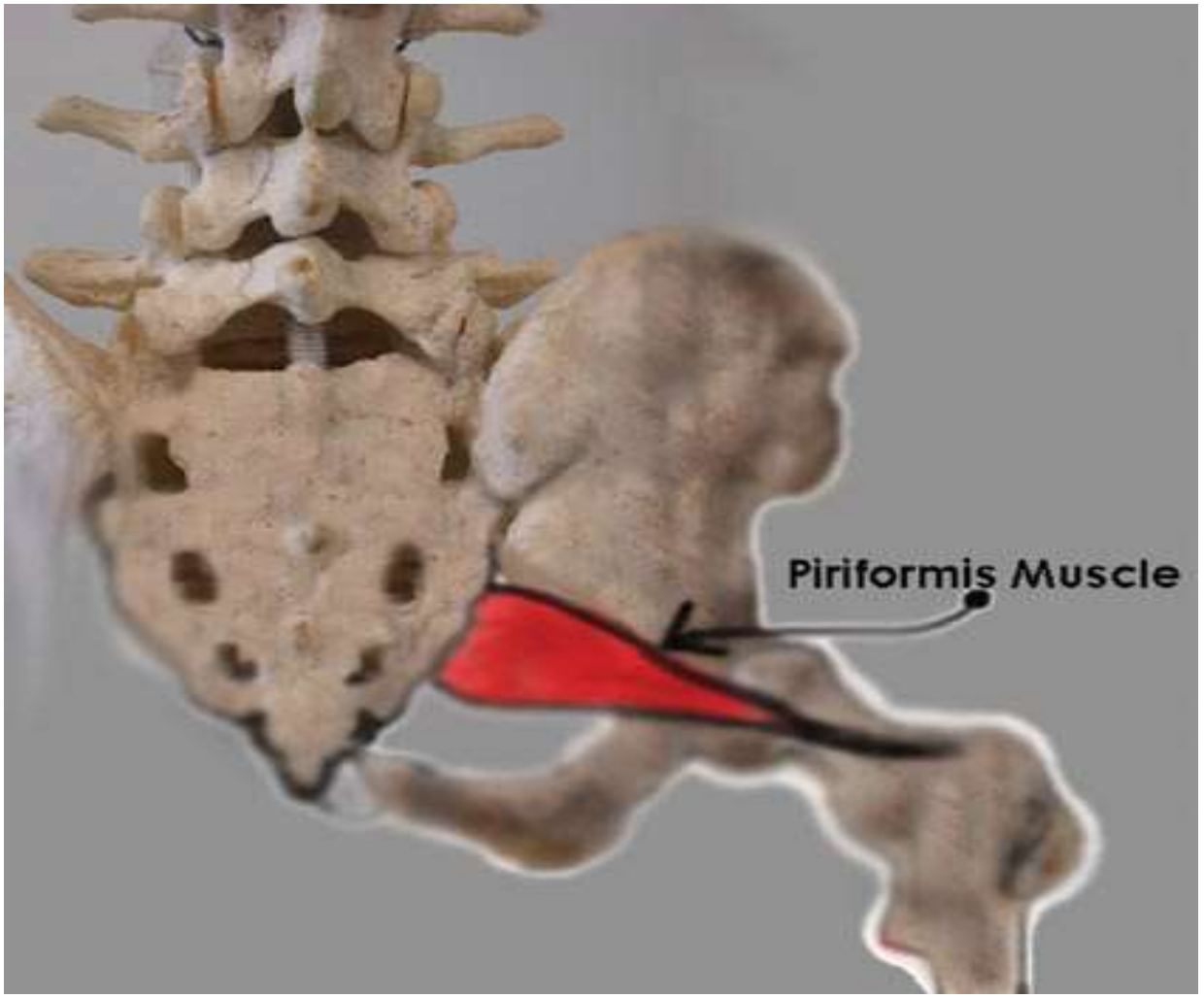
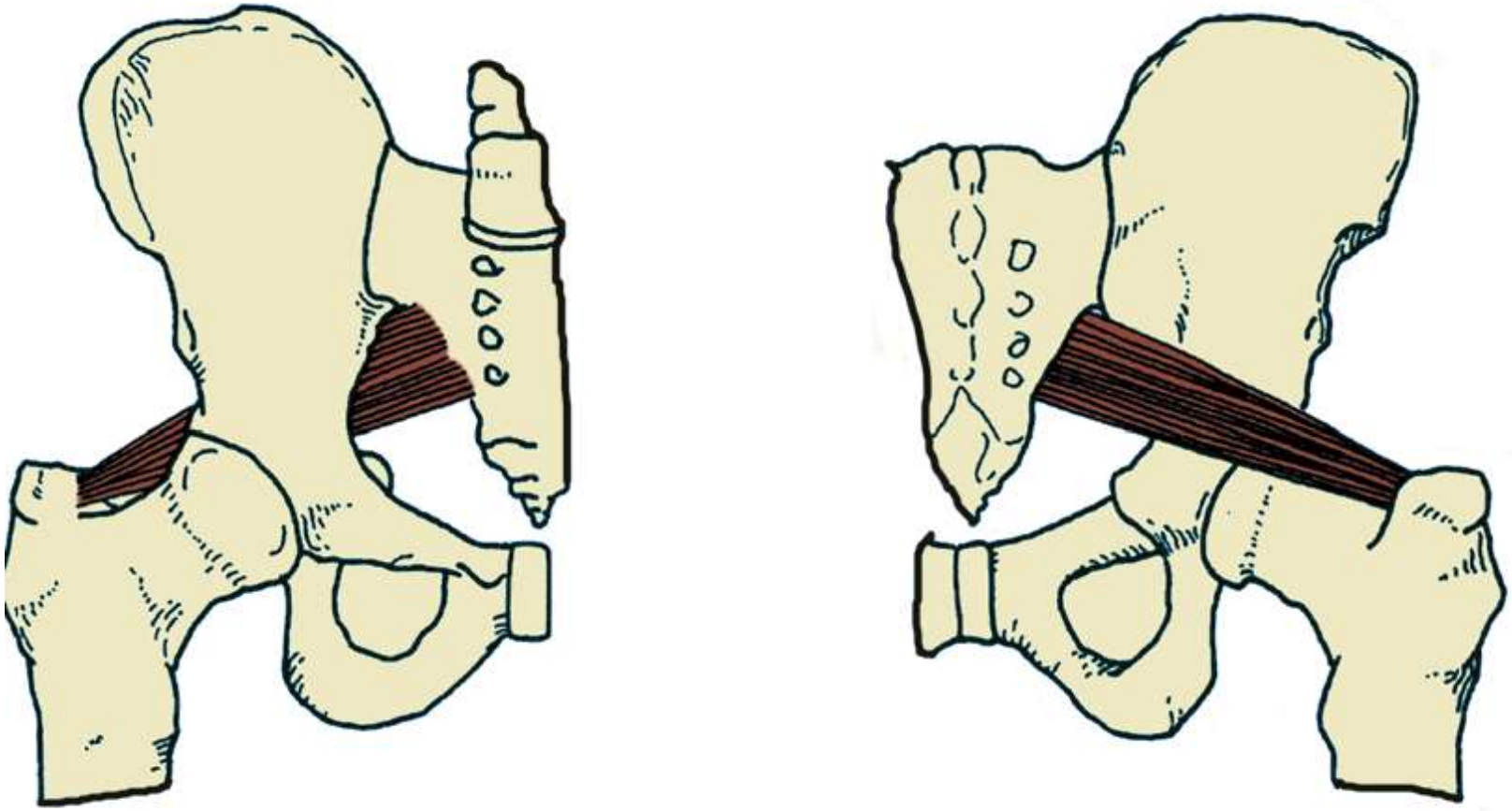
Piriformis syndrome

Anatomy

- **piriformis** muscle is triangular
- its wider end originating from the anterior surface of the S2-S4 vertebrae,sacrotuberous ligament, and greater sciatic foramen.
- runs **obliquely**, **laterally**, and **inferiorly** and becomes **tendinous** with its narrower end inserting into the **piriformis** fossa at the medial aspect of the greater **trochanter** of the femur


Piriformis Muscle



- Branches from L5, S1, and S2 spinal nerves innervate this muscle
- **External rotator** when the hip is in the extended position
- an abductor when the hip is in the flexed position, whereas it is a weak hip flexor during walking.
- The anatomical variations between the sciatic nerve and the piriformis muscle are common and important.

- The nerve can either pass below the muscle (98.5%),
- through and below the muscle (84%), through and
- above the muscle, above and below the muscle, through
- the muscle (10%), or above the muscle.

- Multiple conditions mimic spine pain, which is known as pseudo spine pain.
- Pseudo spine pain describes back and/or leg pain as the presenting symptom of an underlying condition

- Piriformis syndrome is a common condition presenting with buttock and leg pain, also known as pseudo sciatica, resulting from compression or inflammation of sciatic nerve as it courses under or through piriformis muscle in the buttock.

- The name of the piriformis is derived from the Latin pirum for “pear” and forma for “shape

- The **diagnosis** of piriformis syndrome and its management has continued to remain controversial since its original description in 1928

- It is mainly a diagnosis of exclusion

  and there is no consensus about the clinical findings, the laboratory studies, and the treatment.
- the piriformis muscle becomes tight and spasms and sometimes

  irritates the proximal sciatic nerve.

- Pain and paresthesias may be reported in the low back, groin, perineum, buttock, hip, posterior thigh, leg, and foot.

- The patient may experience pain in the rectum during defecation and sexual dysfunction in both men and women may occur.

- Interventional therapy of piriformis syndrome described percutaneous spinal needle injection technique.

- Multiple techniques have been described with local anesthetics, steroids, and neurolytics with pulsed radiofrequency and cryoneurolysis.

- **Indications** for interventional therapy is based on: pathophysiology and **failure** of conservative management with continued disabling pain.
- Noninvasive treatments include drug therapy with nonsteroidal anti-inflammatory drugs and physical therapy,
- including a piriformis **stretch** exercise program.

- **Entrapment** pain associated with piriformis muscle spasm involves:
- The sciatic nerve, including the inferior and superior gluteal nerves and vessels

- The pudendal nerve and vessels
- The posterofemoral cutaneous nerve
- The nerves to the obturator internus and quadratus femoris muscles.

- **Contraindications for interventional therapy:**
- Needle phobia
- Infection
- Coagulation disorders
- Anticoagulant therapy
- Inability to understand and provide informed consent
- Inability to cooperate with evaluation

Nonaspirin antiplatelet therapy.

Pathophysiology

- Patients with piriformis syndrome should be classified into **2** broad categories:

- **Primary** piriformis syndrome: This describes all pathology

  intrinsic to the piriformis muscle, such as myofascial pain, pyomyositis, myositis ossificans, and hypertrophy of the piriformis muscle secondary trauma.

- **Secondary piriformis** syndrome:

  for all other cases in which symptoms of posterior buttock pain with or without radiation down the leg depends on the location of the pathology in relation to the structures adjacent to the sciatic notch, provided that spinal pathology is excluded.

- These could be aneurysms, arterial malformations, benign or malignant tumors, endometriosis, and inflamed structures.
- A **history** of **trauma** is usually elicited in approximately 50% of the cases of piriformis syndrome.

- **Trauma** to the buttock may lead to inflammation and spasm of the piriformis muscle, which leads to release of inflammatory mediators such as histamine, bradykinin,and serotonin, causing irritation of the sciatic nerve leading to the symptoms.

- **Muscle overload :**excessive running,
- change of direction, and weight-bearing activities. Exercising on hard surfaces, uneven ground, with ill-fitting shoes; beginning an exercise program after a long lay-off period;
- increasing exercise intensity or duration

  too quickly; and sitting for long periods of time.

- sciatic neuropathy due to piriformis syndrome after an operation in the sitting position.
- after total hip arthroplasty. It has also been described after laminectomy secondary to postoperative adhesions.

Signs and Symptoms

- The frequency of buttock and leg pain varies from 5 – 6% of patients referred for treatment of pain.

  6:1 female to male predominance
- incidence of 0.33% in a review of 1,293 patients that were referred for treatment.

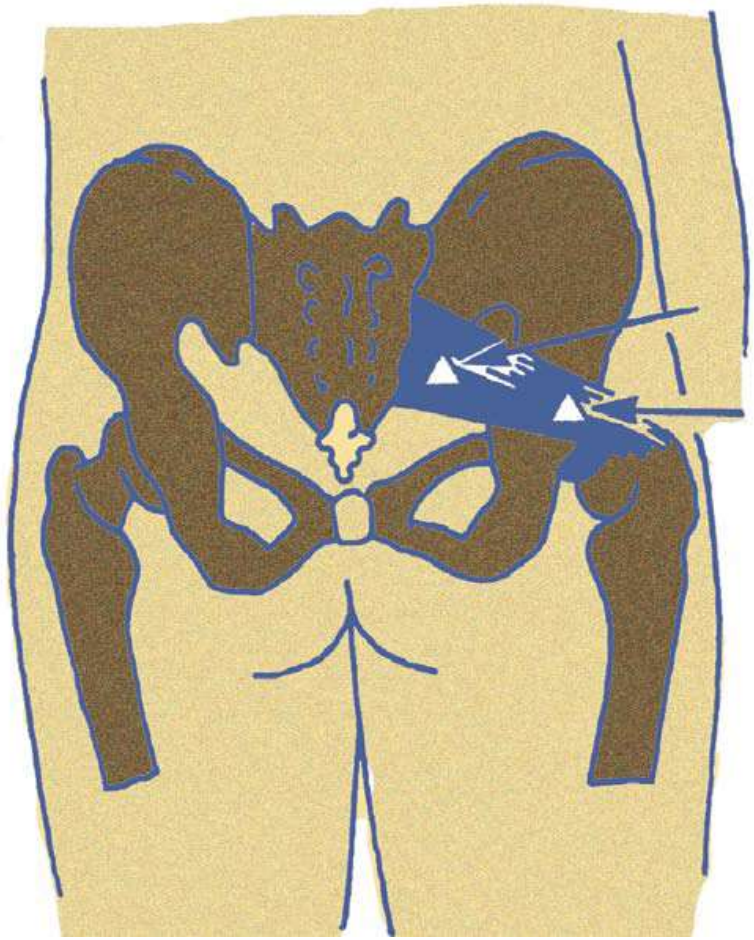
- **past the posterior knee** into the calves as a result of referred pain due to the involvement of posterior femoral cutaneous nerve
- **Low back pain** in approximately 50%
- **Gluteal** pain with or without radiation to the ipsilateral thigh that may sometimes extend below the knee may occur

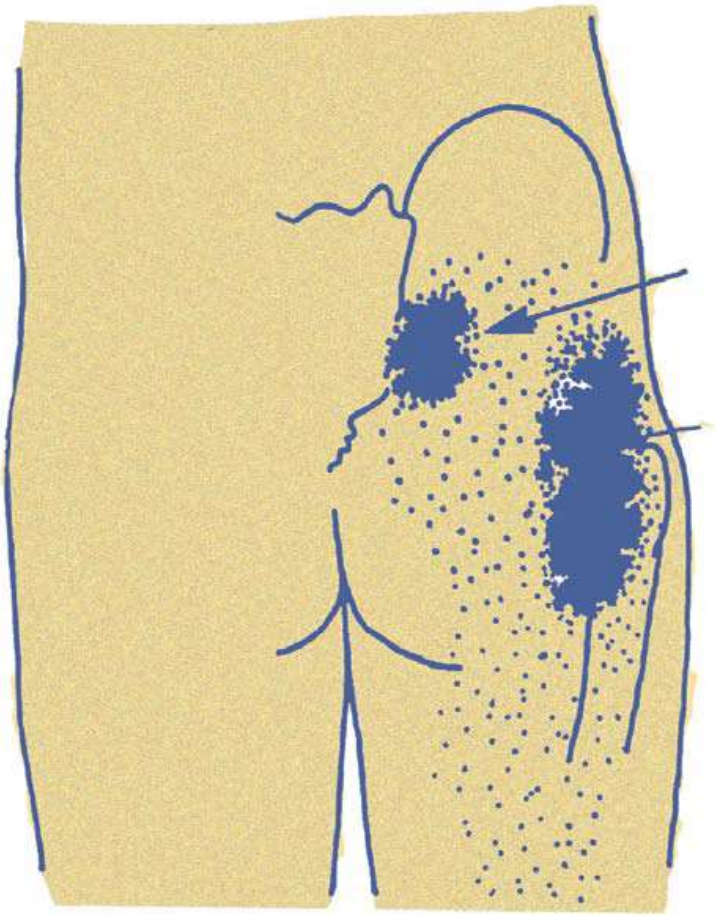
- **Dyspareunia** and pain with bowel movements in 23% of patients.
- Pain is usually exacerbated by flexion, internal rotation,and adduction of the hip joint.
- Sitting intolerance
- inability to drive or ride a bike for long distances.
- Pain may be worse when sitting on hard surfaces.

- Pain on resisted external rotation and abduction of hip.
- Pain on internal rotation of hip.

Physical Examination

- The **gluteal area** should be inspected for any obvious signs of atrophy or evidence of trauma.
- **Tenderness** in the region of the greater sciatic foramen to the greater trochanter is a frequent finding.
- A **spindle-shaped** mass or swelling can sometimes be palpated On rectal or pelvic exams, tenderness in the piriformis area may be present.





- **Pain** is often elicited with specific signs with voluntary hip flexion, internal rotation, and adduction of the hip joint.

- Straight leg raising test (referred to as Lasegue sign) is an inconsistent finding.

- **Pace sign**: patient in the sitting position, pain is elicited on resisted abduction of the hip.

- **Frieberg test**: With patient in the standing or prone position, buttock pain is elicited with forceful internal rotation of the thigh.

- **Neurologic signs** are usually negative unless there is involvement of the sciatic nerve.

Diagnosis:

- **History and physical examination**
- Ruling out all possible secondary causes of the piriformis syndrome which include all spinal and extraspinal causes.
- **CT and MRI** findings of abnormal uptake by the muscle and enlarged piriformis muscle have been reported

EMG-NCV:

- Nerve conduction studies may demonstrate delayed F waves and H reflexes.

Clinical Effectiveness:

- relief lasting about 18 months in perisciatic injection technique.
- injection of 10 mL of 0.5% procaine injection
- botulinum toxin type A

Technique

- Initially the procedure was done without fluoroscopy with palpation of the landmarks. However, now the fluoroscopy with or without injection of contrast is utilized.

- technique of piriformis injection using fluoroscopy and myelography

- prone position the piriformis muscle

  was identified using the **greater trochanter**, **SI joint**,and the lateral border of the **sacrum** as landmarks.
- technique of perisciatic injection in which the patient usually lies in the lateral or semiprone position.
- Nerve stimulator

- **Benzon** described a technique in which the steroid is injected into the piriformis muscle and the area near the sciatic nerve using fluoroscopic guidance and a nerve stimulator.
- used steroids to reduce the inflammation.

- However, they used only very dilute local anesthetic or no local anesthetic to minimize the motor blockade

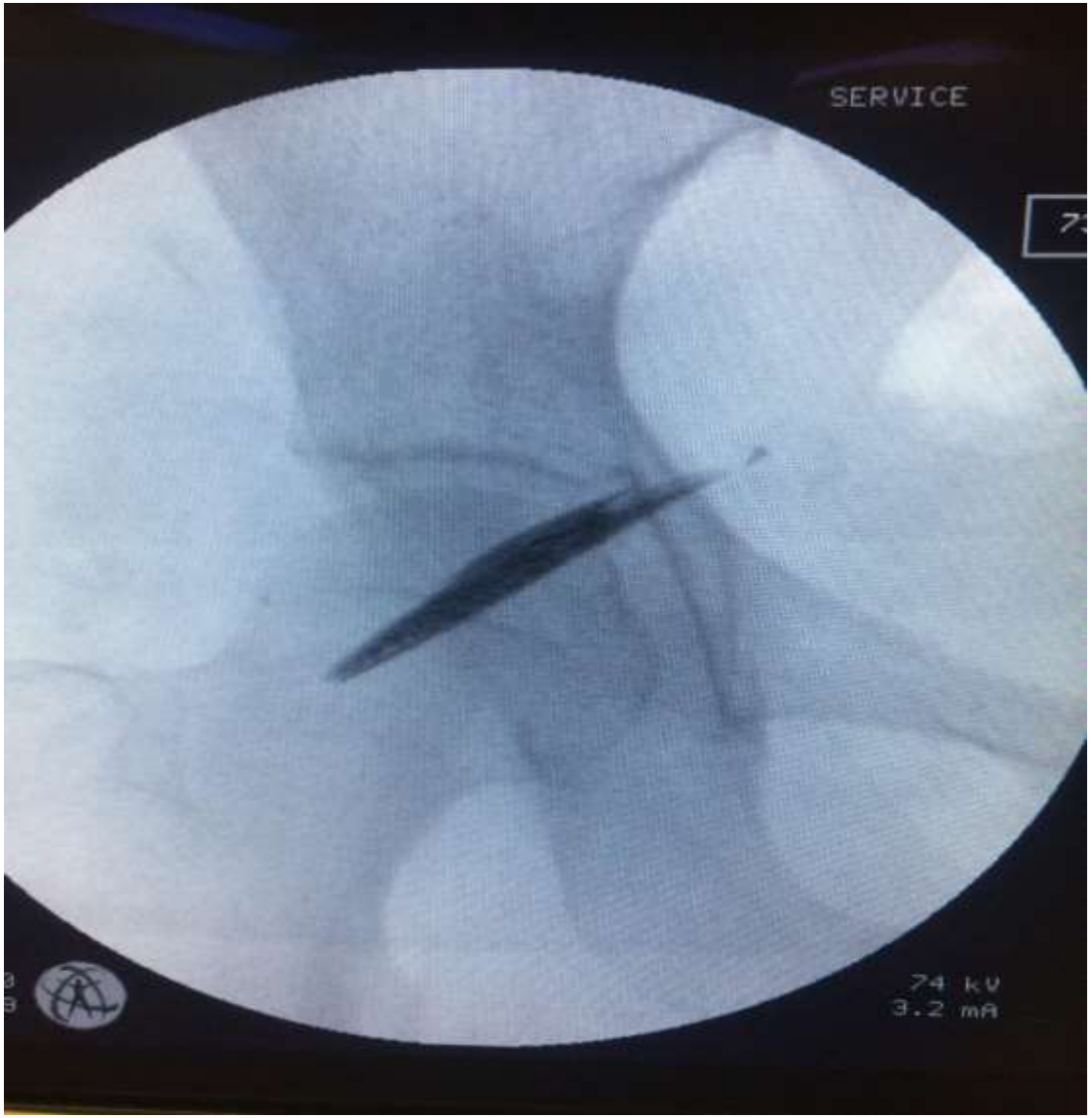
- **current** technique involves injection of the piriformis muscle under fluoroscopic guidance.
- The patient is placed prone on the procedure table and sterile technique is used.

- **Fluoroscopic** view is obtained so that the lateral border of the sacrum as well as the greater trochanter of the femur can be visualized in the same view.
- A pencil-point **22G**, **3.5-inch** needle

- The **point** of **entry** is marked over the superior-medial aspect of the hip joint.
- it provides a margin of safety against accidental entry into the pelvic area.
- advanced **perpendicular** to the skin and

  in most cases a distinct "**pop**" is felt as the pencil-point needle pierces the posterior muscle fascia.
- As the needle is slightly lateral to the location of the sciatic nerve, **paresthesiae** is usually uncommon.

- **lateral** fluoroscopic views, the **needle tip** may be found located approximately halfway **between** the posterior border of the sacrum and the greater trochanter.
- **Confirm** the placement of the needle, and distinct striated spread of the contrast is noted in an oblique direction.
- Usually a total volume of **5 mL** made up of 20 mg of **corticosteroid** diluted with 0.5% of **lidocaine** is injected.


SERVICE
74 kV
3.2 mA

- **Botulinum** toxin may be used for longer lasting relief **if** the patients respond to local anesthetic and steroid injection.Either type A or B has been used.
- **comparing** botulinum toxin type A with methylprednisolone in patients with myofascial piriformis pain. The patients, who had botulinum injections, had significantly **lower pain scores** **at 60 days** after injection.

- Piriformis syndrome may also be treated with **radiofrequency thermoneurolysis** generally with a pulsed mode.
- The patient is positioned prone and the site is identified by fluoroscopy.

- Local anesthetic
- **10** cm **22G** cannula with a **5 mm** active tip is advanced to **periosteum**.

- Radiofrequency probe is introduced through the cannula Stimulation with 50 Hz up to one volt to localize the muscle is provided. Subsequently it is decreased to 0.5 volts. There should not be any motor stimulation with 2 Hz at 2 volts.

- **Radiofrequency** may be carried out at 85 degrees for 60 seconds,repeated twice, or at 42 degrees for 120 seconds with a pulsed mode.

Precautions

- Patients on warfarin therapy should have PT checked
- In stopping anticoagulant therapy, one should take into consideration the risk/benefit ratio of the procedure

- **Aspirin** and **NSAIDS** alone are considered **safe**.

- However, combination of these drugs or other antiplatelet therapy with clopidogrel (Plavix) or ticlopidine

  may be considered to increase the risk

Side Effects and Complications

Potential complications include:

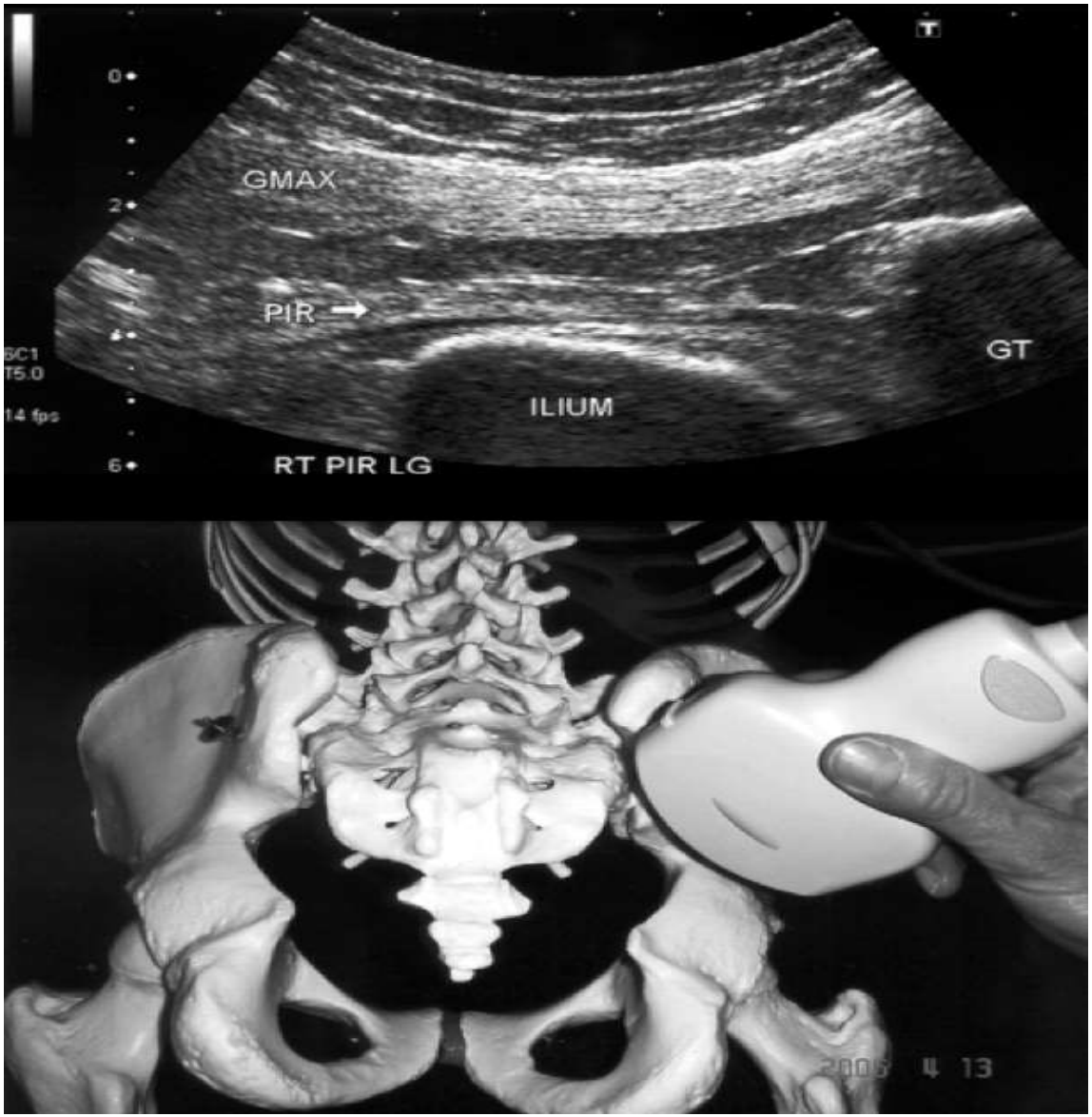
infection, hematoma,neural damage, trauma to the sciatic nerve

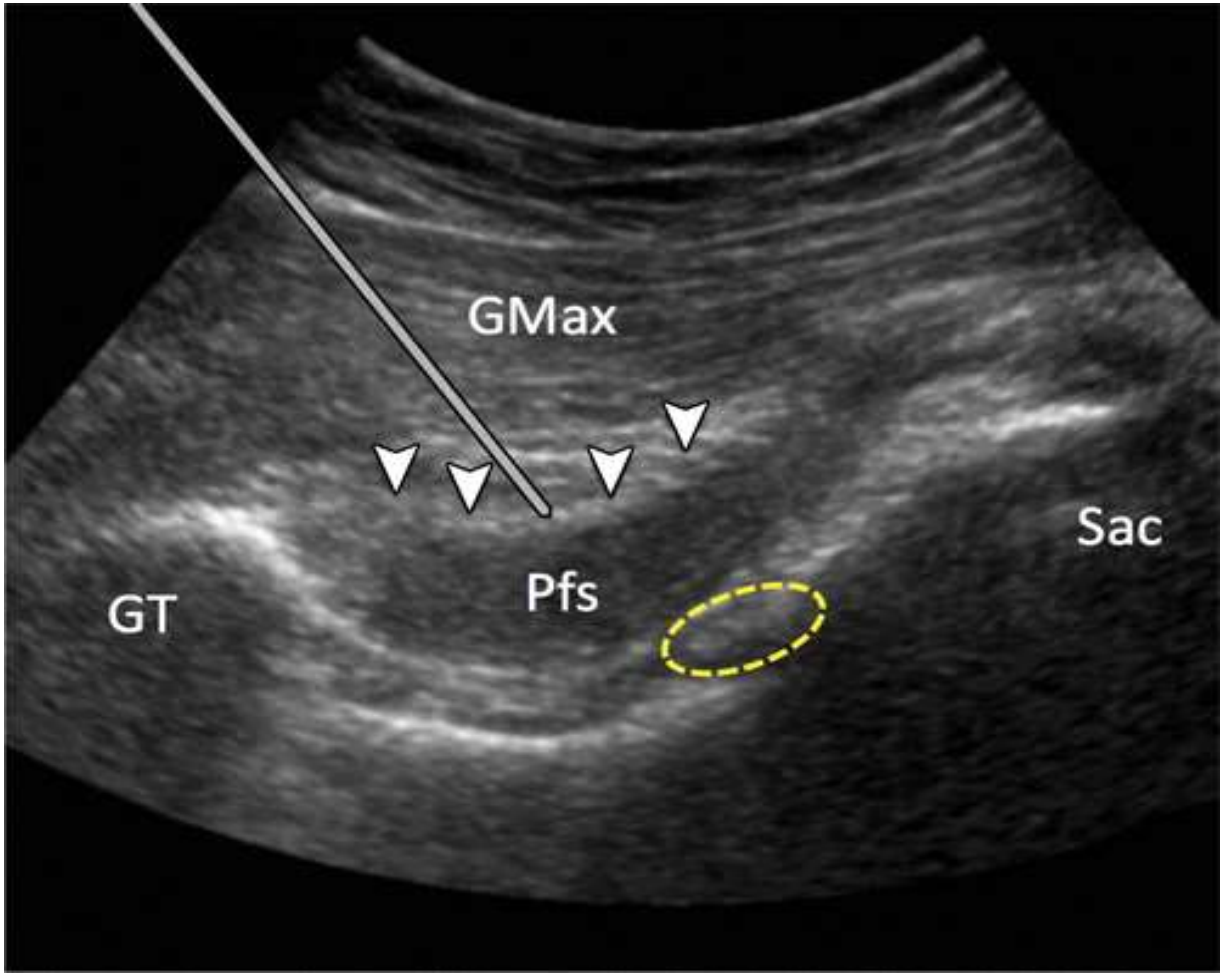
complications of **radiofrequency thermoneurolysis**:

worsening of pain, burning or dysesthesias, decreased sensation and **allodynia**, transient leg pain, persistent leg weakness,inadvertent lesioning of the spinal nerve,

Ventral ramus, or sciatic nerve resulting in motor deficits, sensory loss, and possible deafferentation pain. light headedness, flushing, sweating, nausea, hypotension, syncope, pain at the injection site, and headaches.

- Side effects of **steroids**


GMAX
PIR
GT
ILIUM
RT PIR LG
14 fps


GMax
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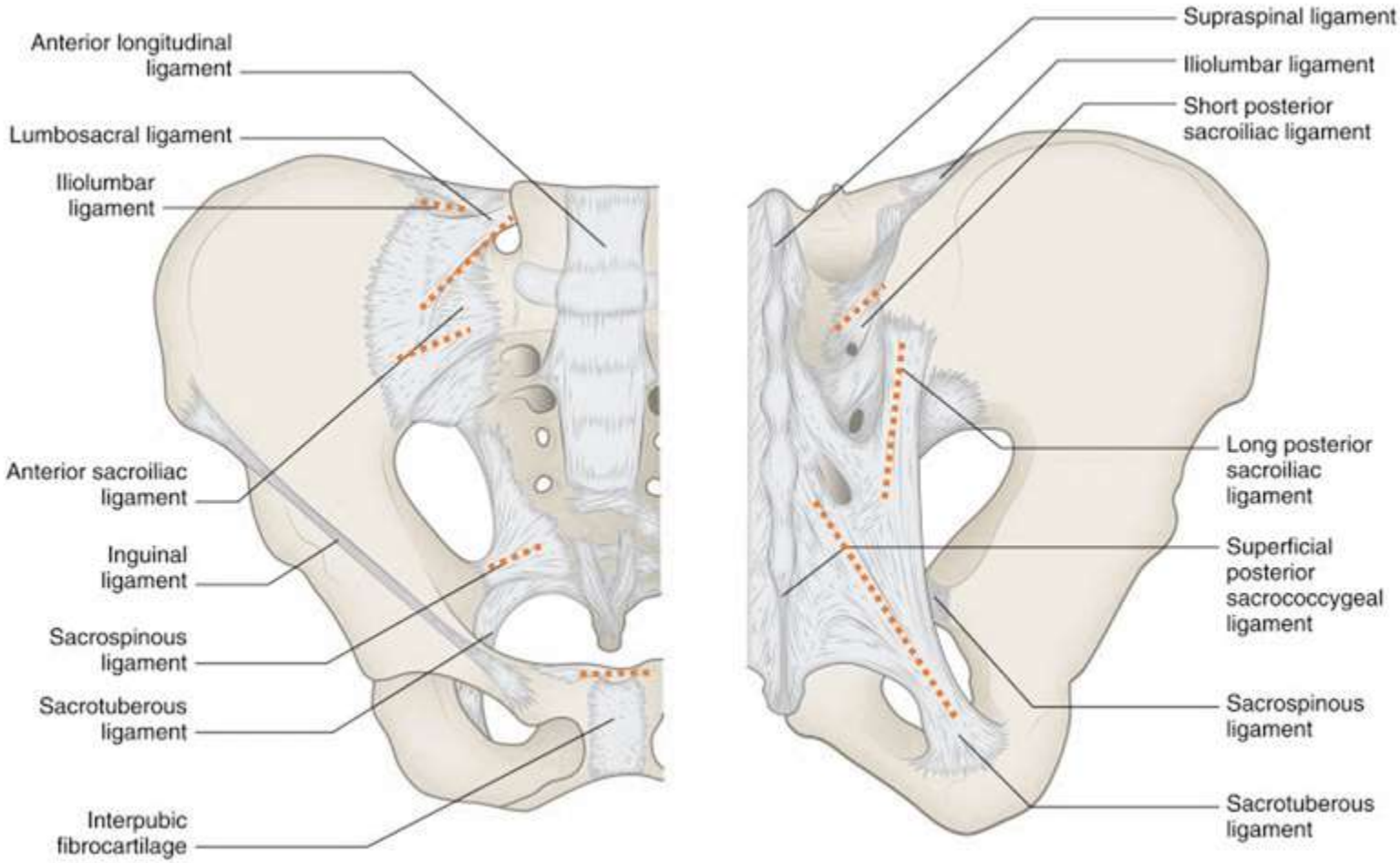
Coccydynia

- **Coccydynia**: common pain syndrome
- pain localized to the tailbone that radiates into the lower sacrum and perineum.
- **female** more than male.
- Coccydynia occurs most commonly after direct trauma to the coccyx from a kick or a fall directly onto the coccyx.

  Also after difficult vaginal delivery.

- **pain** of coccydynia result from strain of the sacrococcygeal ligament or occasionally from fracture of the coccyx.
- Less commonly, arthritis of the sacrococcygeal joint
- tumors affecting the coccyx and adjacent soft tissue


Anterior longitudinal ligament
Lumbosacral ligament
Iliolumbar ligament
Anterior sacroiliac ligament
Inguinal ligament
Sacrospinous ligament
Sacrotuberous ligament
Interpubic fibrocartilage
Supraspinal ligament
Iliolumbar ligament
Short posterior sacroiliac ligament
Long posterior sacroiliac ligament
Superficial posterior sacrococcygeal ligament
Sacrospinous ligament
Sacrotuberous ligament

Clinical Presentation:

- point tenderness over the coccyx;
- the pain increases during movement of the coccyx.

- Movement of the coccyx may also cause sharp paresthesias into the rectum, which can be quite distressing

- **On rectal examination**:

  the levator ani, piriformis,and coccygeus muscles may feel indurated, and palpation of these muscles may induce severe spasm.

- Sitting may exacerbate the pain of coccydynia, and the patient may attempt to sit on one buttock to avoid pressure on the coccyx.

Diagnosis:

- **Plain radiographs** are indicated in all patients who present with, to rule out occult bony disease and tumor.
- Aditional testing including CBC,PSA,ESR

  ANA testing may be indicated.
- MRI of the pelvis is indicated if an

  occult mass or tumor is suggested

Differential Diagnosis:

- Primary disease of the rectum and anus
- Primary tumors or metastatic lesions of the sacrum or coccyx
- Proctalgia fugax:
- but movement of the coccyx does not reproduce the pain.
- fractures of the pelvis and sacrum
- disorders of the sacroiliac joints.

Treatment:

- **First step**: A short course of **conservative** therapy simple analgesics, NSAIDS or cyclooxygenase-2 inhibitors,

- use of a **foam donut** to prevent further irritation to the sacrococcygeal ligament is a reasonable in the treatment of coccydynia

- **SECOND STEP: INJECTION**
- prone position.
- The legs and heels are abducted to prevent tightening of the gluteal muscles.
- The middle finger of the operator's nondominant hand is placed over the sterile drape into the natal cleft
- with the fingertip palpating the sacrococcygeal joint at the base of the sacrum.
- After the sacrococcygeal joint is located,

Fig. 103.2 The pain of coccydynia is localized to the coccyx and is made worse by sitting. *(From Waldman SD:* Atlas of common pain syndromes, *Philadelphia, 2002, Saunders, p 227.)*

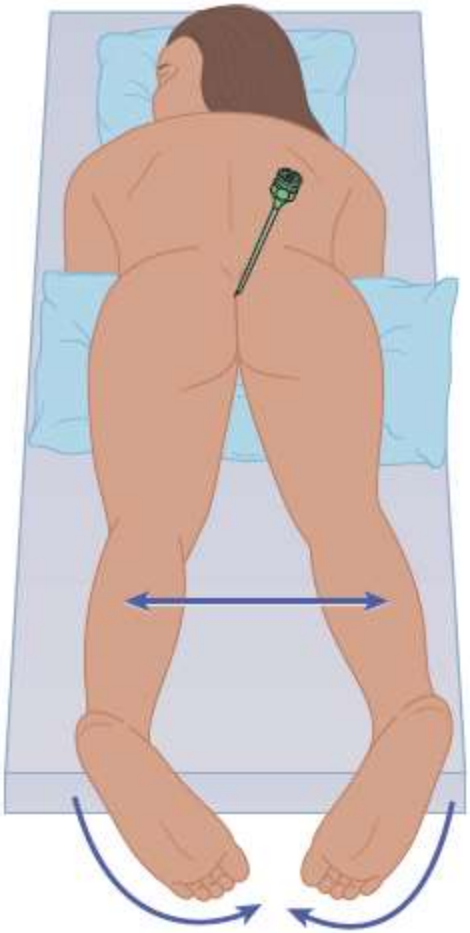
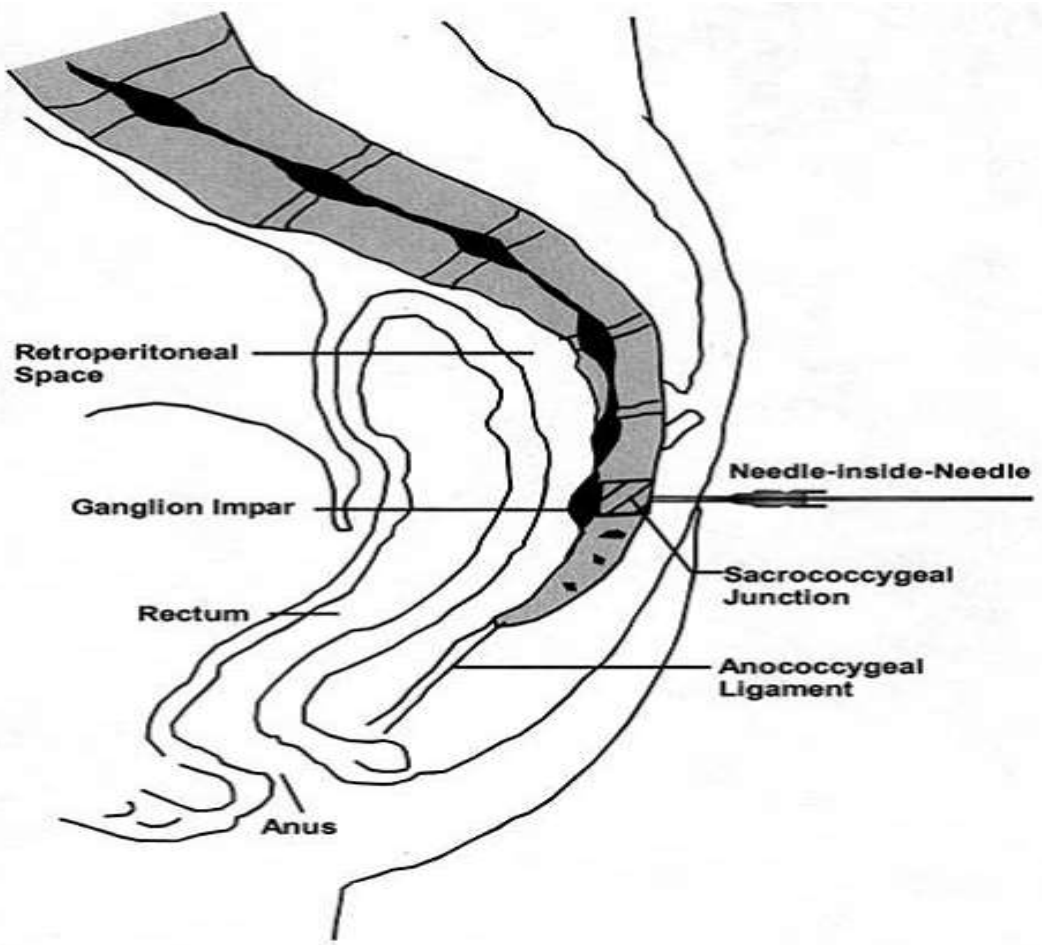


Fig. 103.4 **Injection technique for relieving pain in coccydynia.** *(From Waldman SD: Coccydynia syndrome. In* Atlas of pain management injection techniques, *Philadelphia, 2000, Saunders, p 244.)*


Retroperitoneal Space
Ganglion Impar
Rectum
Anus
Needle-inside-Needle
Sacrococcygeal Junction
Anococcygeal Ligament

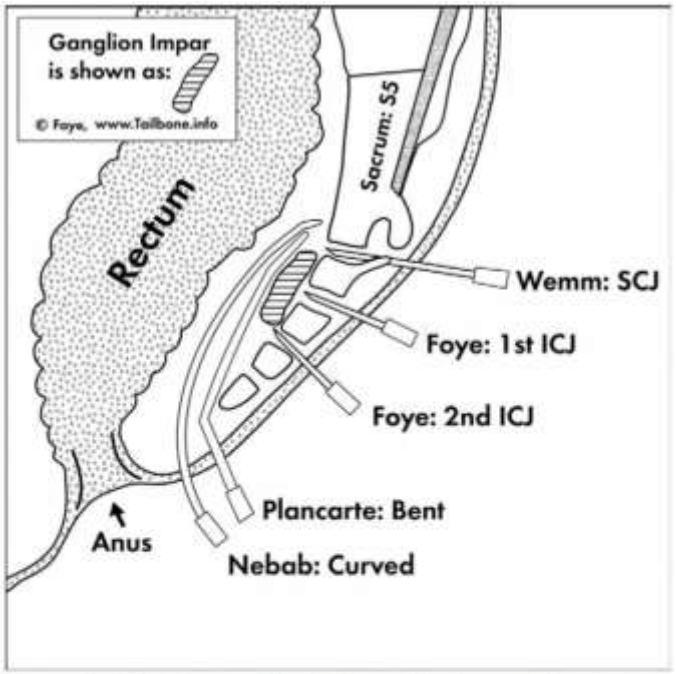
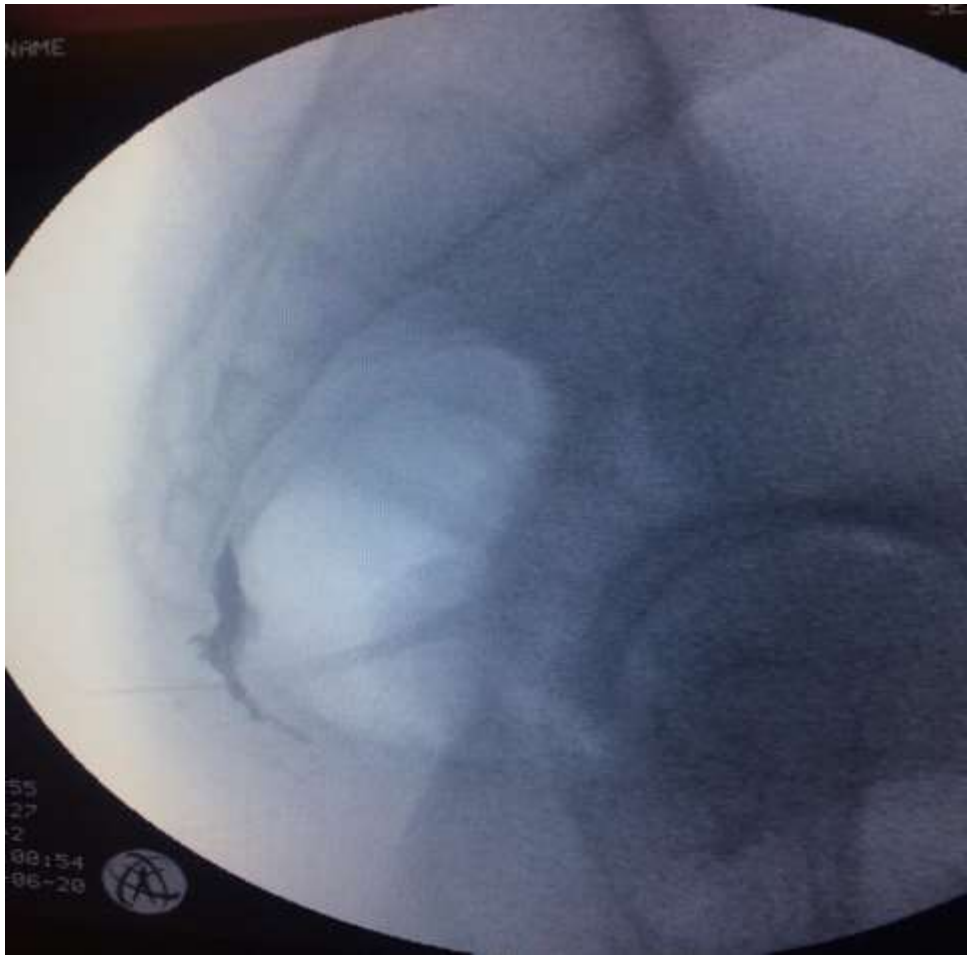


Figure 1 Techniques to block the ganglion Impar, noting the physicians who published them. Early techniques approached via the ano-coccygeal ligament using either a bent needle (Plancarte) or a curved needle (Nebab). Modern approaches include passing the needle via the sacrococcygeal joint (SJC, by Wemm), the first intracoccygeal joint (1st ICJ, by Foye) or the second ICJ (Foye). (Reprinted with permission from Patrick M. Foye, www.Tailbone.info.)

Safe ganglion Impar blocks for visceral and coccyx pain Patrick M. Foye
Techniques in Regional Anesthesia and Pain Management (2008) 12, 122-123

- When the needle is satisfactorily positioned, a syringe containing 5 mL of 1.0% preservative-free lidocaine and 40 mg of methylprednisolone is attached to the needle.
- Gentle aspiration
- Resistance to injection should be minimal. Any significant pain or sudden increase
- in resistance during injection suggests incorrect needle placement,

- should stop injecting immediately and reassess the position of the needle.
- The needle is then removed,and a sterile pressure dressing and ice pack are placed at the injection site.
- ganglion impar block may be used in patients who fail to respond to the foregoing injection technique. In rare patients, surgical coccygectomy may be required to provide long-lasting pain relief


NAME

Conclusion:

- Coccydynia should be considered a diagnosis of exclusion in the absence of trauma to the coccyx and its ligaments.
- Failure to diagnose an underlying tumor can have disastrous consequences.
- As with all pelvic pain syndromes, careful evaluation of behavioral abnormalities should be considered

Thanks for your attention