

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

آسیب های نورولوژیک در جراحی های زنان

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عضو هیات علمی دانشگاه البرز

Neural Injury

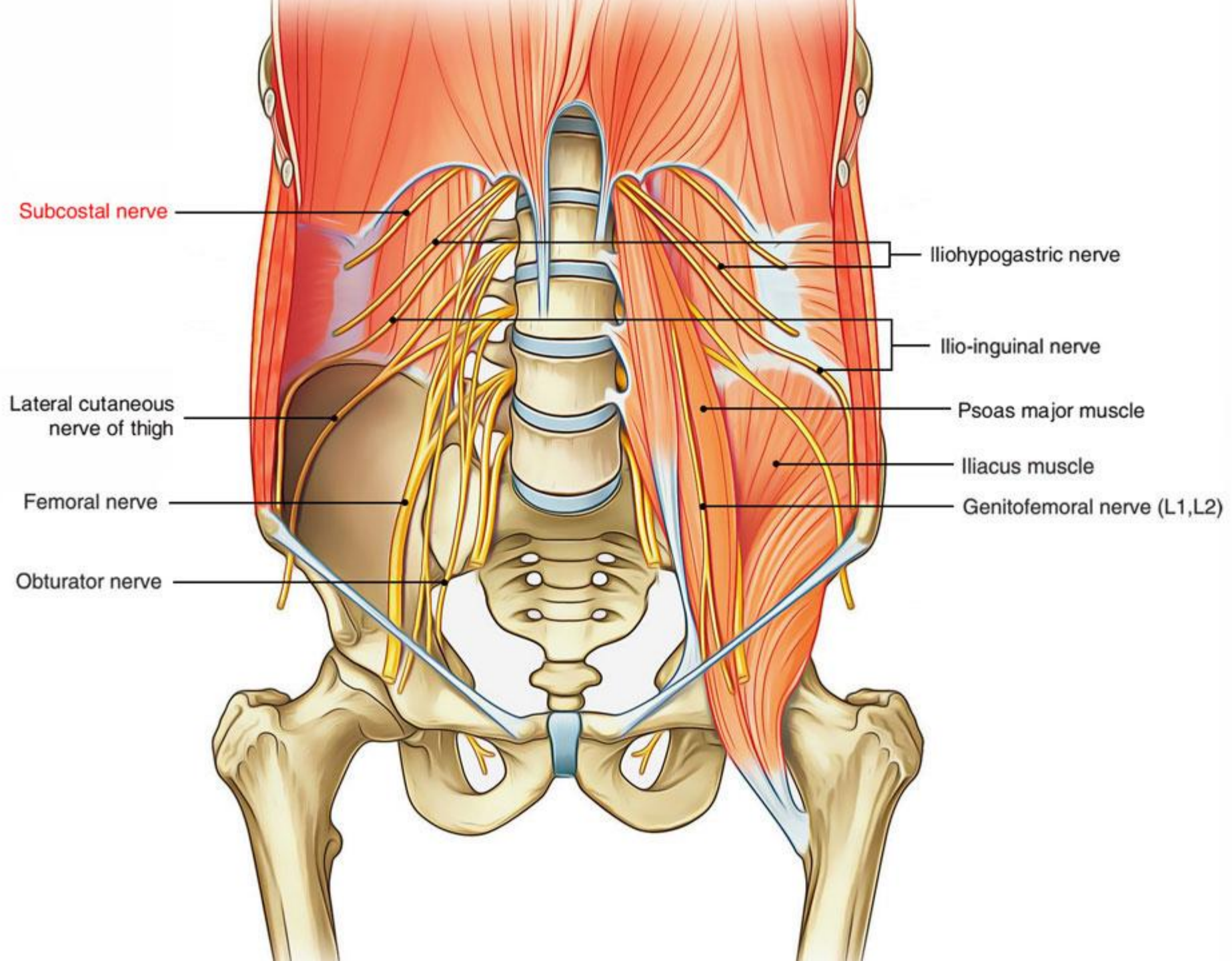
- An unexpected & distressing complication of successful operation.
- Reversible or permanent symptoms:
 - Pain
 - Paresthesias
 - Loss of sensation
 - Motor weakness

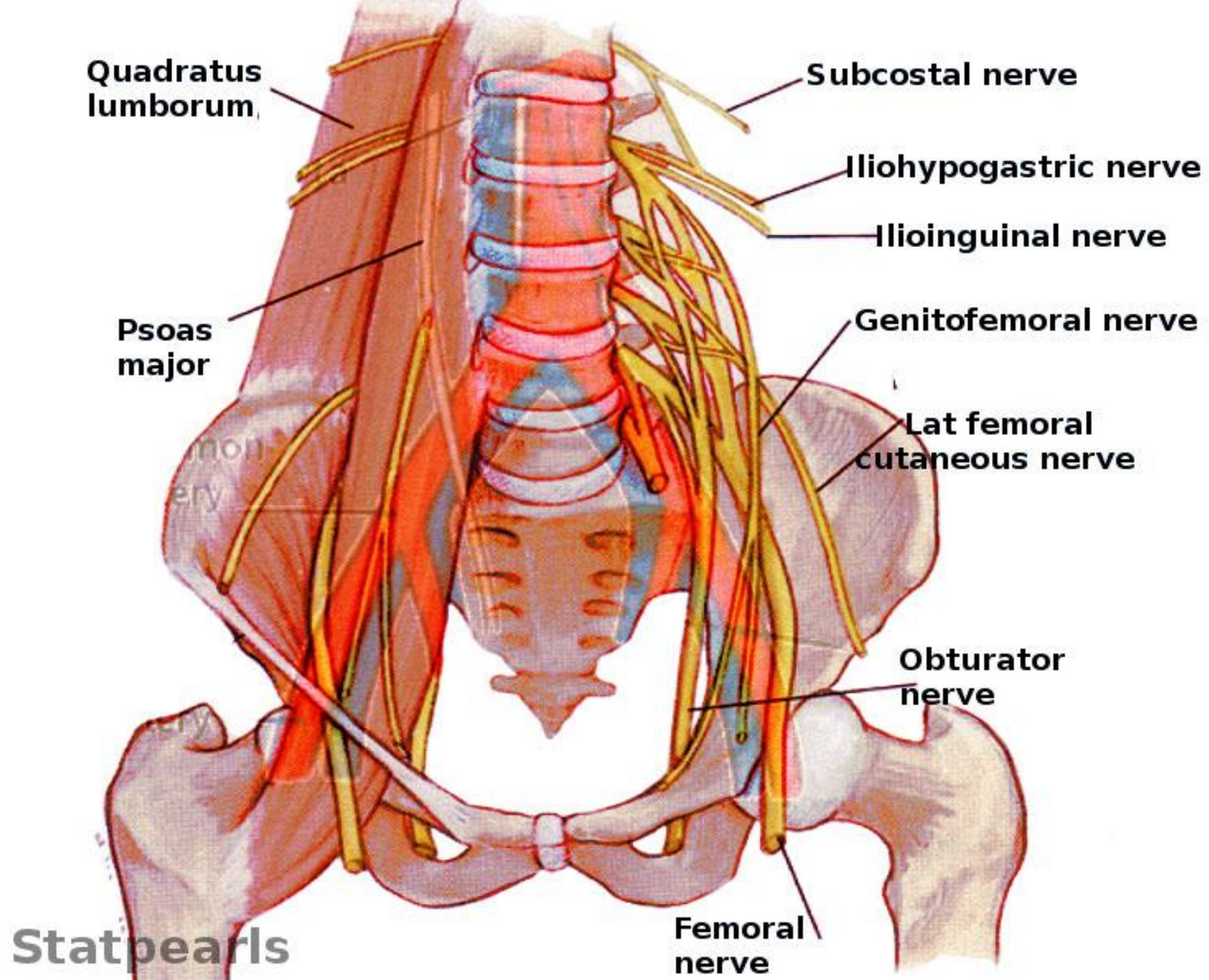
Causes

- Transection from incision, trocar insertion, or thermal injury from electrosurgical devices
- Entrapment from ligation for control of bleeding, tissue reapproximation (eg, closure of retroperitoneum), or reconstructive pelvic surgery (eg, vaginal or bladder suspension procedures)
- Compression or stretching of the nerve from patient positioning, retractors, clamps, or hematoma

Anatomy

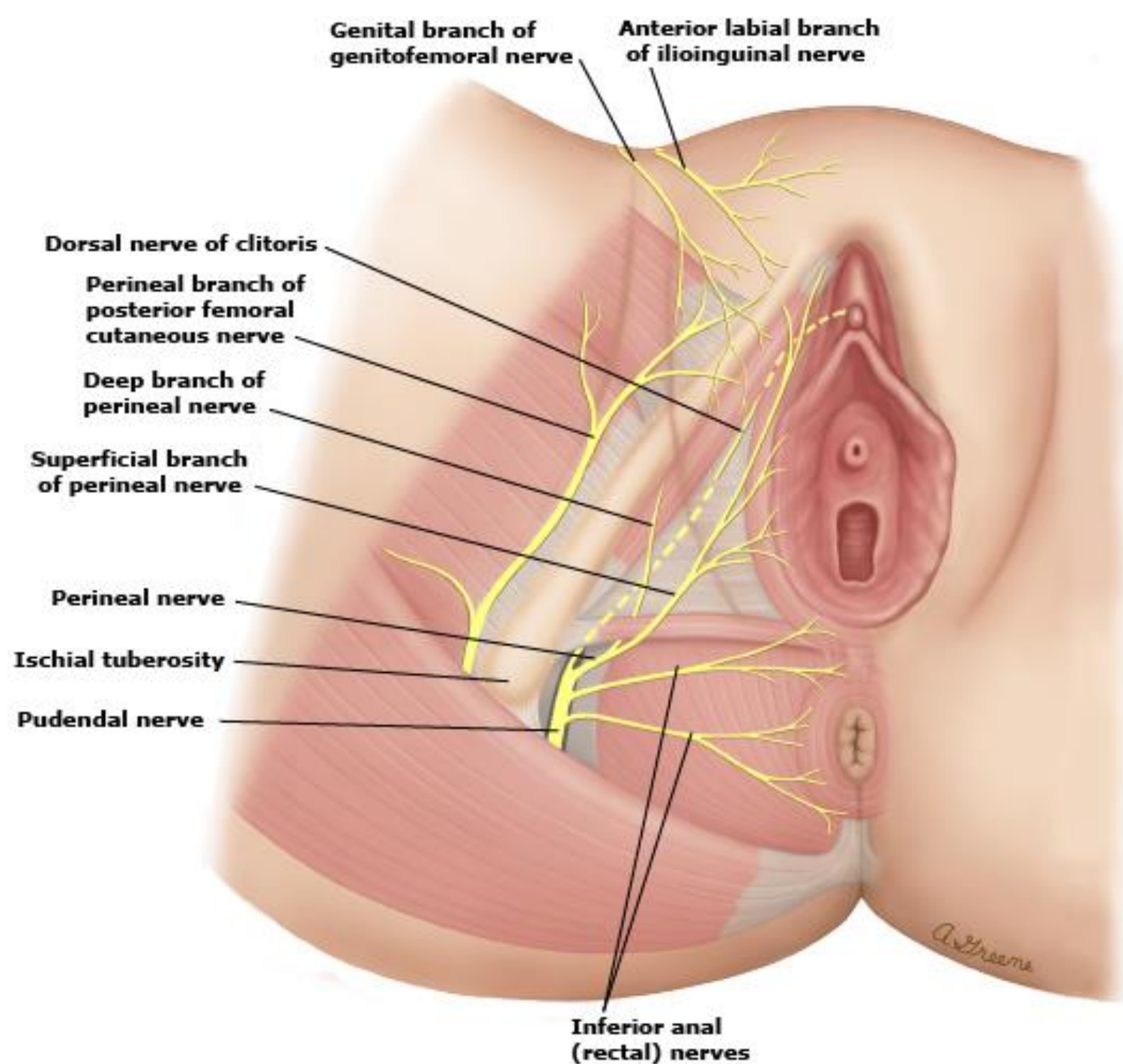
- The most common neuropathies with pelvic surgery involve:
- Femoral
- Ilioinguinal
- Iliohypogastric
- Genitofemoral
- Lateral femoral cutaneous
- Obturator
- pudendal





anatomy

- **nerve** roots involved with vaginal or rectal surgery:
- S1
- S2
- S3
- S4

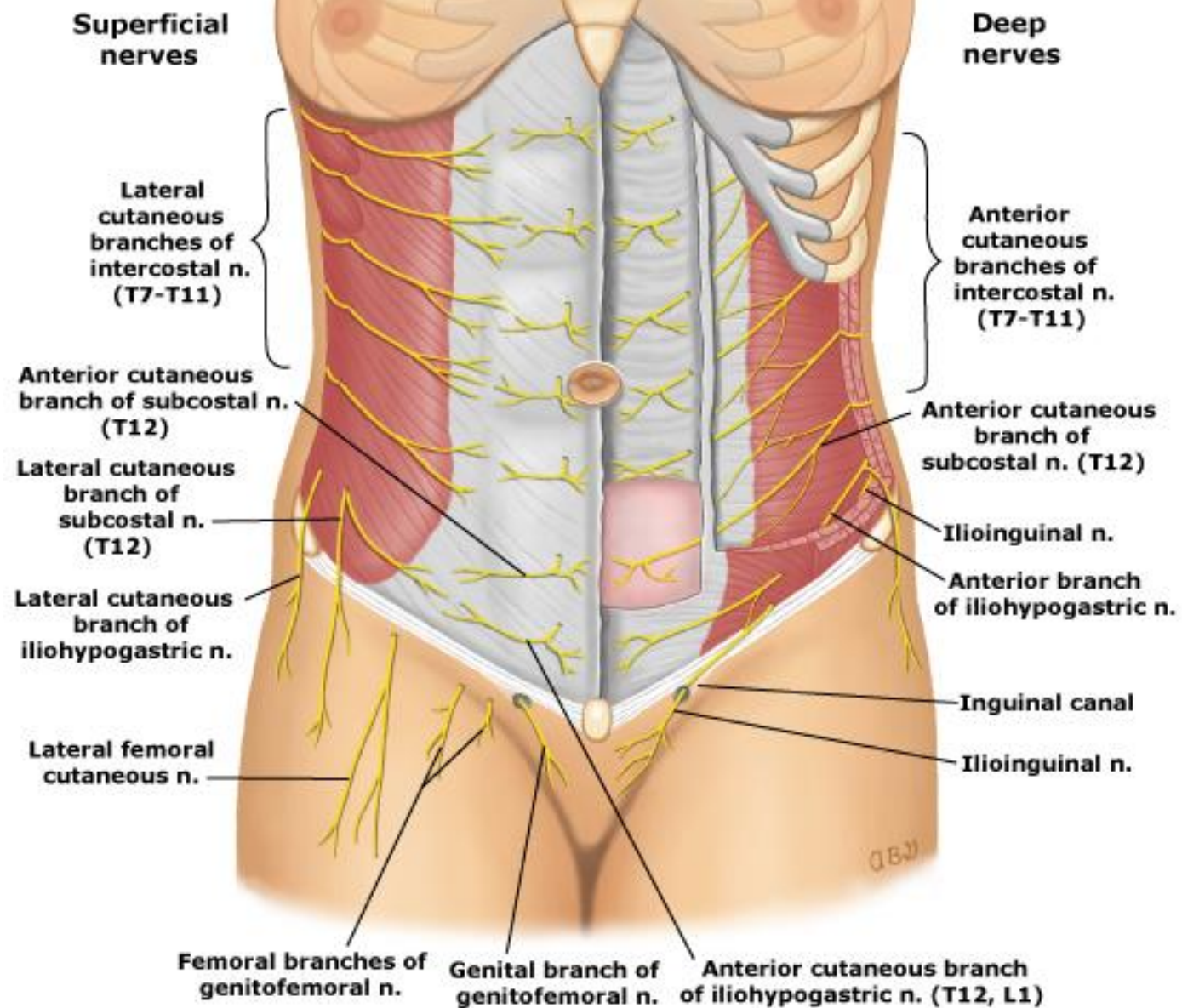


Incidence

- 2 Percent in pelvic surgery
- Factors: type of surgical procedure, surgical approach, patient position, & length of surgery
- Lithotomy position: sciatic, femoral & peroneal neuropathies, compartment syndromes
- Uterosacral suspension & sacrospinous ligament suspension of the vagina: neuropathies of the sacral nerve roots & pudendal nerve
- The most common nerves: femoral, lateral femoral cutaneous

Transection injuries from incisions

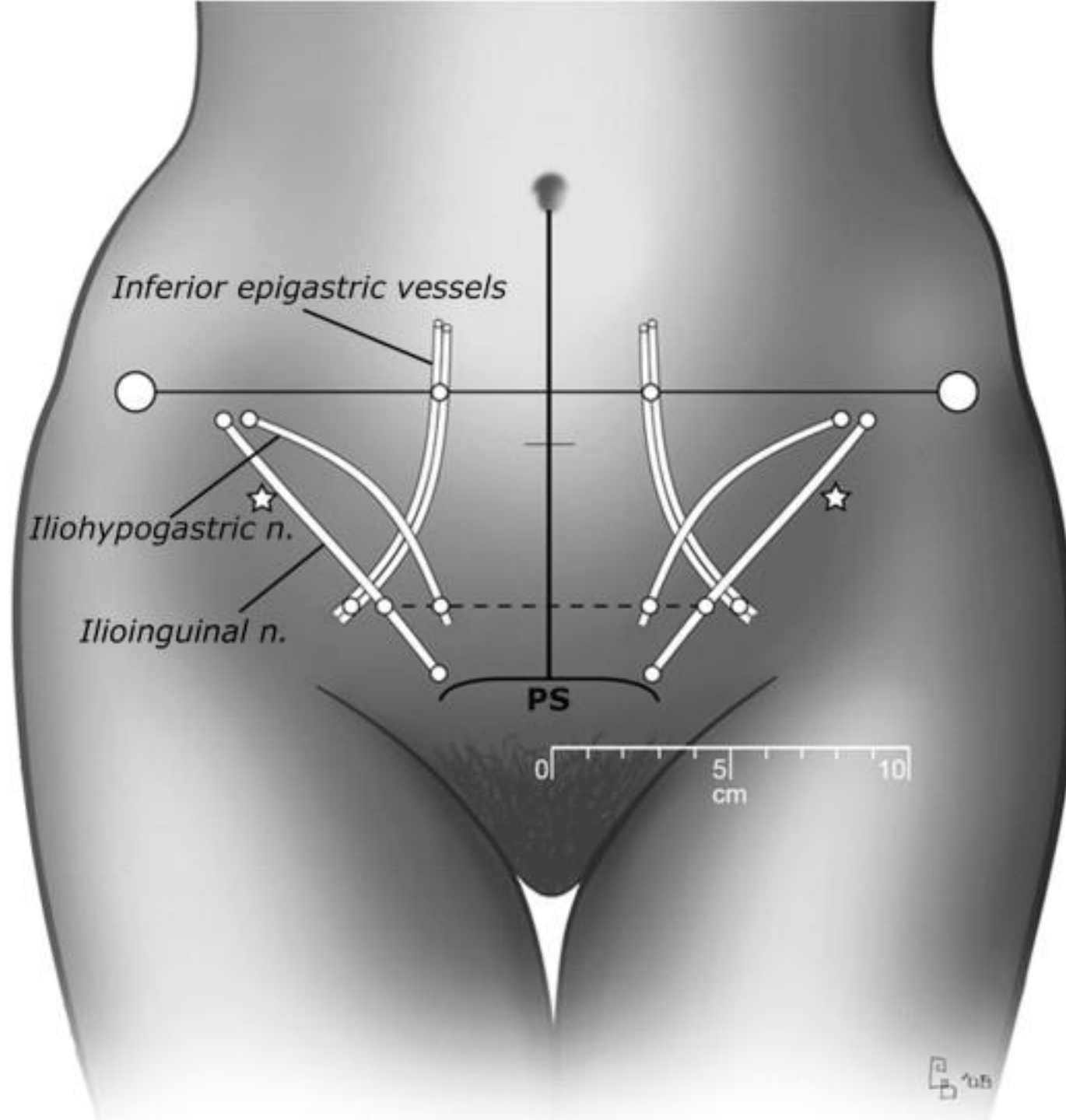
- Longitudinal(vertical) incisions: low risk of nerve injury, most terminal portion of the abdominal wall nerves, paresthesias or rectus muscle paralysis will be minor.
- Transverse incisions: chronic pain occurs in 7% of Pfannenstiel incisions due to entrapment of iliohypogastric or ilioinguinal nerves.
- A transverse incision placed within the borders of the rectus muscles & 2 cm above the symphysis pubis: minimal loss of neural function.
- Dissection of anterior rectus sheath may injure terminal sensory nerve fiber of ant cutaneous branches of iliohypogastric & ilioinguinal nerves.



□ Pfannenstiel Incision

- Skin:
 - Curved incision
 - two fingers breadths above the symphysis pubis
 - midportion of the incision within the shaved area of the pubic hair
- Sheath:
 - Transverse incision .
- Rectus M
 - Separated bluntly
- Parietal peritoneum
 - incised at the midline





Transection injuries from incisions

- Efforts to obtain hemostasis of bleeding perforating vessels may injure the accompanying nerves: A small triangular area of numbness above the incision (apex toward the umbilicus). The paresthesia usually resolves within 6 months.
- A transverse incision that extends beyond the lateral margin of inferior rectus muscle may injure the lateral cutaneous branches of the iliohypogastric & ilioinguinal nerves.
- A transverse incision that is placed too near the symphysis pubis may injure nerves that pass the inguinal ligament & canal, such as femoral, genitofemoral, lateral femoral cutaneous, ilioinguinal & iliohypogastric nerves.

Entrapment injuries

- Fascial closure
- Pelvic reconstructive surgery
- Pain is a common symptom
- Numbness & loss of function is uncommon (in contrast to the transection)
- Early intervention is appropriate
- Release of entrapped nerve can restore sensory & motor function

Neuroma

- Form at the transected or traumatized edge of nerve or at the site of nerve entrapment(eg, as a result of scar tissue).
- Usually diagnosed several weeks to months following surgery
- Persistent postoperative abdominal & groin pain: possibility of iliohypogastric or ilioinguinal neuroma
- Pain & burning at the incision site
- Sensory impairment in the area of nerve distribution
- Referred pain to the groin or along the distribution of the nerve's sensory distribution & pain elicited by percussion over the neuroma.

Neuroma

- Relief of pain following nerve block supports the diagnosis, but false positive & negatives occur.
- Pain is often more of an issue for the patient than minor degrees of motor impairment.
- Pain may initially be managed medically with anti-inflammatory drugs & injection of local anesthetics.
- Excision of affected nerve proximal to the site of the neuroma
- Resection into the retroperitoneum & implantation of the proximal stump into muscle has been recommended to avoid recurrence of pain
- Neurolysis of nerves encased in scar tissue.

Compression injuries

- Caused by prolonged pressure against the nerve
- Retractors
- Prolonged positioning of the patient in stirrups
- Prolonged packing
- Malposition of the patient's arms
- Hematomas
- Neuropathy is due to ischemic injury from pressure on the vasa nervorum & is usually evident in the immediate postoperative period.

Iliohypogastric & Ilioinguinal neuropathies

- Entrapment by sutures, direct trauma, or formation of a neuroma
- Ilioinguinal be at greatest risk
- Symptoms may occur soon after surgery, or months to years later
- Symptoms are aggravated by stretching, coughing, sneezing & Valsalva maneuver
- Examination may reveal trigger points with lancinating pain when touched
- Neurectomy if nerve block produces decrease in pain
- Postoperative side effects are persistent numbness below the nerve

Femoral neuropathy

- Deep pelvic surgery, particularly abdominal hysterectomy, less common after vaginal surgery (hyperflexion of thigh, kinking of nerve)
- Compression of the nerve against the pelvic sidewall
- Nerve emerges from the border of the psoas muscle before exiting the pelvis at the inguinal ligament.
- Very deep or lateral placement of the retractor blades
- Wide Pfannenstiel or Maylard incision
- Thin subcutaneous fat layer (BMI \leq 20)
- Operation time > 4 h
- Poorly developed rectus muscles

Femoral neuropathy

- Narrow pelvis
- Use of self-retaining retractors, especially those associated with extreme lateral traction
- 10 % of patients who undergo laparotomy
- Anesthesia of the anterior & medial thigh
- Weakness in the quadriceps & iliopsoas muscles
- Most resolve spontaneously
- If not, significant disability, weakness of hip flexion & knee extension (climb stairs)

Genitofemoral & lateral femoral cutaneous nerves

- lie on the belly of psoas muscle, lateral to the external iliac vessels
- Are at risk of compression from retractor blades, transection during dissection of the external iliac lymph nodes, mobilization of the iliac vessels, or removal of a large pelvic mass adherent to the pelvic sidewall
- Genitofemoral : anesthesia or paresthesia of the labia & upper medial thigh without motor deficits
- Lateral femoral cutaneous : paresthesia & pain that radiate down the ant. & posterior-lateral aspect of the thigh toward the knee

Obturator nerve

- Arises from L2, L3, & L4
- Unite posterior to the psoas muscle & pass inferiorly over the sacrum or pelvic brim to the obturator canal
- Innervate the thigh adductor muscles, sensory input from the hip joint, knee & anterior medial thigh
- Injured with passage of a trocar (placement of a transobturator tape or passage of a vascular graft), pelvic lymph node dissection in the obturator fossa
- Procedures : excision of endometriosis, paravaginal defect repair with dissection in the space of Retzius & obturator bypass
- Numbness of the inner thigh & weakened adduction of the thigh

Peroneal nerve

- Common site of injury of the common fibular nerve is just below the knee, where the nerve wraps around the lateral aspect of the fibula
- Excessive external pressure caused by prolonged lying during surgery or lengthy hospitalization, crossing the legs, protracted squatting & leg casts
- Stretch injuries are possible
- Presentation : acute foot drop (difficulty dorsiflexing)
- Steppage gait : flexing the hip higher when walking, limp
- Paresthesias &/or sensory loss over the dorsum of the foot & lateral shin

Pudendal nerve

- Arises from S2, S3, & S4, exits the pelvis through the greater sciatic foramen, then re-enters via the lesser sciatic foramen to enter the pudendal canal (Alcock's canal)
- The nerve passes behind the lateral third of the sacrospinous ligament & posterior to the ischial spine (at this point it is at risk of entrapment or injury during sacrospinous ligament fixation)
- Symptoms : perineum, vulve, anus, clitoris, distal urethra, & labia pain, which worsens in the seated position, patient is not awakened by pain, no sensory loss & resolution of pain with pudendal nerve block

Isolated nerve roots S1-S4

- Postoperative sharp buttock pain & numbness that radiates down the center of the posterior thigh to the popliteal fossa
- A review of 182 uterosacral ligament suspension procedures : 3.8 % have symptoms within 24 h
- Symptoms be related to the placement of uterosacral ligament suspension sutures & removal of the sutures produced immediate reduction of symptoms

Nervi erigentes

- Arise from the ventral rami of S2-S4
- Provide parasympathetic innervation to the hindgut
- Injury is due to nerve stretching from retraction, thermal damage from electrocautery, ischemia from disruption of local blood supply, or inflammation from surgical trauma
- Disruption of pelvic parasympathetic activity can lead to rectal, urinary, or erectile dysfunction

Brachial plexus

- Is formed by the ventral rami of the lower cervical & upper thoracic nerve roots.
- Divide into trunks, division, cords, branches & nerves
- Provides cutaneous & muscular innervation to the upper extremity with the exception of the trapezius muscle & a small area of skin near the axilla
- Disruption of any portion of the brachial plexus by compression, stretching, pressure-induced ischemia, or transection can result in motor or sensory dysfunction

