**Clinical Notes**

**Surgical Incisions:**

**All surgical incisions** should be made **in the line of cleavage (direction** of the rows of the collagen fibers) in the dermis**.** These fibers **run in parallel rows. An incision along a cleavage line will heal as a narrow scar, whereas one that crosses the lines will heal as wide or heaped- up scars (ugly).**

**Extravasation of urine**:

**Rupture of penile urethra** may be followed by **extravasation of urine** into the **scrotum,** **perineum and penis** and then **up into the lower part** of the **anterior abdominal wall deep** to the **membranous layer of fascia. The urine is excluded from the thigh** because of the **attachment of the fascia** to the **fascia lata**

**Umbilical Herniae:**

**A- Congenital hernia (** exomphalos) or omphalocele:

It is **caused** by **a failure of part of the midgut** to **return** to the **abdominal cavity** from the **extraembryonic coleom** during fetal life.

**B- Acquired infantile hernia:**

**it is caused** by a **weakness** in the **scar** of the **umbilicus in the linea alba**. **Most disappear** as the **abdominal cavity enlarges without treatment.**

**C- Acquired umbilical of adults** (paraumbilical hernia):

The **hernial sac** **protrudes** through the **linea alba** in the region of the **umbilicus**. It gradually **increases in** size and hang downward. The **neck of the sac** may be **narrow** but the **body of the sac contains coils of** **small and large intestine and omentum. It is more common in female than male**

**Incisional Hernia**:

**A-** It is **caused** to **cut one** of the **segmental** nerves supplying the muscles of the **anterior abdominal** wall.

**B- Infection** with death (necrosis) of the abdominal musculature. The **neck of the sac is large** and **adhesion &** **strangulation of its contents are rare**.

**Epigastric Hernia**:

It **occurs** through the widest part of the **linea alba,** any where **between the xiphoid process &** **umbilicus. It starts off** as a **small protrusion** of the **extraperitoneal fat** between the **fibers** of the **linea alba.** Then **fat is forced through the linea alba** and **trags behind it a small peritoneal** **sac.** The **body of the sac contains a small piece of greater omentum**.

**Separation of the recti abdominis:**

**It occurs** in elderly **multiparous** women with weak abdominal muscles. The **aponeurose**s **forming the rectus sheath become stretched. The hernial sac, containing** **abdominal viscera bulges forward between the medial margins** of **the recti** during cough or strains. This can be **corrected by** **wearing** a suitable **abdominal belt**

**Hernia of the Linea Semilunaris (SPIGELIAN Hernia):**

It is **uncommon.** It **occurs** through the **aponeurosis of the transverses abdominis just lateral** to the edge of the **rectus sheath**. It **occurs just below the level of the umbilicus. The neck of the sac is narrow,** so that the **adhesion and strangulation of** its contentsare **common complications**.

**Lumbar Hernia:**

**It occurs** through the **lumbar triangle** ( Petit’s triangle ) and is **rare.** It is **bounded anteriorly** by the **posterior margin of the external obligue** muscle and **posteriorly** by the **anterior border of latissimus dorsi** muscle and **inferiorly** by the **iliac crest. The floor is formed *by the* internal oblique** and **transversus abdominis** muscles**. The neck of** the hernia is **large** and the **incidence of strangulation low**

**Anterior Abdominal Nerve Block:**

Area of Anesthesia: The skin of the anterior abdominal wall. Indications: Repair of laceration of the anterior abdominal wall

**Pain – Muscle Rigidity and Referred Pain**:

**The rigidity of the muscles** may be **due to inflammation of the parietal peritoneum or due to physician’s hand is cold.** The patient **lies supine and rests** the arms by thesides and **draw up the knees to flex the hip joints**

**Abdominal Herniae:**

* **The hernial sac** is a **pouch ( diverticulum )** of the **peritoneum** and has **a neck and body**
* **The hernial contents may consists of any structure found** within the **abdominal cavity** andmay be **a small piece** of **omentum** to **a viscus like kidney.**
* **The hernial coverings** are formedfrom the **layers of the abdominal wall**

**Indirect Inguinal Hernia**:

* **It is believed to be congenital. It is common.**
* **The hernial sac is the remains of the processus vaginalis ( an outpouching of peritoneum that in the fetus is responsible for the formation of the inguinal canal**
* **The Sac enters the deep inguinal ring lateral to the inferior epigastric vessels.**
* **On reaching the hernial sac to the superficial inguinal ring, the neck will lay in the deep inguinal ring. The neck is narrow**
* **The hernial sac may extend down into the scrotum or labia majora**
* **It is more common than a direct inguinal hernia.**
* **It is more common in male than female (20 times).**
* **It is more common on the right side ( the right testis descends later than the left )**
* **It is more common in young adults and children.**
* **Nearly one third are bilateral**
* **The hernial sac may extend through the superficial inguinal ring above and medial to the pubic tubercle.**

**Direct Inguinal Hernia**:

* **It makes up 15% of all inguinal hernia.**
* **The sac bulges directly anteriorly through the posterior wall of the inguinal canal medial to the inferior epigastric vessels.**
* **The neck of it is wide because it is nothing more than a generalized bulge.**
* **It is rare in women and most are bilateral. It is a disease of old men with weak abdominal muscles**

**Processus Vaginalis:**

**Normally, its upper part becomes obliterated just before birth and the lower part remains as the tunica vaginalis.**

**- It may persist as a preformed hernial sac for an indirect inguinal hernia.**

* **Its lumen remains in communication with the abdominal cavity. Peritoneal fluid accumulates in it, forming a congenital hydrocele.**
* **The upper & lower ends are oblitrated leaving intermediate encysted hydrocele of the cord.**

**Inflammation of the testis cause an accumulation of the fluid within the tunica vaginalis. Most hydroceles are idiopathic**

**Varicocele:**

* The veins of the **pampiniform plexus** are elongated and dilated. It is common in adolescents and young adults. It is **more of the left side**. This is due to, the left **testicular vein** **joins** the **left renal vein** in which the **venous pressure** is **higher.**
* **Rarely,** **malignant** disease of the **left kidney** **extends** along the **renal vein** and **blocks** **the exit** of the **testicular vein**. So, a **rapidly developing** **left- sided varicocele** should therefore always lead one to examine the left kidney.

**Malignant Tumor of the Testis**:

* **It spreads up via** the **lymph vessels** to the **para- aortic (lumbar) lymph nodes** at the level **of L1 vertebra.**
* When the tumor **spreads locally** to involve the **tissues and skin of the scrotum**, the **superficial inguinal lymph** nodes are involved.

**Torsion of the Testis**:

It is a **rotation of the testis** **around** the **spermatic cord** **within** the **scrotum.** It is often **associated with** an excessively **large tunica vaginalis**. It **common** occurs in **active** **young men and children**. It is **accompanied** by **severe pain**. If **not treated quickly**, the **testicular artery** may be **occluded followed** by **necrosis of the testis**

**PERITONEAL FLUID:**

* It is secreted by the **peritoneum**.
* It contains **leukocytes**.
* It ensures that the mobile viscera glide easily on each other.
* It is not **static**.
* Its accumulation causes **ascites**.

**Factors contribute in appendix’s infection:**

* It is long, narrow, blind-ended tube, which leads to stasis of large-bowel contents.
* It has a large amount of lymphoid tissue in its wall.
* Its lumen has a tendency to becom obstructed by hardened intestinal cotents, leading to further stagnation of its contents,

**Pain of appendicitis**:

* Visceral pain is produced by distention of its lumen or/ spasm of its muscle.
* Afferent pain fibres enter the spinal cord at the level of T10 segment, and a vague referred pain is felt in the region of umbilicus.
* Later, the pain shifts to where the inflamed appendix irritates the peritoneum, here pain is precise, severe and localized in right lower quadrant.

**Variability of position of Appendix:**

* It should be borne in mind for diagnosis of appendicitis.
* **In retrocecal appendix,** it is difficult to elicit tenderness on palpation in right iliac fossa, irritation of psoas ms., may cause the patient to keep his right hip joint flexed.
* **An appendix hanging down in the pelvis** may result in absent right iliac region tenderness, but deep tenderness may be revealed just above the symphysis pubis, rectal or vaginal examination may reveal tenderness of peritoneum in the right side of pelvis.

**Liver Trauma:**

* It is a soft; friable structure enclosed in a fibrous capsule. Fractures of the lower ribs or penetrating wounds of the thorax or upper abdomen are common causes of liver injury. Blunt traumatic injuries from automobile accidents are also common and severe hemorrhage accompanies tears of this organ.
* The bile ducts; hepatic arteries and portal vein are distributed in a segmental manner.
* So, appropriate ligation of these structures allows the surgeon to remove large portions of the liver in patients with severe traumatic laceration of the liver or with liver tumor. Even large localized carcinomatous metastatic tumors have been successfully removed.

**Gallstones:**

They are usually **asymptomatic**. Also, they can give rise to **gallbladder colic** or produce **acute cholecystitis**.

**Acute Cholecystitis:**

* It produces discomfort in the **right upper** quadrantof **epigastrium**.
* Inflammation of the gallbladder may cause **irritation** of the subdiaphragmatic parietal peritoneum which is supplied in part by the **phrenic nerve** ( C 3,4 and 5 )
* This may give rise to referred pain over the **shoulder** because the skin in this area is supplied by the **supraclavicular nerves** ( C 3 and 4 ).

**Blood Flow in the Portal Vein and Malignant Disease:**

* The **portal vein** conveys about 70% of the blood to the liver. The remaining 30% is oxygenated blood, which passes to the liver via the **hepatic artery**.
* The wide angle of union of the splenic vein with the superior mesenteric vein to form the **portal vein** leads to streaming of the blood flow in the portal vein.
* The **right lobe** of the liver receives blood mainly from the **intestine**, whereas the **left lobe** plus the **quadrate** and **caudate** lobes receive blood from the **stomach and the spleen**.
* This distribution of blood may explain the distribution of secondary malignant deposits in the liver.

**Portal Vein Obstruction:**

* In these cases which may be due to **cirrhosis** of the liver capillaries connecting the portal and systemic venous circulations open up and become **dilated** and **tortuous** and may lead to **haemorrahge**.
* The superficial veins around the umbilicus and the paraumbilical veins become **distended**.
* These distended subcutaneous veins radiate out from the umbilicus producing in **sever cases** the clinical picture referred to as **caput medusae**.

**Portal Hypertension:**

* It is a **common** clinical condition.
* Enlargement of the **portal –systemic a connection** is accompanied by congestive enlargement of the **spleen**.
* Portocaval shunts for the treatment of the portal hypertension may involve the anstomosis of the portal vein, because it lies within the lesser omentum and to the anterior wall of the inferior vena cava behind the entrance into the lesser sac.
* The splenic vein may be anastomosed to the left renal vein after removing the spleen.

**Important duodenal Relations:**

1- Cases have been reported in which a large gallbladder stone ulcerated through the gallbladder wall into the duodenum.

2- Operations on the transverse colon and right kidney have resulted in damage to duodenum.

**Duodenal ulcer:**

* The **anterolateral** wall is the **common** site for it. That is because the **acid chyme** of the stomach is squirted against this wall.
* An ulcer of the anterior wall of the 1st inch may perforate into the upper part of the greater sac above the transverse colon which directs the escaping fluid into the right lateral paracolic gutter and then to the right iliac fossa.
* An ulcer of the posterior wall of the 1st part may perforate the wall and erodes the large **gastroduodenal artery** (a branch of the hepatic artery) causing a severe hemorrhage.

**Psoas fascia and Tuberculosis:**

* Tuberculous disease of the thoracolumbar region of the vertebral column results in the destruction of the vertebral bodies. Pus may spread **laterally** under the psoas fascia.
* From there, the pus tracks **downward**, following the course of the psoas muscle and appears as a **swelling** in the **upper part** of the thigh **below** the inguinal ligament.
* This abscess may be mistaken for **femoral hernia**.

**Renal Pain:**

* It varies from a dull (not sharp) ache to a severe pain in the flank that may radiate downward into the lower abdomen.
* It can result from stretching of the kidney capsule or spasm of the smooth muscle in the renal pelvis.
* The afferent nerve fibers pass through the renal plexus around the renal artery and ascend to the spinal cord through the lowest splanchnic nerve in the thorax and the sympathetic trunk. They enter the spinal cord at the level of T12.
* Pain is commonly referred along the distribution of the subcostal nerve (12) to the flank and the anterior abdominal wall.

**Renal Mobility:**

* The kidneys are maintained in their normal position by intra- abdominal pressure and by their connections with the perirenal fat; renal fascia and pararenal fat.
* Each kidney moves slightly with respiration. If the amount of the perirenal fat be reduced, the mobility of the kidney may become excessive and produce symptoms of renal colic caused by kinking of the ureter.
* Excessive mobility of the kidney leaves the suprarenal gland undisturbed because both kidney and suprarenal are enclosed within a separate compartment in the renal fascia. Also, any of them can separate easily during operations.

**Kidney Trauma:**

* The kidneys are well protected by the lower ribs; lumbar muscles and vertebral column. However, a severe blunt applied to abdomen may crush the right kidney against the last rib & the left kidney against the last 2 ribs and vertebral column.
* Because 25 % of the cardiac outflow passes through the kidneys, renal injury can result in rapid blood loss.

**Ureteric Stones:**

* There are 3 sites of anatomic narrowing of the ureter where stones may be arrested. Most stones, although radiopaque, are small enough to be impossible to see definitely along the course of the ureter on plane radiographic examination.
* An intravenous pyelogram is usually necessary. The ureter runs down in front of the tips of the transverse processes of the lumbar vertebrae, crosses the region of the sacroiliac joint, swings out to the ischial spine and then turns medially to the bladder.

**Renal Colic:**

* The renal pelvis and ureter send their afferent nerves into the spinal cord at segments T11 and 12 and L1 and 2.
* In renal colic, strong peristaltic waves of contraction pass down the ureter in an attempt to pass the stone onward.
* The spasm of the smooth muscle causes an agonizing colicky pain which is referred to the skin areas that are supplied by these segments of the spinal cord (flank; loin and groin).
* When a stone enters the low part of the ureter, the pain is felt at a lower level and is often referred to the testis or the tip of the penis in the male and labium majus in the female.
* Sometimes ureteral pain is referred along the femoral branch of the genitofemoral nerve (L1 and 2) to the front of the thigh.
* The pain is often so severe that afferent pain impulses spread within the central nervous system giving rise to nausea.

**Caval Obstruction:**

* If the superior or inferior vena cava is obstructed, the venous blood causes distension of the veins running from the anterior chest wall to the thigh.
* The lateral thoracic vein anastomoses with the superficial epigastric vein (tributary of the great saphenous vein of the leg).
* In these circumstances, a tortuous varicose vein may extend from the axilla to the lower abdomen.

**Lumbar Sympathectomy:**

* It aims to produce **vasodilatation** in patients complaining from **vasoconstrictor** disorders.
* The **preganglionic** sympathetic arise from (T11\_L2).
* They synapse in the **lumbar** and **sacral** ganglia.
* The **postganglionic fibers** are distributed among the branches of the **lumbar** and **sacral** nerves.
* **Postganglionic fibers** can pass directly from the **lumbar ganglia** to the **common iliac** and **external iliac** arteries
* As far down as the inguinal ligament.
* Bilateral lumbar sympathectomy in male can be followed by **loss** of the **ejaculatory** power

**Internal Hemorrhoids:**

* The **superior rectal vein** divides into right and left branches.
* The right branch **redivides** into anterior and posterior branches.
* Internal hemorroides are **two** on the right side and **one** on the left.

**PROSTATIC EXAMINATION**:

* The prostate can be examined by a **rectal** examination (P.R).
* The examiner’s gloved finger can feel the **posterior** surface of the prostate through the **anterior** wall of the rectum.

**POSITION OF THE OVARY**:

* The ovary is kept in position by:

1-Broad ligament.

2-Mesovarium.

* **Laxation** of the broad ligaments after pregnancy cause **prolapse** of the **ovaries** in the **rectouterine** **pouch** --< This causes: **Tenderness** of the ovaries and **Deyspareunia** (discomfort during sexual intercourse).

**TUBAL LIGATION:**

* It is performed in **women** who already have children to obtain a birth control.
* Ova **degenerate** in the tube **proximal** to the obstruction.
* Restoration of the continuity of the tube can be performed by taking of the clip.

**SALPINGITIS:**

* The **infecting organisms** enter the **uterus** and **uterine tube** through **sexual intercourse** (or after labor).
* **Salpingitis** and **accumulation of pus** into the peritoneal cavity (pelvic peritonitis) later general peritonitis.

**Internal Hemorroids (piles) :**

* Are due to varicosities of tributareis of superior rectal vein.
* Hemorrhoid is a fold of m.m. & submucosa containing a varicosed tributary of sup. Rectal vein.
* It occurs in upper ½ of anal canal where m.m. innervated by autonomic N.S., so they are painless and sensitive only to strech.
* **Position of varicosed** **tributaries of the vein** lie in anal columns at 3-, 7-, and 11-o’clock positions.

**External Hemorroids :**

* Are varicosities of tributaries of inf. Rectal vein.
* They are covered by m.m of lower ½ of anal canal or skin & commonly associated with internal hemorrhoids.
* Innervated by inf. Rectal nerves, so they are painful & sensitive to pain,temp, touch & pressure.
* It is recognized as a small acute tender swelling at the anal margin.

**Anal Fissure :**

* In chronic constipation … the anal valves may be torn down to the anus forming the fissure.
* It is elongated linear ulcer which lies most commonly in midline posteriorly.
* It is a very painful condition specially during defecation because the fissure extends to the lower ectodermal part of anal canal which is supplied by somatic nerve (inf.rectal nerve).
* Anal fissre is examined under local anesthesia.

**Clinical Notes :**

* **Injury to pelvic floor: during** childbirth can result in loss of support of pelvic viscera leading to **uterine & vaginal prolapse** ,and alteration in position of bladder neck & urethra leading to **stress incontinence**.
* **Visceral pelvic fascia and infection:** the pelvic fascia **in the region of uterine cervix** is referred to as **parametrium** .it is a **common** site for spread of acute infections from uterus & vagina ,so the infection becomes chronic pelvic inflammatory disease.

**Femoral hernia:**

* Femoral hernia is more common in female because of wider pelvis and femoral canal, it should always be treated surgically.
* **The neck of the herniated sac** lies below and lateral to pubic tubercle, while In **Inguinal hernia**, the **neck of swelling** lies above and medial to pubic tubercle.
* It may be difficult to push it up to return to abdomin. –**irreducible hernia..**
* After coughing or straining, a piece of bowel may be forced through the neck, and its blood vessels may be compressed by femoral ring performing **strangulated hernia**.

**Safe Area for Intramuscular Injection:**

* Intramuscular injection enables a large amount of a drug to be introduced at once but absorbed gradually.
* The injection site must be carefully selected to avoid injury to the underlying large vessels and nerves.
* Outer upper quadrant of the buttock is the safe area for intramuscular injection to avoid injury to the underlying sciatic nerve

**Trendelenburg Test:**

* To assesses whether the hip abductors (particularly gluteus medius) are functioning normally
* Observe patient from behind, ask him/her to stand on one foot and then the other
  + Negative test: Pelvis ‘tilts up’ on contralateral side
  + Positive test: Pelvis ‘sags’ on contralateral side
* Problems that could lead to a positive Trendelenburg test:
  + Fracture neck of femur
  + Dislocation of hip joint
  + Coxa Vara
  + Nonfunctioning gluteus medius and minimus due to:
    - Neurological damage (L4 – 5 disc herniation)
    - Any disease affecting muscles (myopathy)

**Footdrop:**

* As the nerve lies on the lateral aspect of the neck of the fibula, it is subcutaneous and can easily be rolled against the bone.
* At this site, it is extremely vulnerable to direct trauma or is involved in fractures of the upper part of the fibula
* Injury to the common peroneal nerve causes footdrop

**Referred Pain From the Hip Joint:**

* The pain originating in the hip joint to be referred to the front and medial side of the thigh (femoral nerve)
* The hip joint disease may give rise to pain in the knee joint (posterior division of the obturator nerve supplies both the hip and knee joints)

**Congenital Dislocation:**

* Affects 1-2 babies in every 1000
* Associated with a shallow acetabulum and an altered angle of the femoral head
* May be bilateral
* Females affected more than males
* May be caused by mechanical factors i.e. malformed uterus
* The affected limb is shorter than the normal limb
* Capsule is loose
* Upper lip of acetabulum is not developed properly (hypoplasia).
* Head of femur moves up out of acetabulum and lies against the gluteal surface of ilium.
* Characteristic clinical sign is the inability to abduct the hip

**Traumatic Dislocation:**

* Rare, because of the strength of joint
* Occurs when joint is flexed & abducted.
* This can occur in a car crash where the [**knee**](http://www.gla.ac.uk/ibls/fab/glossary/knee.html) is pushed backwards, often breaking off the posterior rim of the [**acetabulum**](http://www.gla.ac.uk/ibls/fab/glossary/acetabulum.html)
* The head of femur is displaced posteriorly and rests on the gluteal surface of ilium (posterior dislocation).
* Sciatic nerve is prone to get injured.
* Lower limb is flexed, adducted & medially rotated and is shorter than the normal limb
* Positive Trendelenburg’s sign
* ‘Dipping’ (unilateral dislocation) or ‘waddling’ (bilateral dislocation) gait

**Osteoarthritis:**

* Most **common** disease of hip joint in the **adults**
* Results in:
  + Pain
  + Stiffness (due to pain and reflex spasm of muscles)
  + Deformity i.e. flexion, adduction & external rotation (due to muscle spasm & later on muscle contractures)

**Arthritis of the Hip Joint:**

* A patient with an inflamed hip joint will place the femur in the position that gives minimum discomfort (the position in which the joint cavity has the greatest capacity to contain the increased amount of synovial fluid secreted).
* The hip joint is partially flexed, abducted, and externally rotated
* Tenderness over the head of the femur (on the anterior aspect of the thigh just inferior to the inguinal ligament and just lateral to the pulsating femoral artery) usually indicates the presence of arthritis of the hip joint.

**Gastrocnemius and Soleus muscle tears:**

* Produce severe localized pain & swelling over the damaged muscle

**Ruptured Tendocalcaneus:**

* Common in middle-aged men and frequently occurs in tennis players.
* Occurs at its narrowest part, about 2 in. (5 cm) above its insertion
* A sudden, sharp pain is felt, with immediate disability. The gastrocnemius and soleus muscles retract proximally, leaving a palpable gap in the tendon.
* It is impossible for the patient to actively plantar flex the foot.
* The tendon should be sutured as soon as possible and the leg immobilized with the ankle joint plantar flexed and the knee joint flexed.

**Plantaris tendon:**

* Rupture is rare
* Can be used for autografts in repairing severed flexor tendons to the fingers (like the tendon of the palmaris longus muscle)

**Soles are the site of the planter (Babinski’s) reflex:**

1. When the sole of the foot is stroked firmly on the outer side from the heel to the front in persons over the age of 2 years
2. Normal response is planterflexion (flexion) of the toes. (Negative Babinski's response)
3. Abnormal response is dorsiflexion of the big toe and often a fanning of the other toes (Positive Babinski's response)
4. Under 2 years of age, extension of the toes is the normal response

**Meniscal injury of knee joint:**

* Injury of medial meniscus is more common than the lateral one, because of its strong attachment to the medial collateral ligament, which restricts the mobility of medial meniscus.
* The injury occurs when femur is suddenly rotated medially on tibia, with semiflexed knee joint specially in foot-ball players.
* The tibia is usually abducted on femur and medial meniscus is pulled into abnormal position between femoral & tibial condyles.

**Strength of Knee joint /and injury of its ligaments :**

* The strength and stability of the joint depends largely on the strength of quadriceps femoris ms. + integrity of the ligaments that bind femur to tibia.
* **Medial collateral ligament injury :**

-It is more common than the lateral one

-Partial tearing of the ligament can result from forced abduction of tibia on femur

-Sprains of medial collateral lig. result in tenderness over femoral or tibial attachments of ligament.

* **Lateral collateral ligament injury :**

-it is less common than medial collateral lig.

-it can result from forced adduction of tibia on femur.

* **Cruciate ligaments injury :**

-Tears of anterior cruciate ligament are common than the posterior cruciate ligament. -it is accompanied by damage to other structures : collateral ligaments are commonly torn./ or the joint cavity fills with blood (hemarthrosis) and is swollen.

-In ruptured anterior cruciate lig., tibia can be pulled excessively forward on the femur.

–In ruptured posterior cruciate lig., tibia can be moved excessively backward on the femur.

**Femoral nerve injury (L2,3,4):**

* **Causes :** By stab or gunshot wounds, but a complete division is rare.
* **Motor changes :**

1-quadriceps femoris muscle is paralyzed and knee cannot be extended. In walking, This is compansated for to some extend by the action of adductor ms.

* **Sensory changes :**

1. loss of skin sensation over anterior & medial sides of thigh. ( intermediate + medial cutaneous N. of the thigh injury).
2. 2-loss of sensation over medial side of leg + medial border of foot as far as the ball of big toe.

(saphenous N. injury)

**Sciatic nerve injury (L4,5/S1,2,3):**

* **Causes :**

1-penetrating wounds.

2-fractures of pelvis or dislocation of hip joint.

3-wrong injections into gluteus maximus or medius ( upper outer quadrant of the buttock is the best site).

* In 90% of cases, common peroneal part of the sciatic N. is the most affected because its fibres lie most superficial in sciatic N.
* **Motor changes :**

1-paralysis of hamstring ms., but weak flexion of knee is possible by the action of sartorius (Femoral N.) + gracilis (obturator N.). 2-paralysis of extensors of the leg, leading to foot drop.

* **Sensory changes :**

1-Loss of sensation below knee at the lateral side of leg and back of leg (supplied by lateral cutaneous N. of calf & sural communicating branch of common peroneal N. / and sural N. of tibial N. ), EXCEPT along medial side of lef + along medial border of foot as fare as the ball of big toe, (supplied by saphenous N. from femoral N.).

**Sciatica:**

* it is a condition in which the patients have pain along the sensory distribution of sciatic N., in the posterior aspect of thigh, posterior & lateral sides of leg and lateral side of foot.
* **causes :**

1-intervertebral disc prolapse with pressure on roots of lower lumbar + sacral spinal Ns.

2-intrapelvic tumor, presses on sacral plexus or sciatic N.

3-inflammation of sciatic N. or its terminal branches.

**Common peroneal N. injury:**

* It has an exposed position as it leaves popliteal fossa and winds around neck of fibula to enter peroneus longus ms.
* Commonly injured in fractures of neck of fibula and by pressure from casts or splints.
* **Motor changes :**

paralysis of ms. Of anterior compartment of leg (supplied by deep peroneal N.) + ms. Of lateral compartment (supplied by superficial peroneal N.), so the opposing ms. Plantar flexor of ankle + invertors of subtalar and transverse tarsal joints, cause : planter flexion of foot (foot drop) and inversion, referred to as ‘’equino-varus’’.

* **Sensory changes :**

1-Loss of sensation on the anterior & lateral sides of leg + intermediate part of dorsum of foot & all toes (by superficial peroneal N.), except the lateral side of little toe. But :

2-Lateral border of foot + lateral side of little toe are virtually unaffected (sural N. mainly from tibial N.).

3-Medial border of foot as far as the ball of big toe is completely unaffected (saphenous N. from femoral N.).

**Tibial N. injury**:

* It leaves popliteal fossa deep to gastrocnemius & soleus ms.
* Because of its deep position, it is rarely injured.
* **Motor changes :**

-paralysis of plantar flexor ms. Of back of leg + of sole of foot, so the opposing ms. (extensors) dorsiflex the foot at ankle + evert foot at subtalar & transverse tarsal joints, it is reffered to as calcaneo-valgus.

* **Sensory changes :**

-loss of sensation on sole of foot, Later trophic ulcers develop.

**Obturator N. injury:**

* It enters thigh as anterior & posterior divisions through upper part of obturator foramen. / anterior division descends infront of adductor brevis, and posterior division descends behind adductor brevis and in front of adductor magnus.
* It is rarely injured as in case of penetrating wounds.
* **Motor changes :** paralysis of all adductor ms. Except ischial (hamstring) part of adductor magnus (by sciatic N.).
* **Sensory changes :** is minimal on the medial aspect of the thigh.

**Pes planus (Flat Foot):**

* The medial longitudinal arch is depressed, so the forefoot is displaced laterally and everted.
* The head of talus descends downward & medially between calcaneum & navicular bone
* The plantar calcaneo-navicular ligament (spring) + medial lig.of ankle (deltoid) become permanently stretched + muscles & tendons are also stretched + the bones change their shape
* The causes of flat foot : are both congenital & acquired.
* It occurs after diseases of the muscles of the leg or foot, after long standing, long walking, overweight or illness, so the weak muscles & ligaments are stretched and pain is produced after walking for a short distance.

**Pes Cavus (Clawfoot):**

* The medial longitudinal arch becomes too high.
* It is produced by muscle imbalance, (shortening of muscles or tendons of leg or sole), in most cases due to poliomyelitis.

**Varicose Veins:**

* A varicose vein is a vein which becomes dilated, elongated and tortuous.
* It affects the superficial veins of the lower limb.
* It is produced when the valves of the perforating veins become incompetent (so, allow blood to pass from deep veins to superficial veins).
* As a result, the blood passes from deep veins (high pressure) to superficial veins (low pressure), so the superficial veins become dilated, elongated and tortuous.

**Great Saphenous Vein Cut Down:**

* At the ankle.

-Great saphenous vein is constantly found in front of medial malleolus of tibia.

* At the groin.

-Great saphenous vein drains into femoral vein 2 fingerbreadths below & lateral to pubic tubercle.

* Exposure of the vein through a skin incision (a ‘cut down’) is usually performed at ankle, but this site has disadvantages of phlebitis (inflammation of the vein wall) as a complication.
* In the groin, phlebitis is rare because the larger diameter of the vein at this site allows the use of large-diameter catheters and rapid infusion of large volumes of fluids.

**Great Saphenous Vein in Coronary Bypass surgery:**

* **In occlusive coronary disease,** the diseased arterial segment can be bypassed by inserting a graft from great saphenous vein.
* **At the donor sit**, the superficial venous blood ascends the lower limb against gravity by passing through perforating veins into the deep veins.
* Great saphenous vein can also be used to **bypass obstructions of brachial or femoral arteries.**

**Femoral Vein Catheterization:**

* The femoral vein lies medial to femoral artery just about 2 fingerbreadths below inguinal ligament and is easily cannulated.
* Because of high incidence of thrombosis and fatal pulmonary embolism, the catheter should be removed once the patient is stabilized