



ANATOMY

DONE BY : Qusai Ibraheem

بسم الله الرحمن الرحيم

بهاض الملف استعنت بموست وتين و الاشياء الي حكا عنها مهم بالمحاضرة
وان شاء الله اذا دكتور اعطانا الموست امبورتنتت راح نضيف الاشياء الزيادة

المحاضرة الاولى:

Surfaces of the parotid Gland

1. Lateral (superficial) surface

Is covered by skin and fascia, which contains superficial parotid lymph nodes.

2. Anteromedial surface

- Is grooved by the posterior border of the ramus of the mandible and extends anteriorly over the masseter and medially to the T.M (temporomandibular) joint.
- The branches of the facial nerve emerge from the anterior border of this surface.

3. Posteromedial surface

- Is moulded to the mastoid process, sternocleidomastoid, posterior belly of digastrics, and styloid process and styloid apparatus.

4. Superior surface

Is in contact with the cartilaginous part of external acoustic meatus.

5-Apex of the gland

Overlaps the carotid triangle.

-parotid duct opens into the vestibule of the mouth on a small papilla **opposite the 2nd upper molar tooth**

Structure within Parotid Gland:

a. The external carotid artery:

- Lies deeper than other.

- It divides within the substance of the gland into superficial temporal and maxillary arteries.

b. The retromandibular vein:

- Lies superficial to external carotid artery.
- Formed by the union of maxillary and superficial temporal veins.

c. The facial nerve:

- On a still more superficial plane the facial nerve traversed the gland.
- Within the glands, the nerve divides into its five terminal branches, which leave the gland at its anterior border.

المحاضرة الثانية:

Sensory Supply of Tongue

A.

- The mucous membrane covering anterior two-thirds of tongue is supplied by lingual branch of the mandibular nerve.
- The trigeminal component of this nerve mediates common sensibility.
- The chorda tympani component mediates taste.

B. The posterior third of tongue is supplied by glossopharyngeal nerve.

Motor Supply of Tongue

- The palatoglossal muscle is supplied by pharyngeal plexus of nerves.
- The remaining muscles (intrinsic and extrinsic) are innervated by hypoglossal nerve.

-The mucous membrane of the mouth proper is composed of stratified squamous epithelium keratinized or nonkeratinized and lamina propria.

-Keratinized squamous epithelium covers the hard palate and dorsal surface of anterior two-thirds of tongue.

-The remaining part of the epithelial lining (soft palate, floor of the mouth, and the dorsal surface of the posterior third and the inferior surface of the tongue) is of the nonkeratinized type.

The Soft Palate

- Forms the posterior part of roof of mouth.
- Projects backwards and downwards from the posterior part of hard palate.
- It consists of an aponeurosis, the palatine aponeurosis, to which four paired of muscles are attached
- However, much of the mass of soft palate is formed by mucous and serous glands.
- The upper and lower surface of the mass of soft palate is covered by mucous
- The palatine aponeurosis is formed by the tensor veli palatini.
- The muscles attached to the aponeurosis include the 3 extrinsic muscles (levator veli palatine, palatoglossus, and palatopharyngeus).

Nerve Supply:

- The tensor veli palatini muscle is supplied by mandibular nerve. The remaining four muscles of soft palate(levator veli palatine, palatoglossus, palatopharyngeus, musculus uvulae) are innervated by pharyngeal plexus of nerves.

المحاضرة الثالثة:

- Nasopharynx:** Lies behind the nasal cavity, and extends from base of skull to upper surface of soft palate, at the level of C1 vertebra
- The roof forms a continuous slope with the posterior wall.
- Here lies a collection of lymphoid tissue, prominent only in children, the pharyngeal tonsil.
- Oropharynx:** The posterior wall is on a level with body of C2 vertebra and upper half of body of C3
- extends from the lower surface of the soft palate(C2 and upper part of C3) to the upper border of the epiglottis

- The lateral walls on each side have the palatoglossal and palatopharyngeal arches (pillars of fauces), formed by the underlying corresponding muscles
- The two folds are separated by a triangular recess, the tonsillar sinus or fossa, which is occupied by palatine tonsil

-The palatine tonsil is a large collection of lymphoid tissue which projects into oropharynx from tonsillar fossa.

- The lateral surface is covered by fibrous tissue which forms the tonsillar hemicapsule.

-A peritonsillar abscess occurs outside the capsule .

-The superior constrictor muscle separates this surface from the facial artery.

-Laryngopharynx: Lies behind larynx, and extends from upper border of epiglottis to level of cricoid cartilage (C6 vertebra).

The Wall of the Pharynx is formed from without inward by:

1. **Buccopharyngeal Fascia:** This layer contains a plexus of nerves (pharyngeal plexus) that supplies the pharyngeal muscles and extensive pharyngeal venous plexus.

2. **Muscular Coat:** Consists of three circular muscles, the constrictor muscles: superior middle and inferior constrictors, and three longitudinal muscles: stylopharyngeus, palatopharyngeus, and salpingopharyngeus muscles.

3. **Pharyngobasilar Fascia:**

-Superiorly, attached to the base of skull.

-It holds the nasopharynx permanently open for breathing

4. **Mucous Coat:**

-Consists of a dense connective tissue containing a network of elastic fibers, which is covered with an epithelium.

-In the nasopharynx, the epithelium is pseudostratified columnar and ciliated.

-In the oropharynx and laryngopharynx it is of the stratified squamous type

Inferior Constrictor muscle:

- It is divided into two parts.
- Thyopharyngeus part: arises from oblique line of thyroid cartilage.
- Cricopharyngeus part: is rounded, and extends around the pharynx from one side of the cricoids arch to the other.

The lowest fibers pass transversely backwards, whereas the upper fibers ascend obliquely to be inserted into median pharyngeal raphe

Anteriorly, the triangular gap between origins of middle and inferior constrictors is closed by thyrohyoid membrane .

The membrane is pierced in this area by internal laryngeal nerve and superior laryngeal vessels.

Nerve supply:

With the exception of stylopharyngeus and cricopharyngeus which are supplied by glossopharyngeal nerve and external laryngeal nerves, respectively, all other muscles of pharynx (superior constrictor, middle constrictor, inferior constrictor, palatopharyngeus, sulpinogoharyngeus) are supplied by pharyngeal plexus of nerves

Remember :

pharyngeal plexus supply all soft palate muscles and muscles of pharynx except(imp)

1- tensor palati (which is supplied by mandibular N) and very imp

2-stylopharyngeus (which is supplied by glossopharyngeal nerve)

3-cricopharyngeus(which is supplied by external laryngeal nerve)

Esophagus:

-Ends in abdomen at level of body of T11 vertebra, where it joins the cardiac orifice of stomach

The course of the esophagus can be divided into three parts:

1-Cervical Part

- Lies between trachea and prevertebral fascia overlying the anterior longitudinal ligament and longus coli muscles.
- The recurrent laryngeal nerves ascend, one on each side, in the groove between trachea and esophagus.
- On right, it is in contact with thyroid gland and, at the root of neck, with cervical pleura
- On left, with thyroid gland, but the subclavian artery and thoracic duct separate it from the pleura.
- In addition, the esophagus is related on each side to carotid sheath.

2-Thoracic Part

At first passes through superior mediastinum and then through posterior .mediastinum

Anterior relations

From above downwards: Trachea, right pulmonary artery, left principal bronchus, pericardium (separates esophagus from left atrium), and diaphragm

Posterior relations

longus coli, thoracic vertebra, thoracic duct, azygos vein, terminal parts of hemiazygos and accessory hemiazygos veins, right posterior intercostals arteries, and inferiorly, close to diaphragm, the descending thoracic aorta.

Right relations: Mediastinal pleura and the arch of the azygos vein.

Left relations:

- In the superior mediastinum, it is related to the aortic arch, the left subclavian artery, the thoracic duct, and mediastinal pleura. The left recurrent laryngeal nerve ascends in the groove between esophagus and trachea.
- In the posterior mediastinum, it is related to descending thoracic aorta and mediastinal pleura.

3-Abdominal Part

Lies in the esophageal groove on the posterior surface of the left lobe of liver.

Arterial supply of esophagus

- Upper third by inferior thyroid artery.
- Middle third by esophageal branches of descending thoracic aorta.
- Lower third by esophageal branches of left gastric artery.

Venous drainage

- From upper third into inferior thyroid veins.
- From middle third into azygos veins.
- From lower third into left gastric vein, a tributary of portal vein.

المحاضرة الرابعة:

Peritoneal:

- The peritoneal cavity can be subdivided into a main part, the greater sac, and a diverticulum of it, the lesser sac (omental bursa), which is situated behind the stomach.
- In the male the peritoneal cavity is a closed sac.
- In the female, the lateral ends of the uterine tubes connects the peritoneal cavity in the region of the ovary with the cavity of uterus

Lesser sac(omental bursa)

Anterior wall is formed by From above downwards

1-lesser omentum

2- the posterior surface of the stomach

3- the posterior of the anterior two layers of greater omentum

Posterior wall is formed by :

Anterior of the posterior two layers of greater omentum

Peritoneal Folds of Anterior Abdominal Wall

-Six folds are reflected from the parietal peritoneum lining the posterior surface of the anterior abdominal wall, one above and five below the umbilicus.

1. The fold above the umbilicus is called:

Falciform ligament:

- Is a sickle-shaped fold of parietal peritoneum connecting anterior surface of liver to supraumbilical part of anterior abdominal wall and inferior surface of the diaphragm.
- Its concave, free inferior border contains a fibrous cord, the ligamentum teres (the obliterated remains of the umbilical vein), which extends from the umbilicus to the inferior surface of the liver.
- The falciform ligament divides the liver into two lobes, right and left.
- At the superior surface of the liver, the right and left layers of falciform ligament diverge from each.
- The right layer passes transversely to the right forming the anterior layer of the coronary ligament of the liver.
- The left layer passes to the left to form the anterior layer of the left triangular ligament.
- The falciform ligament divides the liver into two lobes, right and left.
- At the superior surface of the liver, the right and left layers of falciform ligament diverge from each.
- The right layer passes transversely to the right forming the anterior layer of the coronary ligament of the liver.
- The left layer passes to the left to form the anterior layer of the left triangular ligament.
- The falciform ligament divides the liver into two lobes, right and left.
- At the superior surface of the liver, the right and left layers of falciform ligament diverge from each.

- The right layer passes transversely to the right forming the anterior layer of the coronary ligament of the liver.
- The left layer passes to the left to form the anterior layer of the left triangular ligament.

2. Below umbilicus the peritoneum of anterior abdominal wall presents five folds:

- Centrally is the median umbilical fold, containing the median umbilical ligament (the obliterated remains of urachus), which extends from apex of bladder to umbilicus.
- On each side of median umbilical ligament are two folds.
- The more medial, the medial umbilical folds containing the medial umbilical ligament (the obliterated remains of the umbilical artery).

Peritoneal Folds of Posterior Abdominal Wall

a. Mesentery of small intestine:

- It is a broad, fan-shaped peritoneal fold connecting coils of jejunum and ileum to posterior abdominal wall.
- The border attached to posterior wall of abdomen is called the root of the mesentery, which is about 15 cm long, and extends obliquely downwards and to the right from duodenojejunal flexure to the upper part of right sacroiliac joint
- The intestinal border of mesentery is about 6 m long and is thrown into numerous pleats.
- At this border the two layers of the peritoneum separate to enclose the gut, forming its visceral layer.

b. Transverse mesocolon:

- Its two layers pass from anterior aspect of head and body of pancreas to posterior surface of transverse colon, where they separate to enclose that part of the colon.

Lesser Omentum

- Between the liver and the 1st 2 cm of duodenum, the omentum presents a free right border, which forms the anterior boundary of the epiploic foramen.
- This free border contains between its two peritoneal layers the portal vein, hepatic artery and bile duct.

Greater Omentum

- The anterior two layers descend from greater curvature of stomach and first 2 cm of duodenum, pass downwards in front of loops of small intestine for a variable distance, and then they turns round and ascend up to the transverse colon where they loosely blend with the peritoneum on the anterior surfaces of the transverse colon and mesocolon.

Intraperitoneal Organs

An organ is said to be intraperitoneal when it is almost totally covered with visceral peritoneum.

- 1-The stomach,
- 2-jejunum
- 3- ileum
- 4- transverse colon
- 5- sigmoid colon
- 6- spleen

Retroperitoneal Organs

Retroperitoneal organs lie behind the peritoneum and are only partially covered with visceral peritoneum.

- 1-The pancreas
- 2- ascending
- 3-descending colons
- 4- kidneys

5- ureters

Nerve Supply of the Peritoneum

1. The parietal peritoneum:

- Is sensitive to pain, temperature, touch, and pressure.
- The parietal peritoneum lining the central part of diaphragm is supplied by the phrenic nerve (C4) --- hence referred pain from this area to tip of shoulder.
- The peritoneum lining the peripheral part of diaphragm is supplied by the lower six intercostals nerves
- The remainder of the parietal peritoneum is supplied by the lower six intercostals and L1 nerves.
- In the pelvis the obturator nerve is the chief source of supply.

2. The visceral peritoneum:

- Is sensitive only to stretch and tearing and is not sensitive to touch, pressure, or temperature.
 - . It is innervated by afferent nerves which travel with the autonomic supply to the viscera.
 - Overdistension of a viscus leads to the sensation of pain
-

Stomach:

-It lies in epigastric, umbilical, and left hypochondriac regions of abdomen

Cardiac orifice

- Lies on the left of median plane, behind the 7th left costal cartilage 2.5 cm from its junction with the sternum (at the level of T11 vertebra).

Pyloric orifice

-Lies about 1.2 cm to the right of median plane near the level of lower border of L1 vertebra (transpyloric plane), when the body is in the supine position.

Relation of stomach:

Anterior surface

Is related to anterior abdominal wall, left costal margin, left pleura and lung, diaphragm, and left lobe of liver.

Posterior surface

Is related to **stomach bed** (lesser sac, diaphragm, spleen, left suprarenal gland, upper part of left kidney, splenic artery, body of pancreas, transverse mesocolon, and transverse colon).

Arterial Supply:

The arterial supply of stomach arises from celiac trunk.

a. Right and left gastric arteries:

- Are branches of hepatic and celiac arteries, respectively.
- They form an anastomosing arch along lesser curvature.

b. Right and left gastroepiploic arteries:

- are branches of gastroduodenal and splenic arteries, respectively.
- They form a similar arch along the greater curvature.

c. Short gastric arteries:

- Branches of the splenic artery.
- They supply the fundus.

Venous Drainage

- Veins from stomach drain into portal circulation.
- The right and left gastric veins drain directly into portal vein.
- The right gastroepiploic vein joins the superior mesenteric vein.
- The left gastroepiploic and short gastric veins join the splenic vein.

Lymph Drainage:

- Lymph vessels from stomach follow the arteries and drain into right and left gastric nodes, the right and left gastroepiploic nodes, and the short gastric nodes.
 - Lymph from these node drains into the celiac nodes.
-

محاضرة 5:

Duodenum Relations :

a. Superior (first) part Anteriorly :

- Passes upwards and backwards from pylorus, below epiploic foramen, and above head of pancreas.
- It lies behind the quadrate lobe of liver and the gall bladder.

b. Descending (Second) Part:

Anterior Relations:

From above downwards, it is related to fundus of gall bladder and right lobe of liver, transverse colon, and coils of small intestine.

Posterior relations:

Right kidney and right ureter.

Medial Relations:

Common bile duct, main pancreatic duct, and head of pancreas

c. Transverse (Third) Part:

Anterior Relations:

Crossed by superior mesenteric vessels and root of mesentery of small intestine.

Posterior Relations:

Right ureter, right psoas major, inferior vena cava, and abdominal aorta.

Superior Relations:

The head of the pancreas.

Inferior Relations:

Coils of jejunum

d. Ascending (Fourth) Part:

Anterior Relations:

Roots of mesentery of small intestine, and coils of jejunum.

Posterior Relations:

Left psoas major and left sympathetic trunk.

Blood supply of duodenum :

- Upper half by superior pancreaticoduodenal branch of gastroduodenal artery.
- Lower half by inferior pancreaticoduodenal branch of superior mesenteric artery.
- Upper half of duodenum is drained by superior pancreaticoduodenal vein into portal vein.
- Lower half by inferior pancreaticoduodenal vein into superior mesenteric vein

Ileum:

- Its mesentery is attached to the posterior abdominal wall above and to the left of the abdominal aorta

Blood Supply of jejunal and ileum:

- Numerous jejunal and ileal branches arise from left side of superior mesenteric artery and enter the mesentery by passing between the two layers of the root.
- The jejunal branches join each other in a series of anastomosing loops to form arterial arcades: single for the upper jejunum and double lower down.
- From the arcades, straight arteries pass to the mesenteric border of the gut.
- These vessels are long and close together.
- The ileal arteries are similar but form a large series of arcades, 3 – 5, the most distal lying near the ileal wall so that the straight vessels branching off the arcades are shorter than those for the jejunum.

- Occlusion of a straight artery may lead to infarction of the segment of the jejunum or ileum supplied because these are end arteries, but occlusion of arcade vessels is usually without effect due to their numerous anastomotic connections
- Veins correspond to the branches of the superior mesenteric artery and drain to the superior mesenteric vein

Large intestine

appendix

- The tip of the appendix is subject to a considerable range of movement and may be found in the following positions:

(1) Behind cecum (retrocecal position); or behind the lower part of ascending colon (retrocolic position), or behind both (form about 65. 25% of the cases).

(2) hanging down into the pelvis against right pelvic wall (pelvic), form about 31% of cases.

(3) Below cecum (subcecal), forms about 2.25% of cases.

(4) front of the terminal part of ileum (preileal), forms about 1% of cases; or behind the terminal part of ileum (postileal), forms about 0.5 % of the cases

المحاضرة 6:

Transverse colon Relations:

Anterior Relations:

Anterior abdominal wall and greater omentum

Posterior Relations:

2nd part of duodenum, head of pancreas, and coils of small intestine

Superior relations:

Liver, gall bladder, greater curvature of stomach, and lateral end of spleen

Inferior Relations:

Small intestine

Blood Supply of transverse colon

The proximal two-thirds of the transverse colon is supplied by middle colic branch of superior mesenteric artery. The distal third by left colic branch of inferior mesenteric artery

Position of taeniae coli

-In the caecum, ascending colon, descending colon, and sigmoid colon the taeniae coli are placed: Anteriorly, posteromedially, and posterolaterally

-In the transverse colon, the anterior is placed inferiorly; the posteromedial is placed posteriorly; and the posterolateral is placed anterosuperiorly

Rectum

-Begins on pelvic surface of S3 vertebra as continuation of sigmoid colon.

- It follows the concavity of sacrum and coccyx, and passes through pelvic diaphragm to become continuous with anal canal.

- The anorectal junction lies 2 – 3 cm (1 finger)beyond tip of coccyx

- The peritoneum is related only to upper two-thirds of rectum, covering at first its front and sides, but lower down its front only.

-In empty state of the rectum, the mucous membrane lining its lower part presents a number of longitudinal folds which are effected by distension of the rectum.

-Beside these, there are permanent transverse folds of a semilunar shape, which are most marked when the rectum is distended

Relation of rectum:

Anterior Relations

Upper two-thirds:

- In the male to rectovesical pouch.
- In the female to rectouterine pouch.
- In both sex the pouch contains terminal coils of ileum and sigmoid colon

Lower third:

-In the male to posterior surface of bladder, vas deferens, seminal vesicles, terminal part of the ureter, and prostate

- In the female to vagina

Posterior Relations

- In the median plane, it is related to lower three sacral vertebrae, coccyx, median sacral vessels, ganglion impar, and branches of superior rectal vessels.
- On each side of the median plane, it is related to piriformis, anterior rami of lower three sacral and coccygeal nerves, sympathetic trunk, right and left coccygeus and right and left levator ani.

Lateral Relations

Sigmoid colon or distal part of ileum, pelvic sympathetic plexuses, coccygei, and levatores ani.

Anal canal:

- Passes downwards and backwards from the rectal ampulla (at the level of the prostate, in the males) to the anus.

Relation:

Anterior relations

- In the male, it is separated from membranous urethra by the perineal body.
- In the female, it is related to perineal body and lower part of vagina

Lateral relations

It is separated from the fat of ischiorectal fossae by levator ani and external anal sphincter muscles

Posterior relations

Related to anococcygeal raphe

Lining of the anal canal

Its upper half is lined by columnar epithelium

- The mucous membrane in this region exhibits 5 to 10 vertical folds, the anal columns, which are joined together at their lower ends by small semilunar folds called anal valves

- The site of attachment of the valves forms the pectinate line, which indicates the level where the upper half of the anal canal joins the lower half.

The lower half of the canal is lined by stratified squamous epithelium, which gradually merges at the anus with the perianal epidermis.

- In this region the mucous membrane has no vertical folds

Nerve supply of the anal canal

a. Mucous membrane of upper half of the canal:

Is sensitive to stretch and is supplied by sensory fibers from hypogastric plexus.

b. Lower half of the canal: Is sensitive to pain, temperature, touch, and pressure and is innervated by inferior rectal nerves.

c. The involuntary internal sphincter:

Is supplied by sympathetic fibers from Is supplied by inferior :hypogastric plexuses.

d. The voluntary external sphincter rectal nerve, a branch of pudendal nerve, and by perineal branch of the S4 nerve

Venous Drainage:

- The upper half of the canal drains by superior rectal veins (about 6 in number), which begin in the internal rectal venous plexus (in the submucosa) and continues upwards in the submucosa. On the surface of the rectum they unite to form a superior rectal vein, which is continuous as the inferior mesenteric vein, a tributary of the portal circulation.
- The lower half of the canal drains by inferior rectal veins, which, on each side, arises from the external rectal venous plexus (lies immediately

underneath the skin of the anal canal) and drains into internal pudendal vein (systemic tributary).

- Communicating veins connect the external and internal plexuses, and so form an important connection between the systemic and portal circulations
- Much of the blood from the external plexus normally passes by these communicating veins into the internal plexus, and, in consequence of congestion or thrombosis in the internal plexus, may result in similar conditions in the external plexus

Lymph Drainage of anal canal:

- The upper half of anal canal drains into pararectal lymph nodes and then mesenteric lymph nodes.
- The lower half of anal canal drains into medial group of superficial inguinal lymph nodes.

Lymphatic drainage of the rectum

drains into pararectal lymph nodes and then mesenteric lymph nodes.

Internal Hemorrhoids (Piles)

- Internal hemorrhoids are varicosities of the tributaries of superior rectal (hemorrhoidal) vein and are covered by mucous membrane.

- The tributaries of the vein, which lie in the anal column at the 3-, 7-, and 11-o'clock positions when the patient is viewed in the lithotomy position (commonly used for pelvic examinations of the female), are particularly liable to become varicosed.

- Anatomically, a hemorrhoid is therefore a fold of mucous membrane and submucosa containing a varicosed tributary of superior rectal vein and a terminal branch of superior rectal artery

- Internal hemorrhoids are initially contained within the anal canal (first degree).

- As they enlarge, they extrude from anal canal on defecation but return at the end of the act (second degree).

-With further elongation, they prolapse on defecation and remain outside anus (third degree).

- Since internal hemorrhoids occur in the upper half of the anal canal where the mucous membrane is innervated by autonomic afferent nerves, they are painless and are sensitive only to stretch.

- The causes of internal hemorrhoids are many:

a-They frequently occur in members of the same family, which suggests a congenital weakness of the vein walls.

b-Chronic constipation, associated with prolonged straining at stool, is a common predisposing factor.

c-Pregnancy hemorrhoids are common owing to pressure on the superior rectal veins by the gravid uterus.

d-Portal hypertension as a result of cirrhosis of the liver can also cause hemorrhoids.

e-The possibility that cancerous tumors of the rectum are blocking the superior rectal vein must never be overlooked

External Hemorrhoids

-External hemorrhoids are varicosities of the tributaries of inferior rectal (hemorrhoidal) vein as they run laterally from anal margin.

-They are covered by skin and commonly are associated with well-established internal hemorrhoids.

-They are covered by mucous membrane of the lower half of anal canal or skin, and they are innervated by inferior rectal nerves.

- They are sensitive to pain, temperatures, touch, and pressure, which explains why external hemorrhoids are painful.

-Its cause is unknown, although coughing or straining may produce distention of the hemorrhoid followed by stasis

- The presence of a small, actually tender swelling at anal margin is immediately recognized by the patient

anal fissure

- The lower ends of the anal columns are connected by small folds called anal valves.
 - In people suffering from chronic constipation, the anal valves may be torn down to the anus as the result of the edge of the fecal mass catching on the fold of mucous membrane.
 - The elongated ulcer so formed, known as an anal fissure, is extremely painful.
 - The fissure occurs most commonly in the midline posteriorly, or less commonly, anteriorly
-

محاضرة 7:

Lobes of Liver

-Thus the two lobes are demarcated from one another above and in front by falciform ligament, and below and behind by fissures for ligamentum teres and ligamentum venosum

Caudate lobe

- Is situated on the posterior surface.
- It is bounded on the left by the fissure for the ligamentum venosum; on the right by the deep groove which lodges the upper portion of the inferior vena cava; below by the porta hepatis; and above, it is continuous with the superior surface.
- Below and to the right, the caudate lobe is connected to the mass of the right lobe by a narrow process of liver substance, termed the caudate process, which lies immediately behind the porta hepatis and forms the roof of the epiploic foramen.
- Below and to the left the caudate lobe presents a small rounded projection, the papillary process.

Extension of the whole liver

It extends from the level of the 5th intercostal space to the lower margin of the ribs.

extension of the Anterior surface of liver

On the right side, the diaphragm separates this surface from the pleura and 6-10 costal cartilages. and on the left side, from the 7 and 8 costal cartilage

extension of the Right surface of liver

Is covered by peritoneum, and extends from the 7-11 rib

Posterior surface: at its lower end the groove for inferior vena cava separated from portal hepatis in front by the caudate process

Inferior (Visceral) Surface

- Is directed downwards and backwards and slightly to the left
- On left lobe is a shallow impression, the gastric impression, which is indirect continuity with the esophageal impression.
- On the right of gastric impression there is a rounded omental tuberosity.
- The fissure for the ligamentum teres passes extends from the inferior border of the liver to the left end of the porta hepatis, where it become continuous with the lower end of the fissure for ligamentum venosum.
- The porta hepatis is located between quadrate lobe in front and caudate process behind.
- It is a deep fissure which runs transversely between upper end of fissure for ligamentum teres and the fossa for gallbladder.
- Through the porta hepatis the portal vein, the hepatic artery proper and hepatic plexus of nerves enter the liver, and the right and left hepatic ducts and some lymph vessels emerge.
- The caudate process connects the lower right part of caudate lobe to right lobe.
- It is placed behind the porta hepatis and in front of the inferior vena cava.

- The papillary process projects from the inferior and left part of caudate lobe of the liver.
- The fossa for the gallbladder forms the right boundary of the quadrate lobe and extends from inferior border of the liver to right extremity of porta hepatis.
- To the right of fossa for gallbladder, the inferior surface of the right lobe of the liver is marked by three impressions, colic, renal and duodenal.
- The colic impression is related to the right colic (hepatic) flexure and lies in the anterior part of the area, immediately behind the inferior border of the liver
- The renal impression is related to the anterior surface of right kidney and lower part of right suprarenal gland.
- It is situated behind colic impression and is separated from gallbladder by duodenal impression

Kupffer cells account for 15% of liver cells population, their main functions:

- a. Metabolize aged erythrocytes.
- b. Digest hemoglobin.
- c-Screte protein related to immunological process and destroy bacteria that eventually enter the portal blood through the intestine

In the space of Disse, fat-storing (stellate) cells, contain vitamin A-rich lipid inclusions , their function:

- a. uptake, storage, and release of retinoids.
- b. synthesis and secretion of extracellular matrix proteins and proteoglycans.
- c. secretion of growth factors, and cytokines.
- d. regulation of sinusoidal lumen diameter.

Structure of liver:

- Cords are separated by fine vascular sinusoids, the liver sinusoids, through which blood flows
- These sinusoids are dilated vessels composed of a discontinuous layer of fenestrated endothelial cells.
- The fenestrae have no diaphragm
- The liver, therefore, unusual in having both arterial and venous blood supplies, as well as separate venous drainage.
- The hepatic artery brings blood that is rich in oxygen to support liver metabolism.
- The portal vein brings materials absorbed from intestine.
- In turn blood from liver drains via hepatic veins into inferior vena cava