SMALL AND LARGE INTESTINES

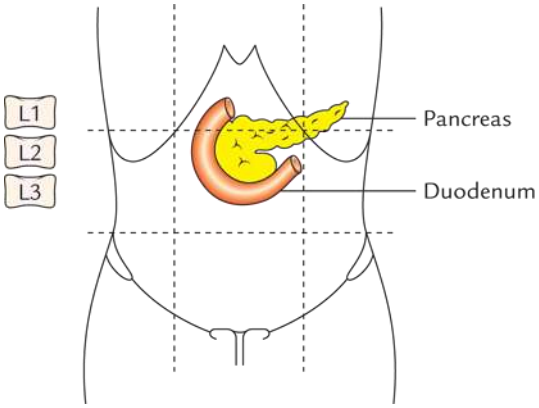
DESCRIBE DUODENUM UNDER FOLLOWING HEADINGS(A)PARTS AND POSITION,(B)RELATIONS (C)DEVELOPMENT (D) BLOOD SUPPLY.(LE)

The duodenum is the shortest ,widest and most fixed part of the small intestine.

(A)**Parts and position:**

It extends from the pylorus to the duodenojejunalflexure.It is curved around the head of the pancreas in the form of letter C.

It lies above the level of umbilicus,opposite the first,second and third lumbar vertebrae.



Parts:

Duodenum is 25 cm long.

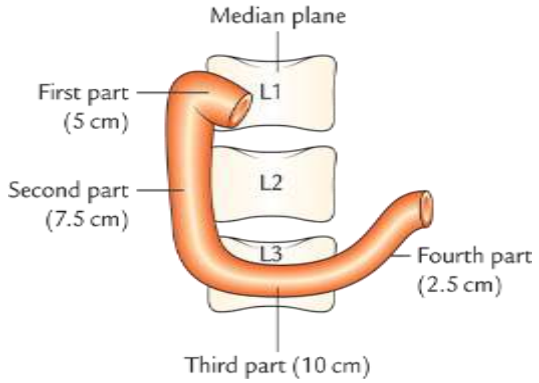
Divided into 4 parts.

First or superior part.5cm long.

second part or descending part,7.5cm.

Third part 10cm.

fourth part or ascending part 2.5cm.



Relations:

The duodenum is retroperitoneal and fixed.

Anteriorly ,it is partly covered with peritoneum.

First part:

Peritoneal relations:

The proximal 2.5cm is attatched to the lesser omentum above and greater omentum below.

The distal 2.5 cm is fixed .it is retroperitoneal ,covered with peritoneum only on its anterior aspect.

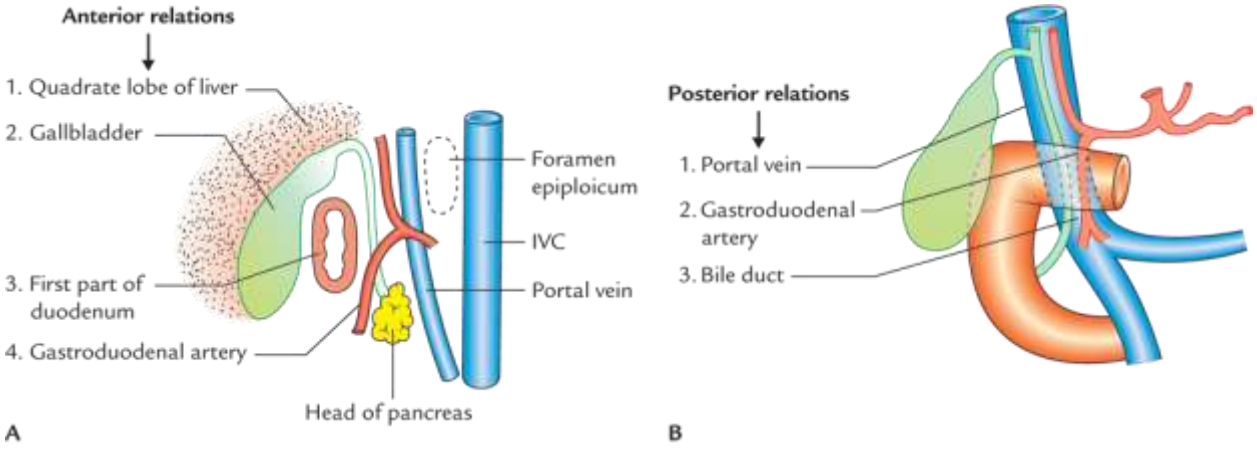
Visceral relations:

Anteriorly- quadrate lobe of the liver and gall bladder.

Posteriorly-gastroduodenal artery,bile duct and portal vein.

Superiorly-epiploic foramen.

Inferiorly-head and neck of the pancreas.



Second part:

Visceral Relations:

Anteriorly-right lobe of the liver.

Transverse colon.

Root of the transverse mesocolon and

Small intestine.

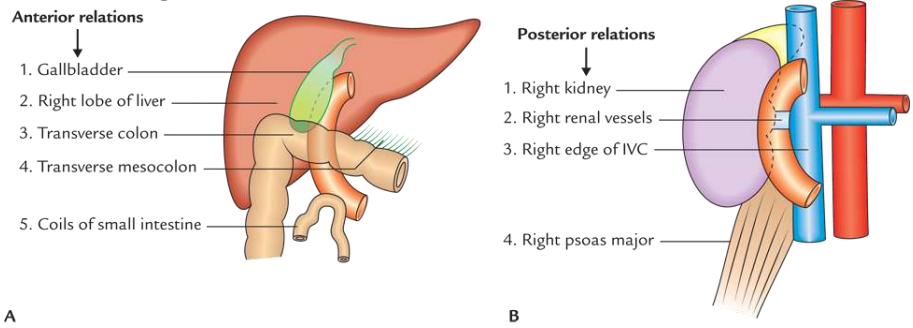
Posteriorly-anterior surface of the right kidney near the medial border.

Right renal vessels.

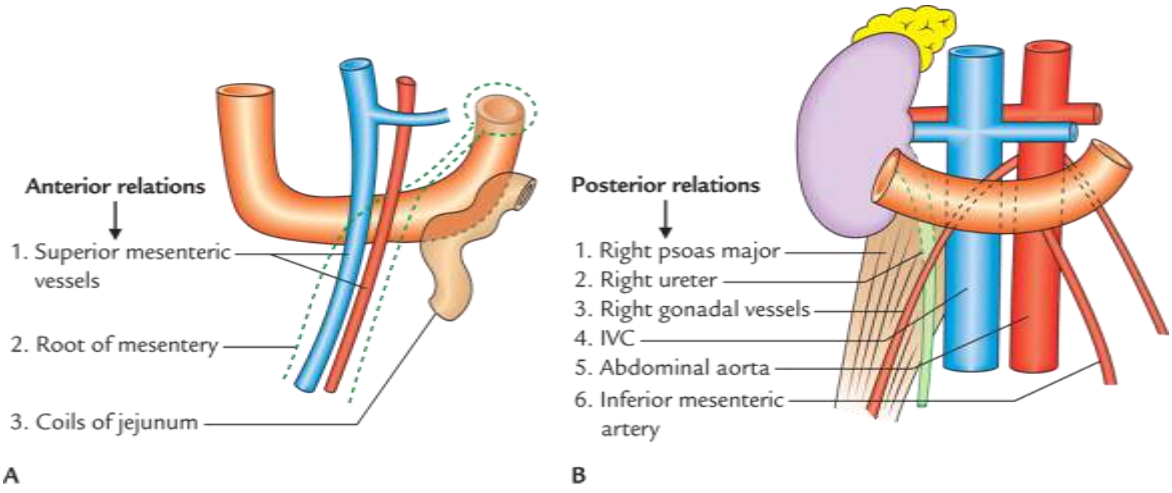
Right edge of the inferior vena cava.

Right psoas major.

Medially-head of the pancreas.
The bile duct.
Laterally-right colic flexure.



Third part:
Visceral relations:
Anteriorly -superior mesenteric vessels
Root of mesentery.
Posteriorly-right ureter
Right psoas major.
Right testicular or ovarian vessels.
Inferior venacava.
Abdominal aorta with the origin of inferior mesentrery artery.



Superiorly-head of the pancreas with uncinated process.
Inferiorly-coils of jejunum.
Fourth part:
Visceral relations:
Anteriorly-Transverse colon.
Transverse mesoclon.
Lesser sac and stomach.

Posteriorly

left sympathetic chain.
Left psoas major.
Left renal vessels.
Left testicular vessels.
Inferior mesenteric vein.

To the right-

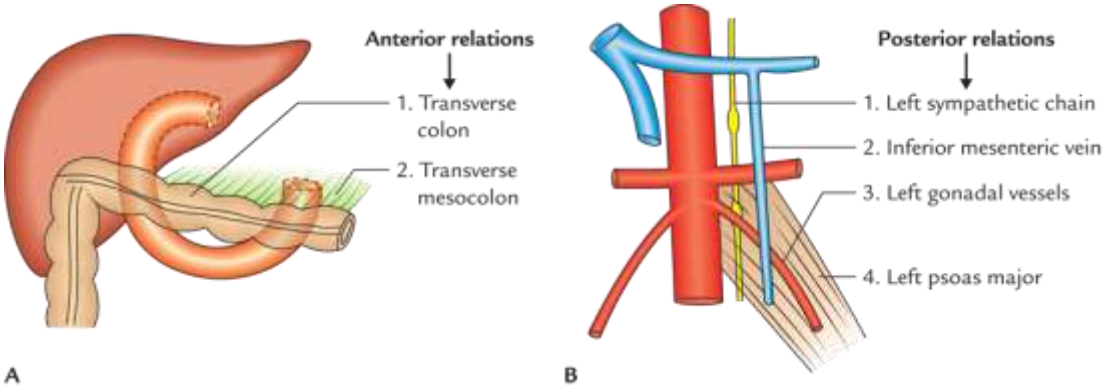
attatchment of the upper part of the root of the mesentery.

To the left-

kidney
Left ureter.

Superiorly-

body of the pancreas.



Development :

The first part upto the level of opening of the bile duct into second part develops from the foregut and below that level it is develops from the midgut.

Blood supply:

Arterial supply

Upto the level of opening of the bile duct into the second part,it is supplied by superior pancreaticoduodenal artery.

Below this part it is supplied by inferior pancreaticoduodenal artery.

The first part of the duodenum receives additional supply from the

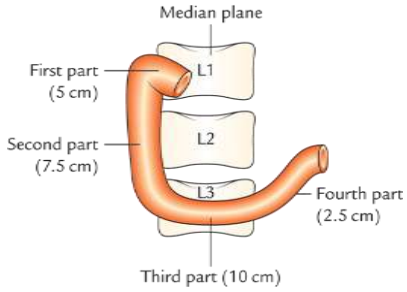
Right gastric artery.
The supraduodenal artery,
The retroduodenal branches of gastroduodenal artery,
Branches from right gastroepiploic artery.

Venous drainage:

The veins of the duodenum drain into the splenic superior mesenteric and portal veins.

DESCRIBE THE SECOND PART OF DUODENUM UNDER FOLLOWING HEADINGS (A)RELATIONS (B)INTERNAL FEATURES (C)ARTERIAL SUPPLY (D)DEVELOPMENT AND (E)APPLIED ANATOMY(LE)

The second part of the duodenum is about 7.5cm long.
It begins at the superior duodenal flexure,passes downwards to reach the lower border of the third lumbar vertebra.
Here it curves towards the left at the inferior duodenal flexure,to become continues with the third part.



Relations:

Peritoneal relations:

It is retroperitoneal and fixed.its anterior surface is covered with peritoneum,except near the middle where it is directly related to the colon.

Visceral Relations:

Anteriorly-

Right lobe of the liver.
Transverse colon.
Root of the transverse mesocolon and
Small intestine.

Posteriorly-

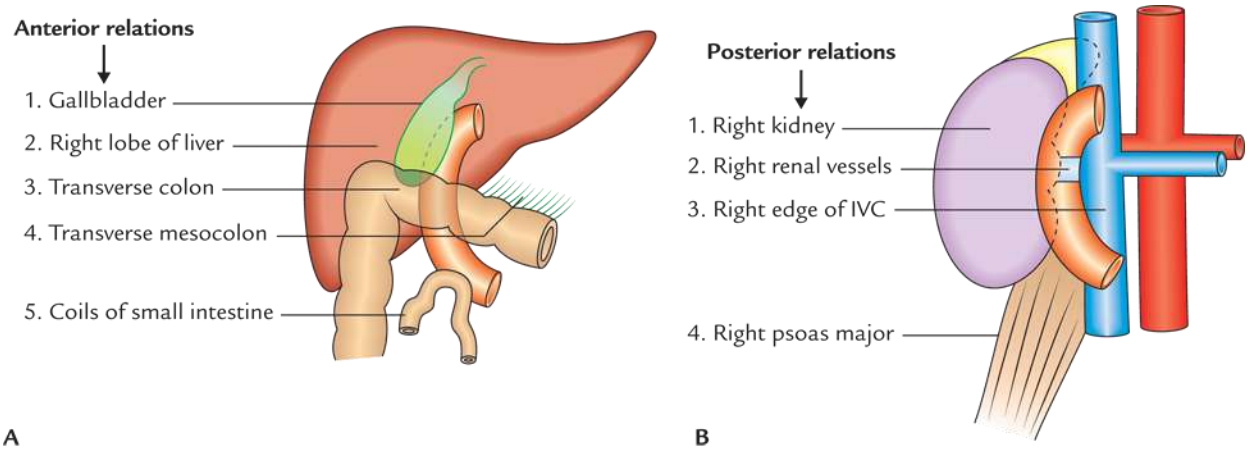
Anterior surface of the right kidney near the medial border.
Right renal vessels.
Right edge of the inferior vena cava.
Right psoas major.

Medially-

Head of the pancreas.
The bile duct.

Laterally-

Right colic flexure.



Internal features:

The interior presents the following features.

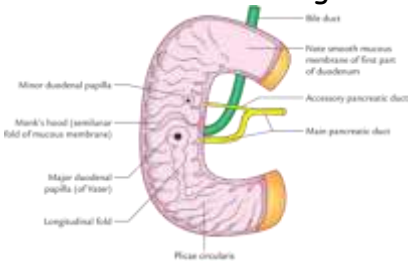
Circular folds-these are permanent mucosal folds thickly set in duodenum.

The major duodenal papilla is an elevation present posteriomedialy.8 to 10 cm distal to the pylorus.thehepatopancreatic ampulla opens at the summit of the papilla.

The minor duodenal papilla is present 6 to 8 cm distal to the pylorus,and presents the opening of the accessory pancreatic duct.

plicasemicircularis-it arches above the major duodenal papilla and resembles a monks hood.

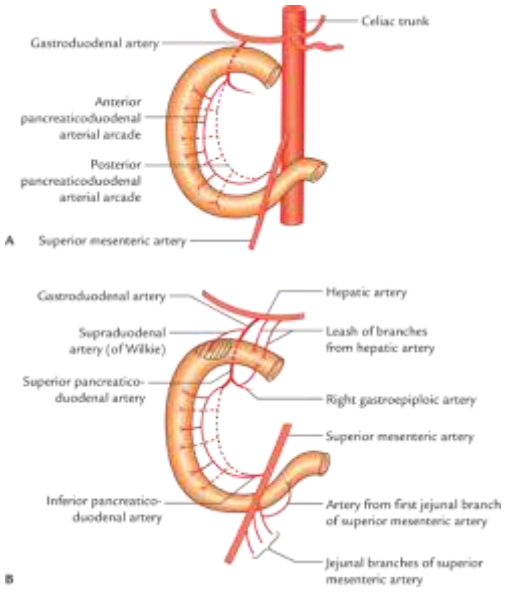
plicalongitudinalis-it is a vertical fold extending from the major papilla.



Arterial supply:

upto the level of opening of the bile duct into the second part,it is supplied by superior pancreaticoduodenal artery.

Below this part it is supplied by inferior pancreaticoduodenal artery.



Development:

The first part upto the level of opening of the bile duct into second part develops from the foregut and below that level it is develops from the midgut.

Applied anatomy:

Congenital stenosis and obstruction of the second part of the duodenum may occur at the site of the opening of the bile duct.

Other causes of obstruction are

An annular pancreas

Pressure by superior mesenteric artery.

Contraction of the suspensory muscle of the duodenum.

SECOND PART OF THE DUODENUM-EXTENT ,RELATIONS,BLOOD SUPPLY AND DEVELOPMENT(SE)

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It begins at the superior duodenal flexure,passes downwards to reach the lower border of the third lumbar vertebra.

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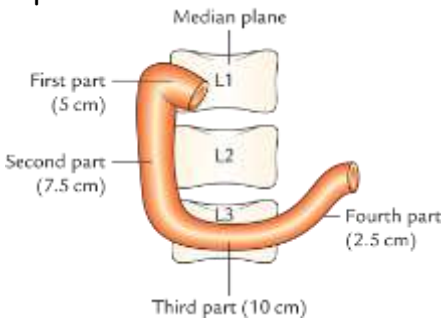

Relations:

Peritoneal relations:

It is retroperitoneal and fixed.its anterior surface is covered with peritoneum,except near the middle where it is directly related to the colon.

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Medially

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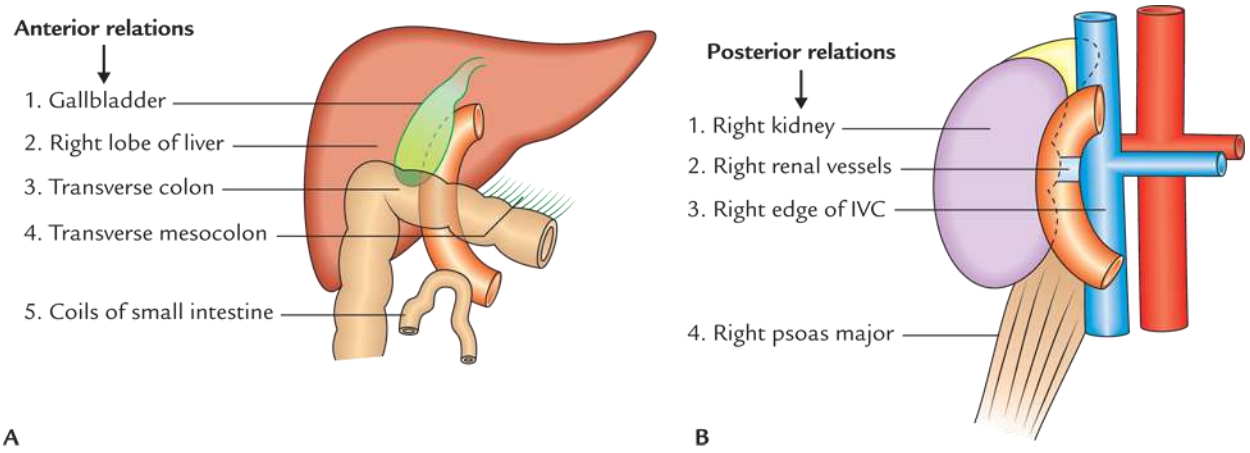
Laterally

Right colic flexure.



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Venous drainage:

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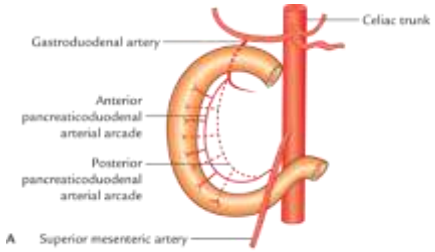
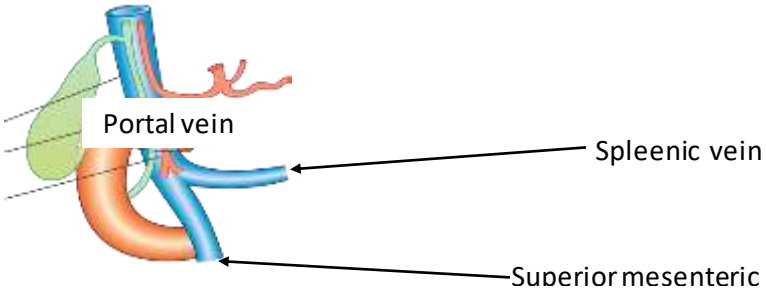
Arterial supply

Venous drainage





Development:

The first part upto the level of opening of the bile duct into second part develops from the foregut and below that level it is develops from the midgut.

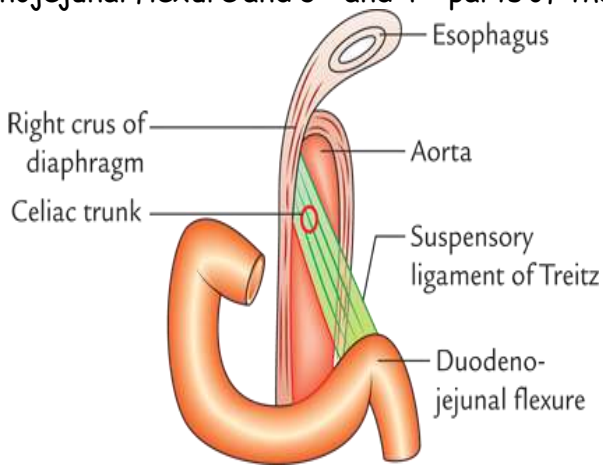
SUSPENSORY LIGAMENT OF THE DUODENUM(SE)

It is the fibromuscular band.

Susbends the duodenojejunal flexure.

Arises fron the right crus of the diaphragm,close to the right side of the oesophgus.

Passes downwards behind the pancreas and attatched to the posterior surface of the duodenojejunal flexure and 3rd and 4th parts of the duodenum.



It is made up of

Striped muscle fibres in the upper part.

Elasticfibres in the middle part.

Plain muscle fibres in the lower part.

Its contraction increases the angle of the duodenojejunalflesure.

If it is attatched only to the flexure,then it causes partial obstruction of the gut.

DIFFERENCES BETWEEN DUODENUM, JEJUNUM AND ILEUM(SE)

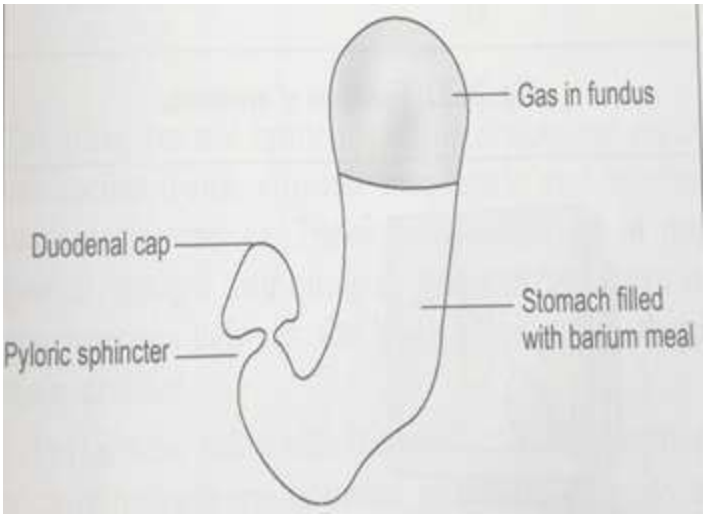
	duodenum	jejunum	ileum
Mucosa- villi	Broad, ridge- like in the proximal duodenum. Foliate(leaf-like) in the distal duodenum	Tall foliate in proximal jejunum Finger- like in distal part	*Finger shaped villi *Small and few over Peyer's patches
Lamina propia	Crypts of Leiberkuhn+	*Crypts of Leiberkuhn + *Occasional solitary lymphoid follicles +	*Crypts of Leiberkuhn + *aggregations of lymphoid follicles – Peyer's patches
Muscularis mucosae	uninterrupted	uninterrupted	Breached by Peyer's patches
submucosa	Connective tissue packed with glands of Brunner.	Connective tissue	Connective tissue with lymphoid tissue of Peyer's patches

DUODENAL CAP (SE)

It is a triangular shadow formed by the first part of duodenum in the skiagrams taken after a barium meal.

The triangular shadow shows a well demarcated base and less distinct apex.

When duodenal ulcer is present in the first part, a small fleck of barium is found filling the ulcer crater and the duodenal cap is said to be deformed.



Peculiar features of first part are:

Only this part of duodenum is intraperitoneal & freely movable.

Only part supplied by end arteries.

Devoid of circular mucus folds.

Duodenal ulcers commonly occur in the first part of the duodenum.

PARTS OF DUODENUM(SA)

Parts:

Duodenum is 25 cm long.

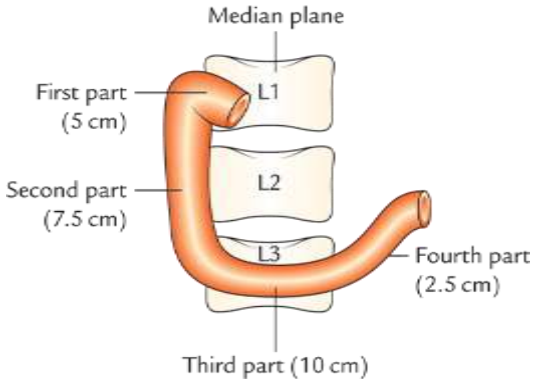
Divided into 4 parts.

First or superior part-5cm long.

Second part or descending part-7.5cm.

Third part or horizontal part-10cm.

fourth part or ascending part- 2.5cm.

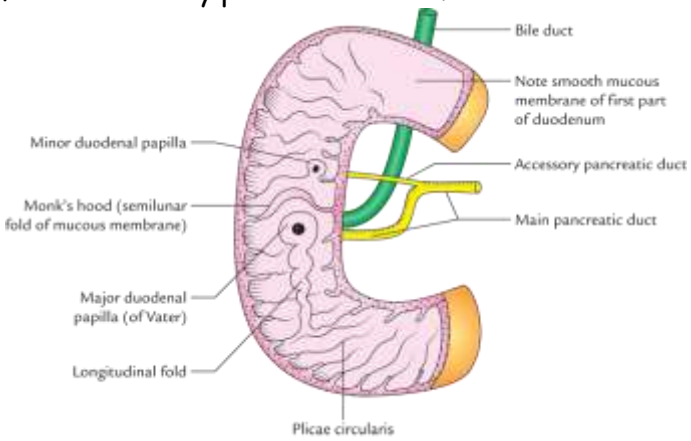


INTERIOR OF THE SECOND PART OF THE DUODENUM(SA)

Internal features:

The major duodenal papilla is an elevation present posteriomedialy.8 to 10 cm distal to the pylorus.thehepatopancreatic ampulla opens at the summit of the papilla.

The minor duodenal papilla is present 6 to 8 cm distal to the pylorus,and presents the opening of the accessory pancreatic duct.



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It is made up of

- Striped muscle fibres in the upper part.
- Elasticfibres in the middle part.
- Plain muscle fibres in the lower part.

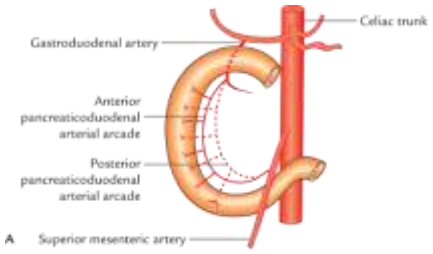
Its contraction increases the angle of the duodenojejunalflesure.

If it is attatched only to the flexure,it causes partial obstruction of the gut.

BLOOD SUPPLY OF THE SECOND PART OF THE DUODENUM(SA)

Upto the level of opening of the bile duct into the second part,it is supplied by superior pancreaticoduodenal artery.

Below this part it is supplied by inferior pancreaticoduodenal artery.



DESCRIBE THE APPENDIX UNDER THE FOLLOWING HEADINGS?(A)SITUATION,(B)POSITION,(C)BLOOD SUPPLY,(D)DEVELOPMENT,(E)STRUCTURE(LE)

VERMIFORM APPENDIX-SITUATION,POSITION,BLOOD SUPPLY,MICROSCOPIC STRUCTURE AND APPLIED ANATOMY.(SE)

Appendix is a worm like diverticulum from the caecum

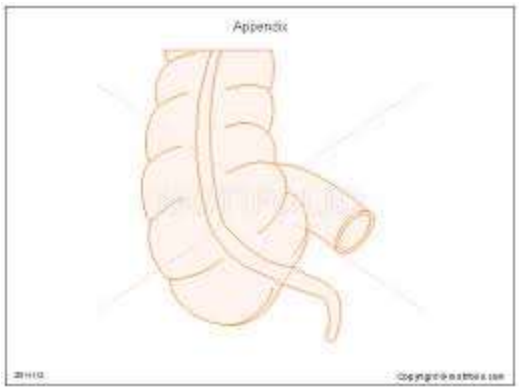
(A)Situation:

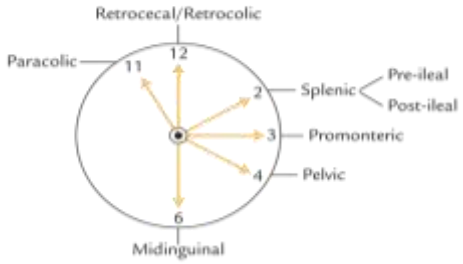
It is present in the right iliac fossa.

(B)Position:

The appendixarises from the posteriomedial wall of the caecum, about 2cm below the ileocaecal orifice.

The base is fixed. The tip has various positions.





The various positions of the tip are:

Paracolic (11 O clock)position:The appendix pass upwards and to the right.

Retrocaecal (12 O clock) position is the commonest position.The appendix lie behind the caecum or colon.

Splenic (2 O clock)position: it could be pre-ileal or post-ileal

Post-ileal:The appendix lie behind the ileum. It is most dangerous because the inflammation spreads into the peritoneal cavity.

Promontoric: (3 O clock) The appendix passes horizontally to the left to the sacral promontory.

(C)Blood supply:

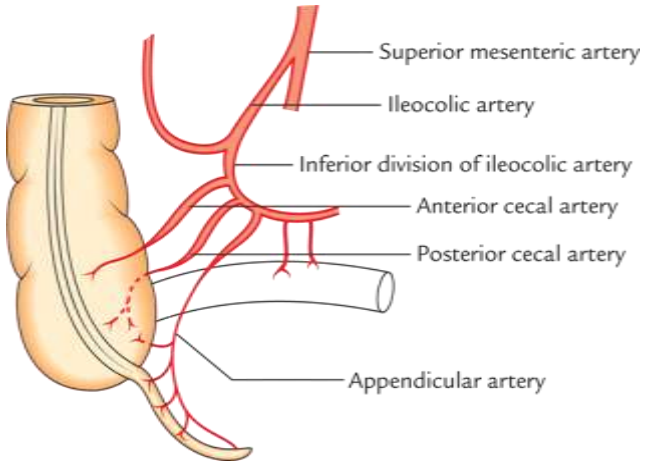
Arterial supply:

The appendix is supplied by the appendicular artery branch of the lower division of the ileocolicartery.

The artery passes behind the terminal part of the ileum,supplies the entire organ and provides a recurrent branch towards the base.

Here it anastomoses with the posterior caecal artery.

The venous drainage is by the appendicular,ileocolic and superior mesenteric veins,to the portal vein.



(D)Development:

The appendix is developed from the lower narrow part of caecal diverticulum which arises from the distal limb of the U shaped loop of the primitive midgut.To reach the right ileac fossa,the caecum and appendix undergo 270 degree rotation around the axis of the superior mesenteric artery.

(E)Structure of the appendix:

It presents four coats.

Mucosa

Contains muscularismucosae,laminapropria and surface epithelium.

surface is lined by simple columnar epithelium,with numerous goblet cells,entrochromaffin cells.

Submucosa

Contains loose areolar tissue and numerous lymphatic follicles.

Muscularisexterna

Cosists of outer longitudinal and inner circular layers of smooth muscle.

Serosa

Derived from peritoneum and covers the entire tube ,except along the mesoappendix.

.

Applied anatomy:

Appendicitis:

Caused by the Inflamation of appendix.

Symptoms:

Pain,vomiting and raised temperature.

Treatment is appendicectomy.

Appendicular dyspepsia:

Chronic appendicitis produces dyspepsia.

It is due to passage of infected lymph to the subpyloric nodes.

Diverticulae of the Appendix:

It is a small evagination of mucous membrane .

Neoplasms of Appendix (Carcinoid tumours)

MECKEL'S DIVERTICULUM(SE)

Meckel's diverticulum is a true congenitaldiverticulum,

It is the vestigial remnant of the proximal part of the vitellointestinal duct.

It is the most common malformation of the gastrointestinal tract

It is 2 feet proximal to ileocaecal junction,2inches long.

Present in approximately 2% of the population.

It is more common in males.

Structures of the diverticulum:

It presents four coats-mucousa,submucousa,muscularisexterna,& serosa,

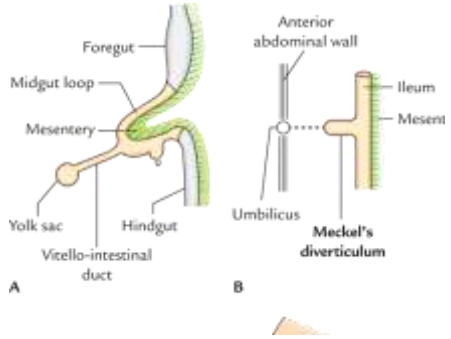
Applied anatomy:

peptic ulcer may be formed in the mucous membrane as oxyntic cells may be present in the mucosa.

The diverticulum may be inflamed,and may spread into the peritoneal cavity.

It may cause intestinal obstruction.

Treatment is surgical resection.



CAECUM(SE)

The caecum is the large blind sac forming the commencement of large gut.

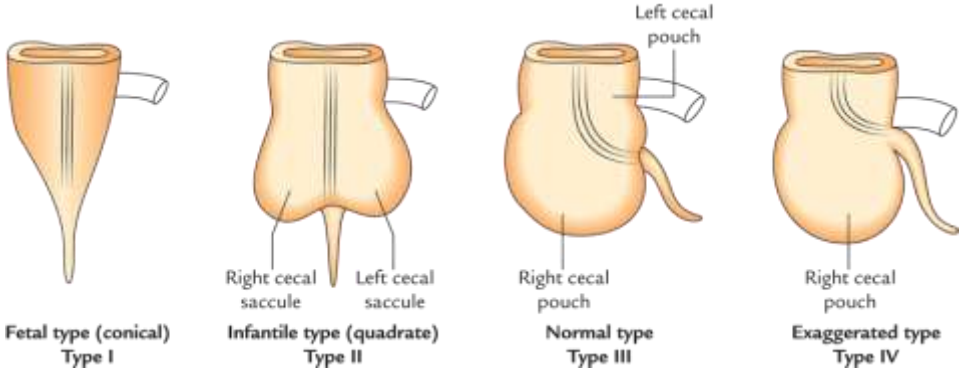
Situated in the right iliac fossa,above the lateral half of the inguinal ligament.

It communicates superiorly with the ascending colon,andposteromedially with the appendix.

Size:length-6cm,breadth-7.5cm.

Shape:it is an asymmetrical cul-de-sac,but the shape varies.

Types:



Foetal:2%,the caecum is conical and the appendix arises as a straight tube from its apex.
Infantile type:2%The caecum is conical and the appendix arises as attatched to a depressed bottom.
Normal adult type:90%,right saccule enlarges more than the left one,and the appendix is situated about 2cm below the ileocaecal junction.
Exaggerated type:4% to 5%,here right saccule hugely enlarges and left sacculeatropies. The appendix is close to the ileo-caecaljumction.

Relatiions:

Anteriorly

Coils of intestine and anterior abdominal wall.

Posteriorly:

Muscles-right psoas and iliacus.

Nerves-genitofemoral,femoral and lateral cutaeneous nerve of thigh.

Vessels-Testicular or ovarian vessels.

Appendixin the retrocaecal recess.

Blood supply:

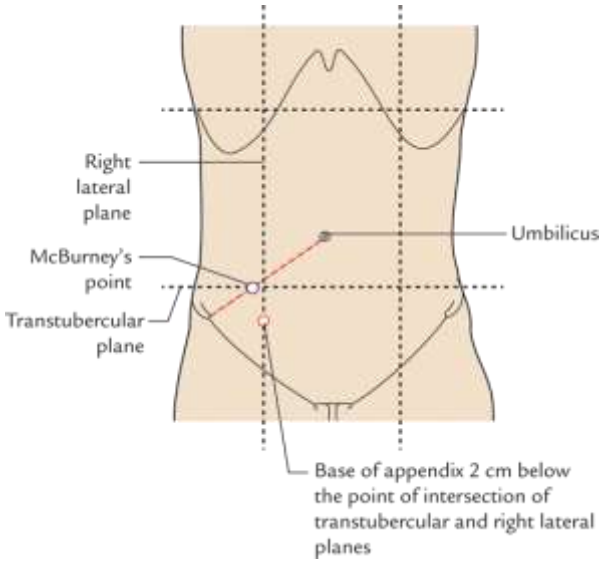
Caecal branches of the ileocolic artery.

The veins drains into the superior mesenteric vein.

MACBURNEY'S POINT(SE,SA)

TheMacburney's point lies at the junction of lateral one-third and medial two-thirds of the line joining the right anterior superior iliac spine to the umbilicus. It corresponds roughly,to the position of the base of the appendix.

MacBurneys point is the site of maximum tenderness in appendicitis.



PARTS OF LARGE INTESTINE.(SA)

The large gut consists of four parts.

Caecum and appendix.

Colon

Ascending colon-15cm long

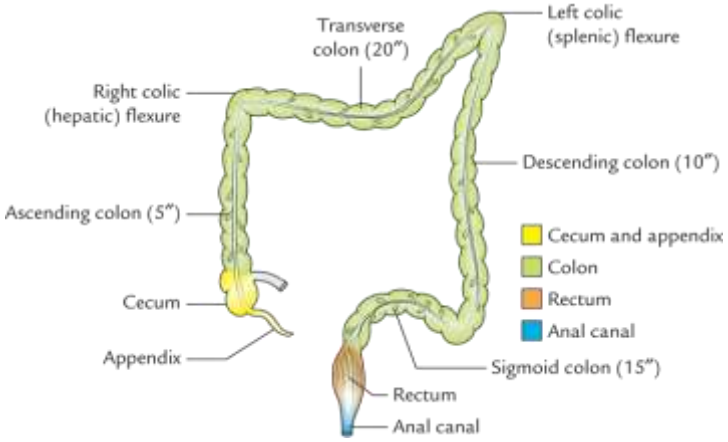
Transverse colon-50cm long.

Descending colon-25cmlong.

Sigmoid colon-40cm long.

Rectum-12cm.

Anal canal-3.8cm.



MAIN FEATURES OF COLON(SA)

The three cardinal features of colon are

Taeniaecoli,

Sacculations,and

Appendices epiploicae.

The taeniae coli are three thick bands produced by the aggregations of longitudinal muscles of the large gut.

The taeniae are absent in vermiform appendix and rectum.

Within the 4feet taenia ,6 feet large gut is inserted.therefore the surface of the gut is sacculated.

The appendices epiploicae are peritoneal pouches containing fat,andare present in entire large gut except caecum ,appendix and rectum.

TAENIAE COLI.(SA)

The taeniae coli are three thick bands produced by the aggregations of the longitudinal muscles of large gut.

The taeniae are absent in vermiform appendix and rectum.

Each taenia coli is 4feet long.

Within the 4feet taenia ,6 feet large gut is inserted.therefore the surface of the gut is sacculated.

In a vertical colon,the position of taeniae are taenialibera on anterior surface,taeniamesocolica on posterio medial surface,taeniaometalis on posterio lateral surface.

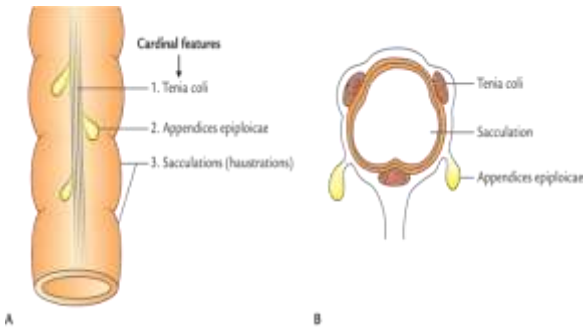
All taeniae converge towards the base of the appendix.

Traced distally,about 5cm above the rectosigmoid junction the taenia unite to form 2 thick bands,anterior and posterior.

Anterior band passes infront of the rectum,it is formed by the fusion of taenialibera and taeniaomentalis.

Posterior band passes behind the rectum, it is formed by the downward continuation of taeniamesocolica.

APPENDICES EPIPLOICAE(SA)



The appendices epiploecae are peritoneal pouches cantaining the fat.

They are present in the entire large gut except the caecum,appendix and rectum.

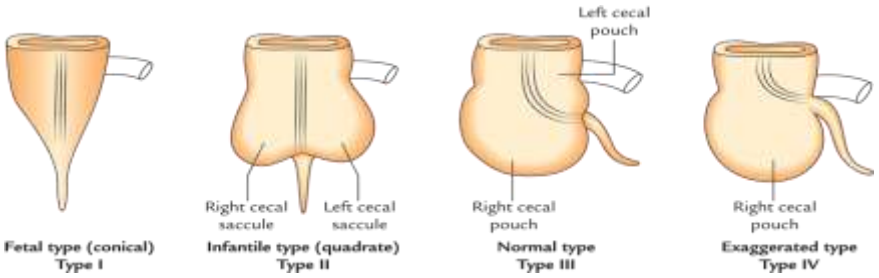
It is more numerous in the transverse and sigmoid colon.

They usually project between taenia libera and taenia mesocolica.

DIFFERENCES BETWEEN LARGE AND SMALL INTESTINE(SA)

FEATURE	SMALL INTESTINE	LARGE INTESTINE
1.Gross feature	6.5meters long,narrow.	1.5 metreslong,wider.
2.Appendices epiploicae	Absent	Present
3.Taeniae coli	Absent	Present
4.Sacculations	Absent	Present
5.Distensibility	Less	More
6.Fixity	Greater part is freely mobile	Greater part is fixed.
7.Villi	Present	Absent
8.Transverse mucosal folds	permanent	Obliterated when longitudinal muscle coat relaxes.
9.Crypts of liberkuhn	Crypts are lined by absorptive cells,goblet cells and granular paneth cell	The crypts are longer,more numerous and goblet cells are predominant.paneth cells are absent.
10.Peyer's patches	Present in ileum	Absent
11.common sites for	a.Intestinal worms	a.Entamoebahistolytica
	b.Typhoid	b.Dysentery organisms
	c.Tuberculosis	c.Carcinoma
12.Effects of infection and irritation	Diarrhoea	Dysentery

TYPES OF CAECUM(SA)



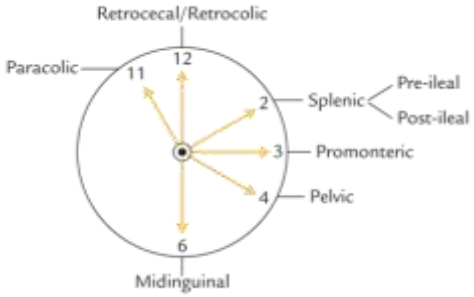
Foetal:2%,the caecum is conical and the appendix arises as a straight tube from its apex.

I**nfantile type**:2%The caecum is conical and the appendix arises as attatched to a depressed bottom.

N**ormal or adult type**:90%,right saccule enlarges more than the left one,and the appendix is situated about 2cm below the ileocaecal junction.

E**xaggerated type**:4% to 5%,here right saccule hugely enlarges and left sacculeatropies. The appendix is close to the ileo-caecaljumction.

VERMIFORM APPENDIX-POSITION(NORMAL AND ABNORMAL)(SA)



Retrocaecal&Retrocolic

Pelvic

Subcaecal&Paracolic.

Splenic could be preileal and post ileal.Preileal position is more dangerous because infection of the appendix will spread to peritoneal cavity.

Promontoric

Mid-inguinal

Ectopic-Is present in the left iliac fossa.

SIGMOID COLON(SA)

Sigmoid colon is 37.5cm.

Extends from the pelvic brim to the third piece of the sacrum.

The loop presents 3parts.

Vertical,horizontal and oblique.

It is suspended by the sigmoid mesocolon.

Blood supply:

Arterial supply:is by

Sigmoid arteries branch from inferior mesenteric artery.

A recurrent branch of the superior rectal artery.

Venous drainage

Portal system via inferior mesenteric vein.

Lymphatics

Inferior mesenteric group of pre aortic lymph nodes.