The colon
- Visceral osteopathy -

Nicolas VIGNON – Osteopath D.O. - 2019

The author of the Seminar

- Graduated D.O. in 2005 – 6 years full time studies
- Private practice near Lyon – FR
- Since 2018 : Anatomy teacher in one Osteopathy school (Lyon)
- 2006-2017 : Visceral Osteopathy teacher in Lyon
- 2011-2015 : Visceral and Urogenital Osteopathy teacher in Nantes
- Since 2014 : Collaborator of Finet and Williame D.O. : Workshops in France, Belgium, Spain, Germany… Structuring the osteopathic treatment : simplified procedure, visceral and urogenital osteopathy on Evidence Based Medicine and own Researches.
- http://deltadyn.be

Link to booklet

- http://exercicesdestill.net/download/colon

The appendix

Anatomy

- Blind-ended muscular tube attached to the posteromedial wall of caecum, about 2cm below ileocaecal junction.
- Suspended by peritoneal fold : MESOAPPENDIX.
- Length : 4 – 11 cm, diam : 1 – 7 mm.
- Longer in children, decreases after 40. Mature size at 3 years old.

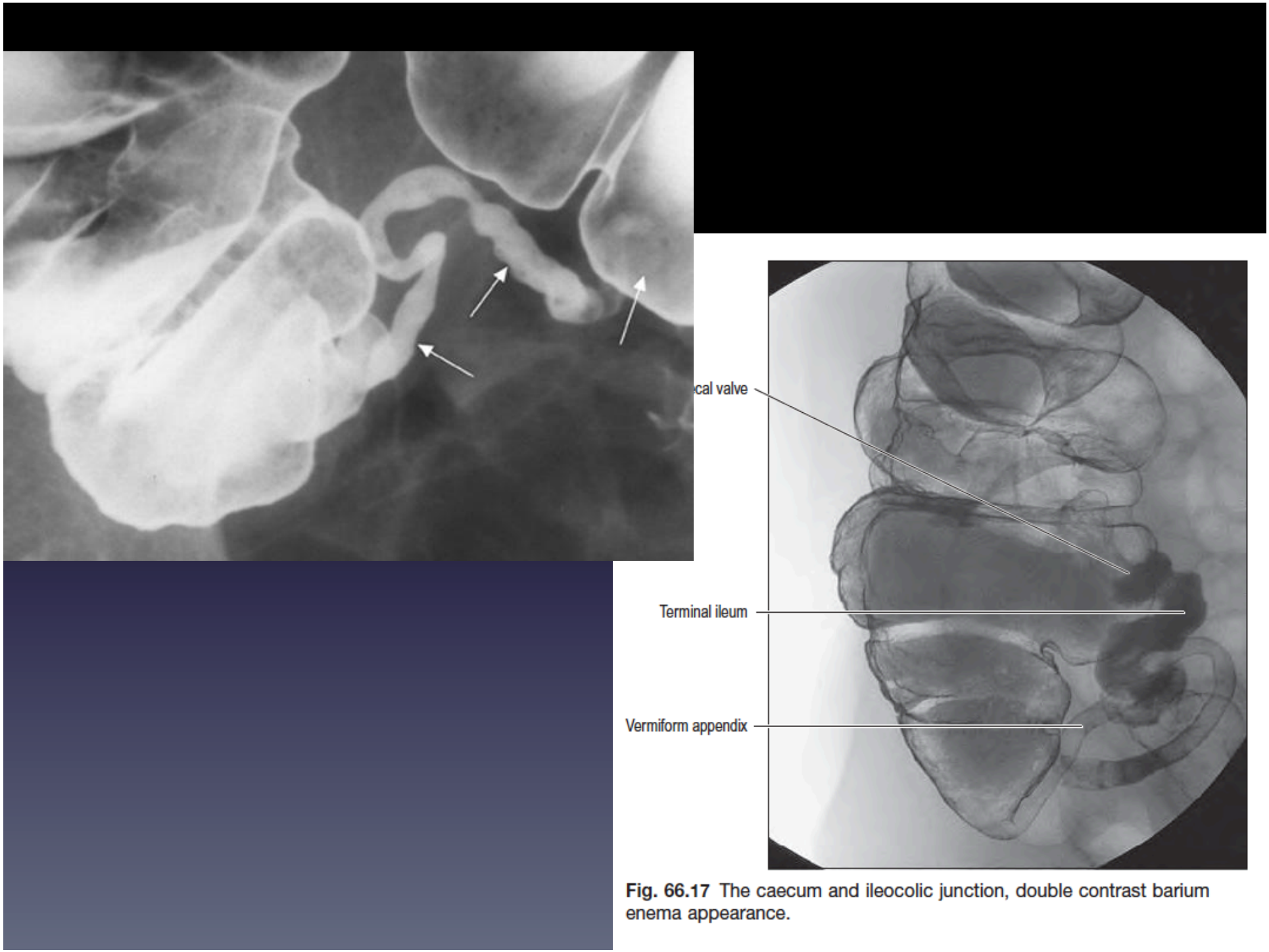
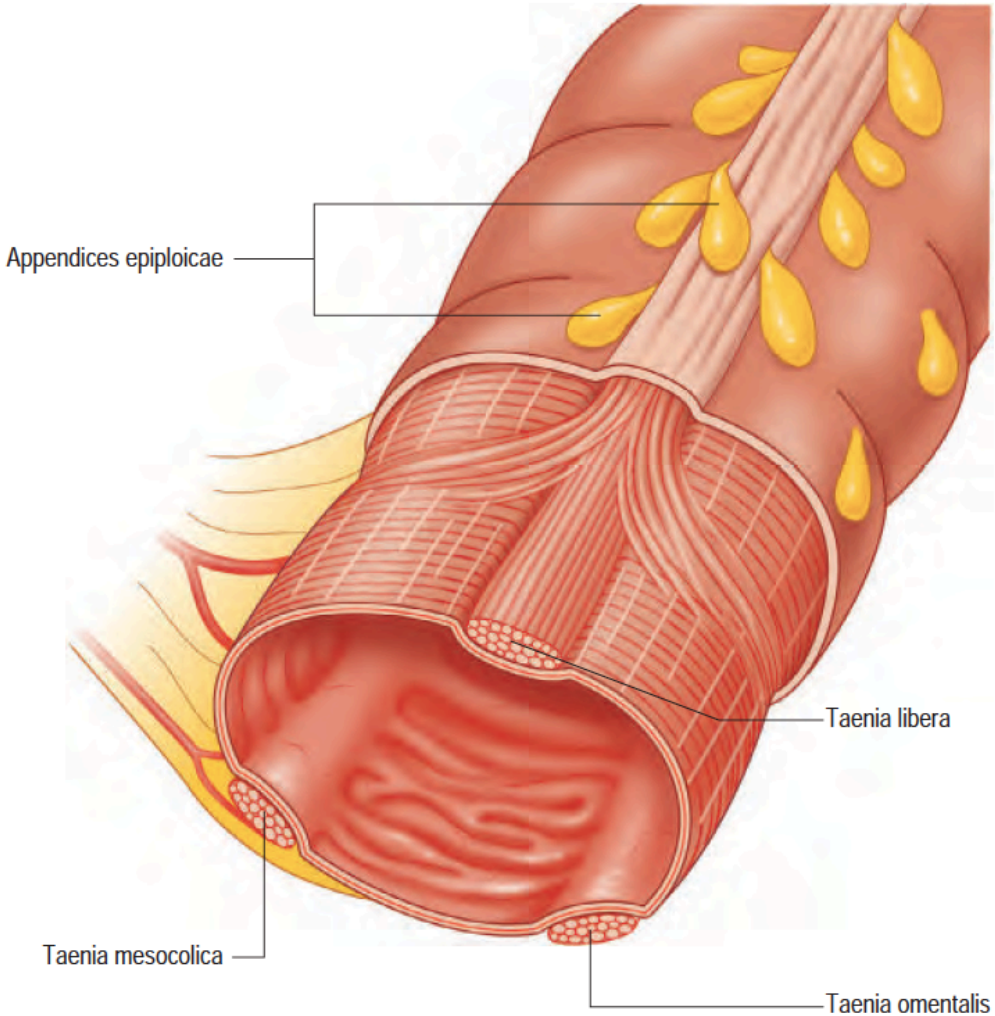
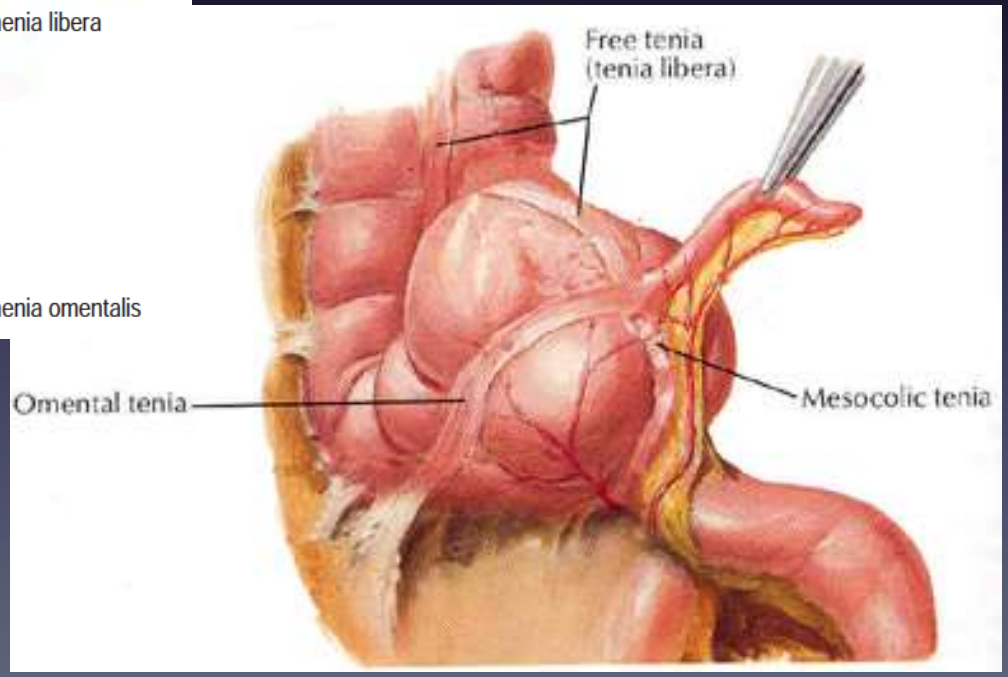


Fig. 66.17 The caecum and ileocolic junction, double contrast barium enema appearance.

- The 3 taeniae of the colon converge to the base of the appendix.
- The opening contains sometimes an incomplete valve : Valve of Gerlach.


Appendices epiploicae
Taenia libera
Taenia mesocolica
Taenia omentalis


Free tenia
(tenia libera)
Omental tenia
Mesocolic tenia

- Different locations for the appendix !
- Not possible to palpate !

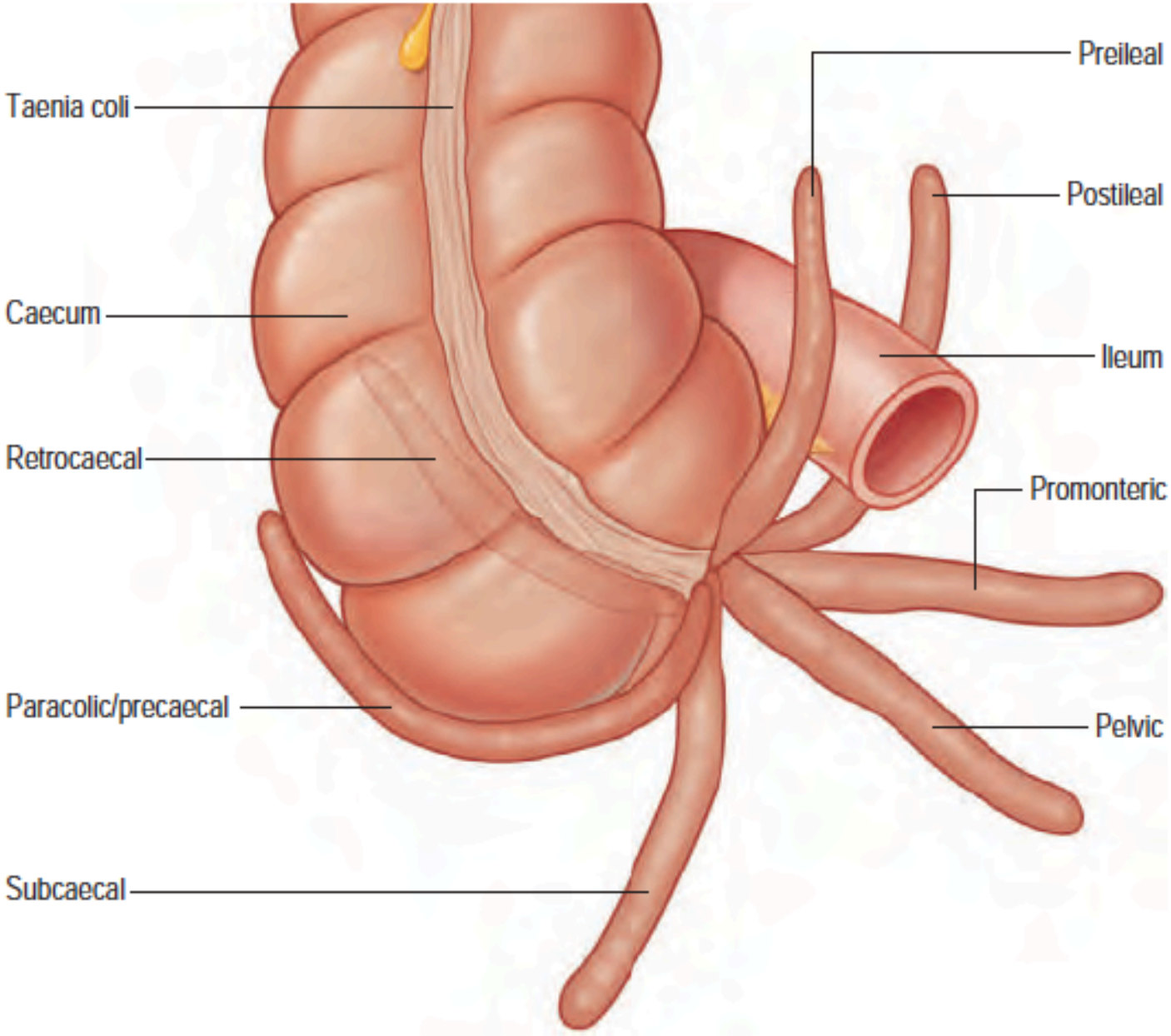
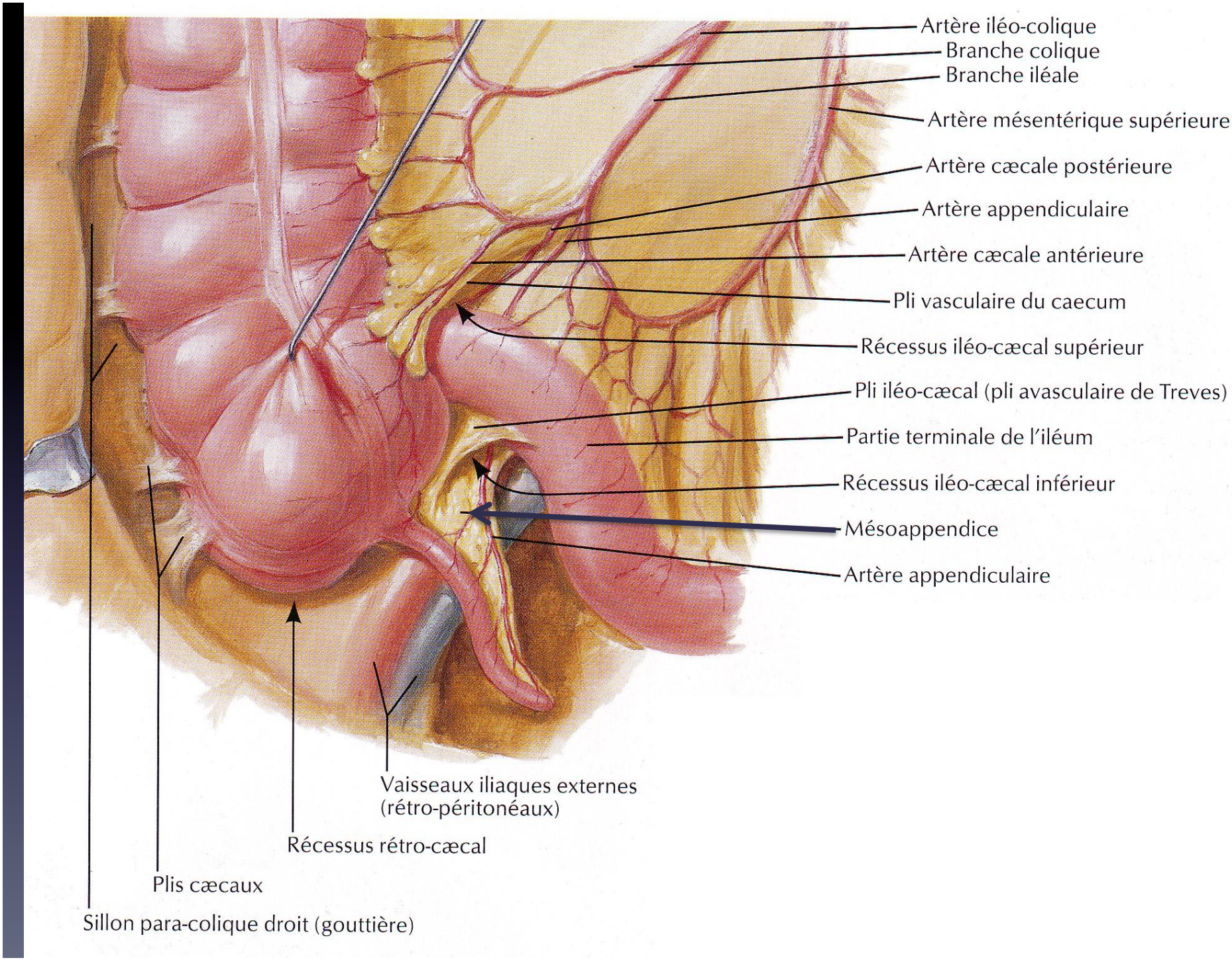
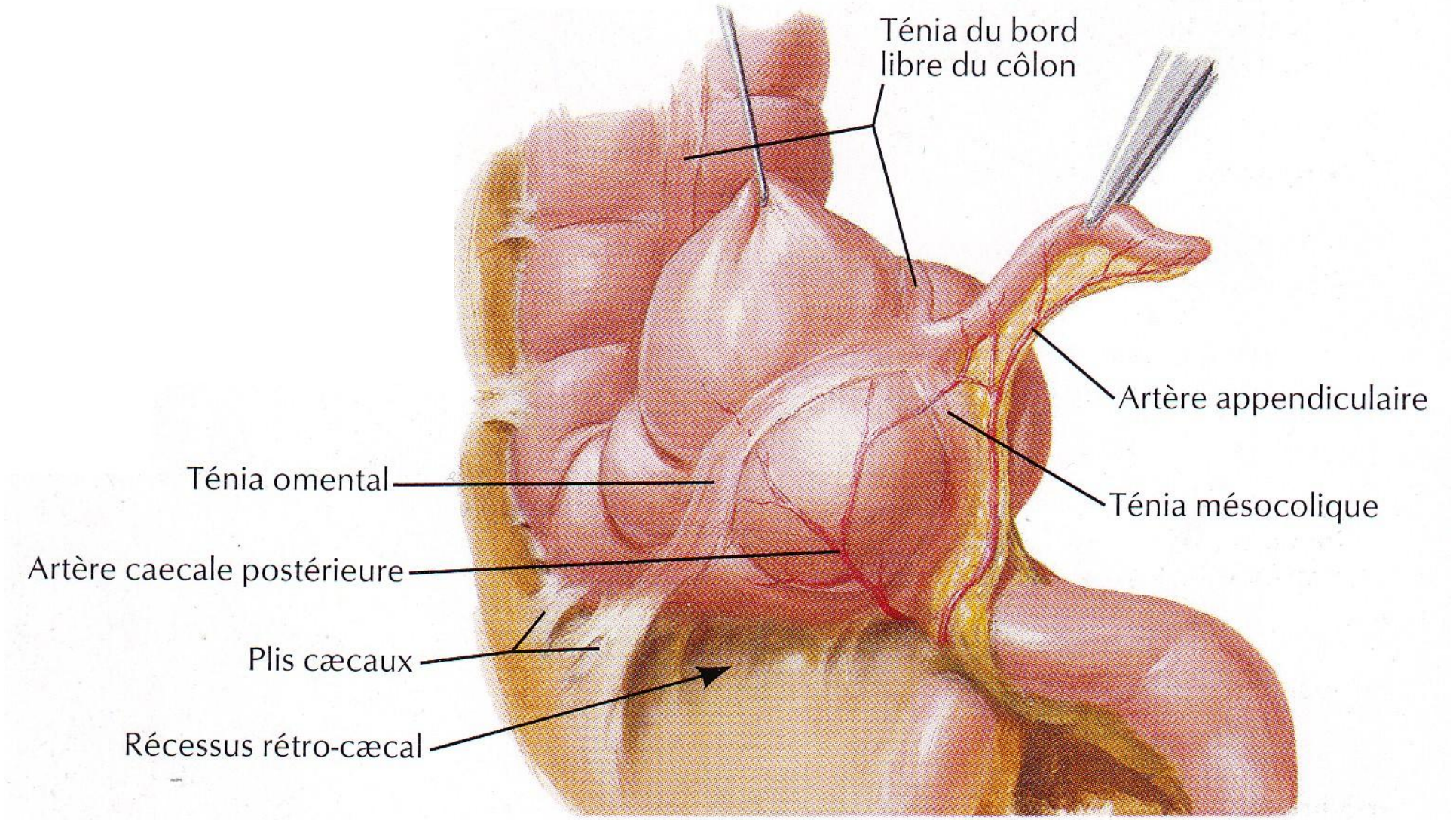


Fig. 66.19 The major positions of the appendix encountered at surgery or postmortem.

The mesoappendix

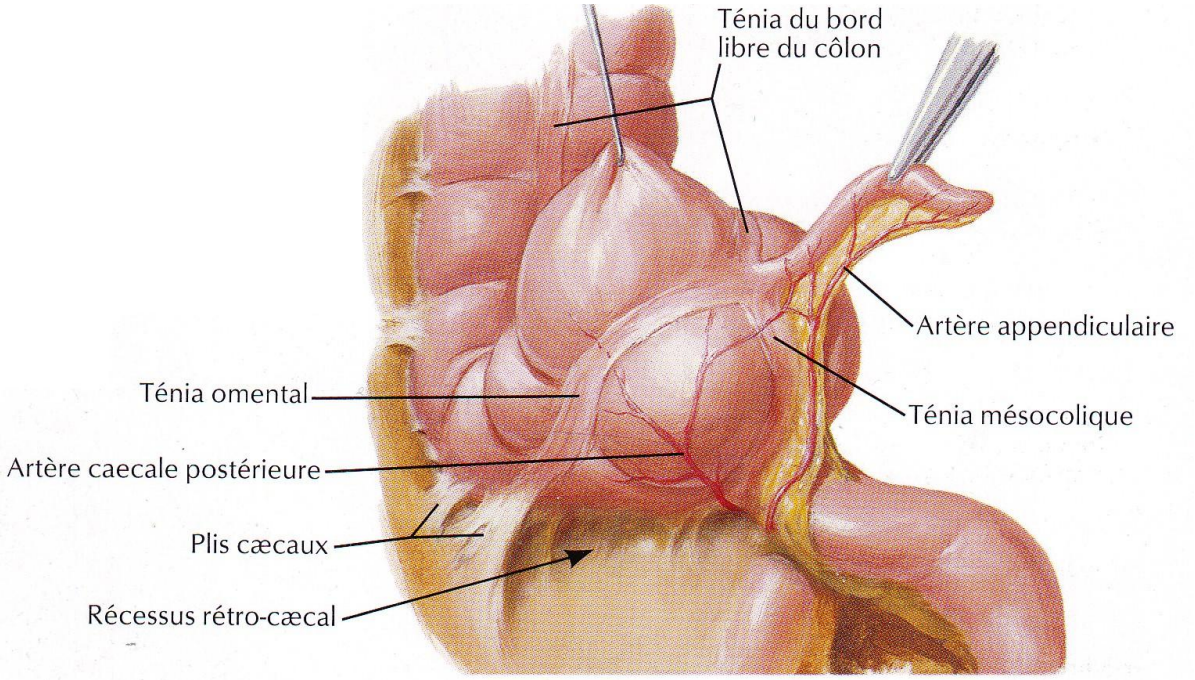
- Short, triangular and variable.
- It extends the whole length of appendix.
- The body of appendix is kinked on itself where the free border of mesoappendix ends : Like a worm : named **vermiform**.
- Appendicular vessels pass through the free margin of the mesoappendix.

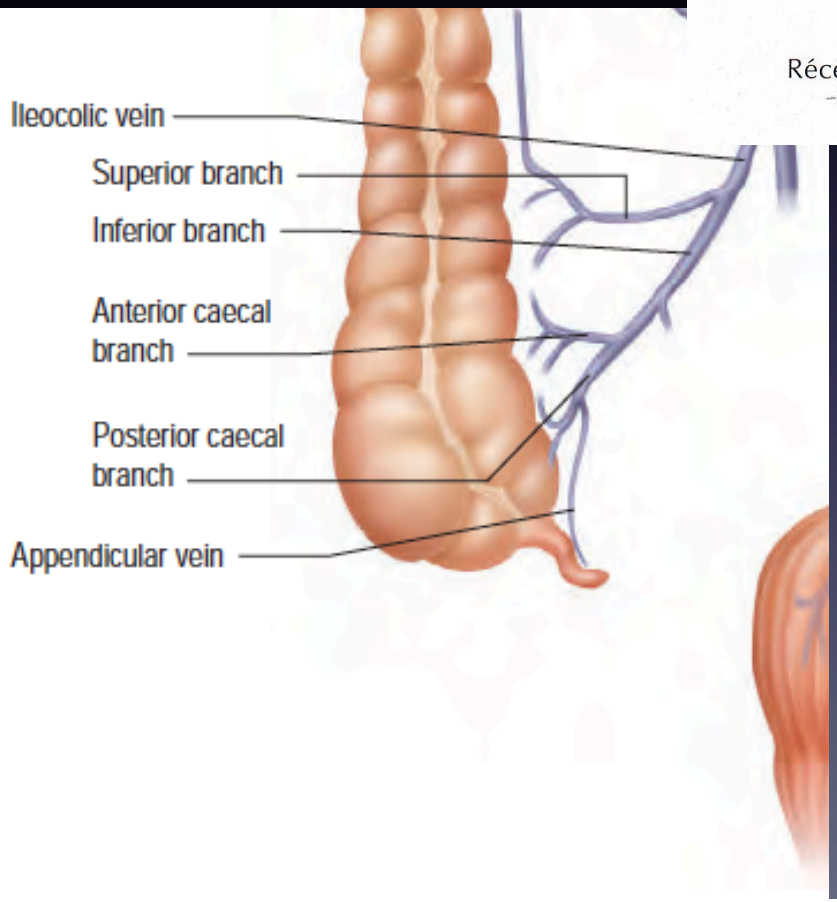

Artère iléo-colique
Branche colique
Branche iléale
Artère mésentérique supérieure
Artère cæcale postérieure
Artère appendiculaire
Artère cæcale antérieure
Pli vasculaire du caecum
Récessus iléo-cæcal supérieur
Pli iléo-cæcal (pli avasculaire de Treves)
Partie terminale de l'iléum
Récessus iléo-cæcal inférieur
Mésoappendice
Artère appendiculaire
Vaisseaux iliaques externes
(rétro-péritonéaux)
Récessus rétro-cæcal
Plis cæcaux
Sillon para-colique droit (gouttière)


Ténia du bord
libre du côlon
Artère appendiculaire
Ténia omental
Ténia mésocolique
Artère caecale postérieure
Plis cæcaux
Récessus rétro-cæcal

Vascularization

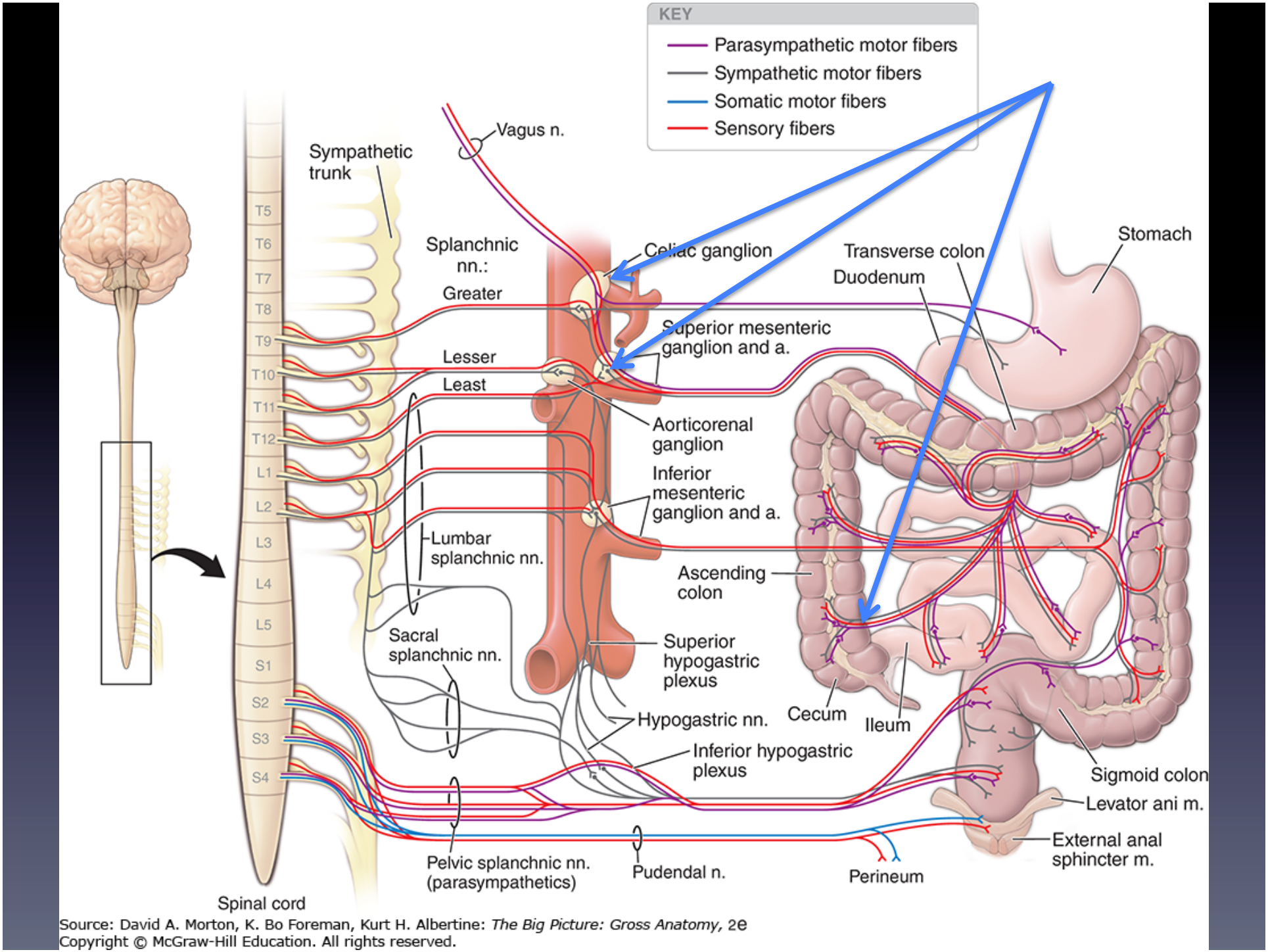
- Appendicular art., from the inferior ileocolic art.
- Anastomosis with the posterior caecal art.
- Veins follow the same path.
- Lymph vessels drain into 1 or 2 nodes lying in the mesoappendix and into the superior mesenteric nodes.


Ténia du bord libre du côlon
Artère appendiculaire
Ténia omental
Ténia mésocolique
Artère caecale postérieure
Plis cæcaux
Récessus rétro-cæcal


Ileocolic vein
Superior branch
Inferior branch
Anterior caecal branch
Posterior caecal branch
Appendicular vein

Nerve supply

- From the coeliac and superior mesenteric plexuses,
- Origin from the vagus nerves and greater + lesser splanchnic nerves (T5-T12)
- Afferences mostly from T10 (appendix).



Source: David A. Morton, K. Bo Foreman, Kurt H. Albertine: *The Big Picture: Gross Anatomy*, 2e

Published online 2013 Jan 15. doi: 10.1128/mBio.00366-12
PMCID: PMC3551545
PMID: 23322636

Microbial Composition of Human Appendices from Patients following Appendectomy

Caitriona M. Guinane,[a,b] Amany Tadrous,[c] Fiona Fouhy,[b,d] C. Anthony Ryan,[c,e] Eugene M. Dempsey,[c,e] Brendan Murphy,[c,e] Emmet Andrews,[c] Paul D. Cotter,[a,b] Catherine Stanton,[a,b] and R. Paul Ross[a,b]

…We conclude that the human appendix contains a robust and **varied microbiota distinct from the microbiotas in other niches within the human microbiome**. The microbial composition of the human appendix is subject to extreme variability and comprises a diversity of biota that may play an important, as-yet-unknown role in human health.

J Coll Physicians Surg Pak. 2004 Apr;14(4):256-8.

The vermiform appendix: not a useless organ.

Zahid A[1].

…the appendix has more recently been identified as an important component of mammalian mucosal immune function, particularly B-lymphocyte-mediated immune responses and extrathymically derived T-lymphocytes. This structure helps in the proper movement and **removal of waste matter in the digestive system**, contains lymphatic vessels that **regulate pathogens**, and lastly, might even produce **early defences** that prevent deadly diseases. The appendix is one of the guardians of the internal environment of the body from the hostile external environment.

Semin Immunol. 2018 Apr;36:31-44. doi: 10.1016/j.smim.2018.02.005. Epub 2018 Mar 2.

The immunological functions of the Appendix: An example of redundancy?

Girard-Madoux MJH[1], Gomez de Agüero M[2], Ganal-Vonarburg SC[3], Mooser C[4], Belz GT[5], Macpherson AJ[6], Vivier E[7]

…In humans, it is highly conserved and malformations are extremely rare, suggesting a **role for that structure**. The Appendix could perform a dual role :

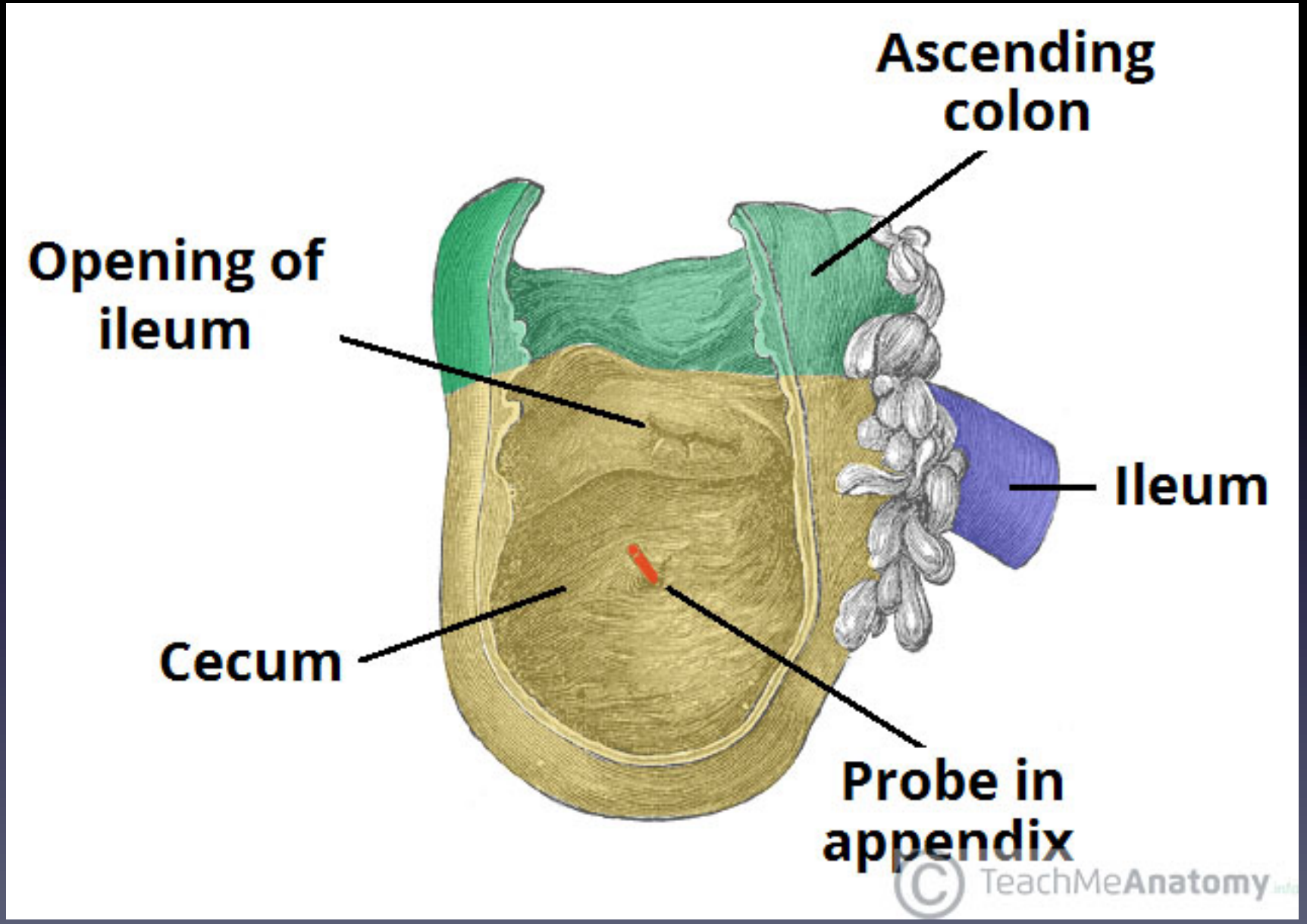
First, it is a concentrate **of lymphoid tissue resembling Peyer's patches and is the primary site for immunoglobulin A production which is crucial to regulate the density and quality of the intestinal flora**.

Second, given its shape and position, the Appendix could be a unique niche for commensal bacteria in the body. It is extremely rich in biofilms that continuously shed bacteria into the intestinal lumen. **The Appendix contains a microbiota as diverse as that found in the colon and could replenish the large intestine with healthy flora after a diarrhea episode**…

The caecum

Anatomy

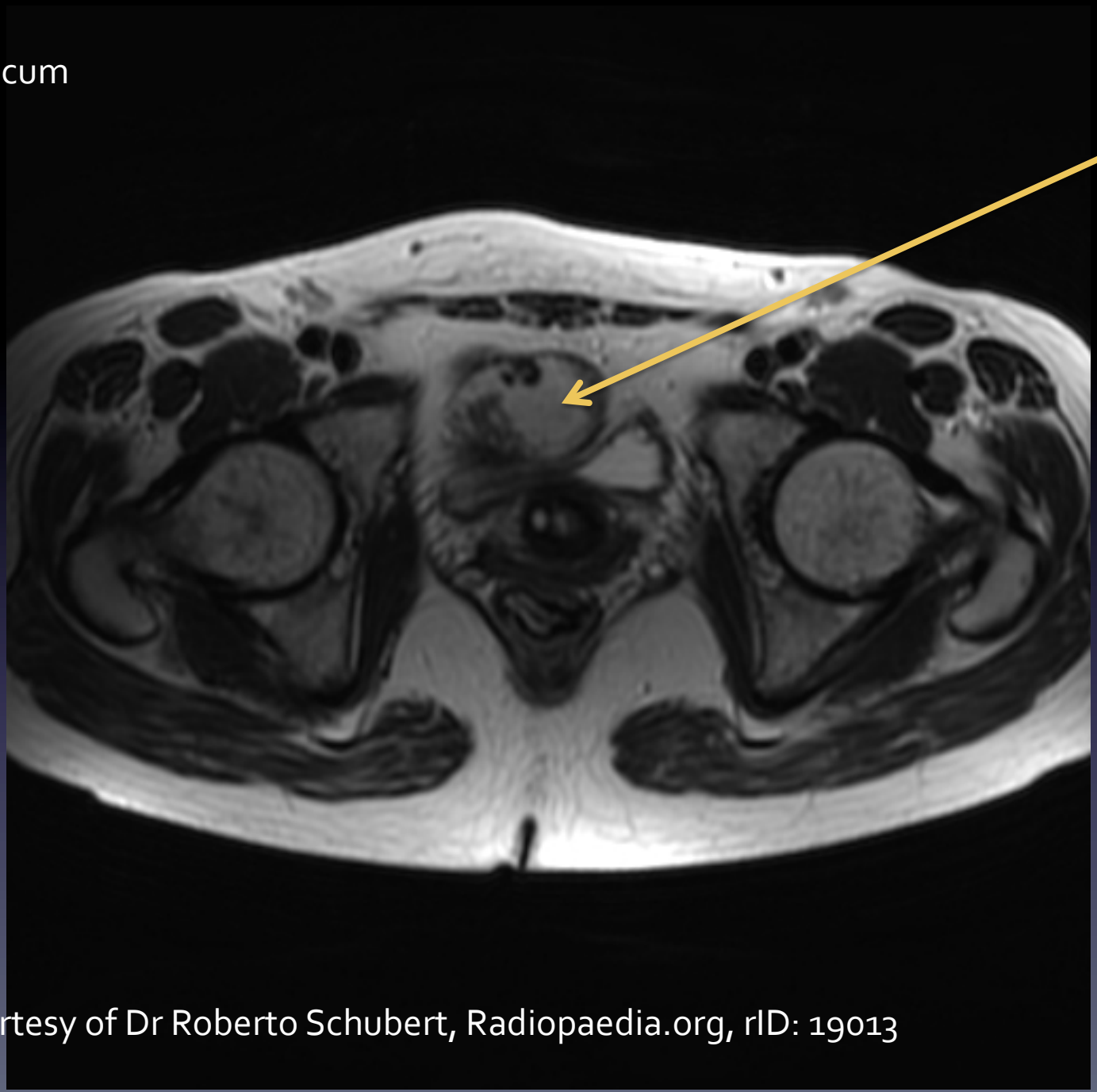
- First part of the large bowel, lies in the right lower quadrant of the abdomen (iliac fossa),
- Lies below the ileocaecal valve, above which the large intestine continues as the ascending colon,
- Can be found in the right part of the abdomen, or under the liver,
- 6 cm in length, can have a maximum diameter of 9 cm before it is considered abnormally enlarged.


Ascending colon
Opening of ileum
Ileum
Cecum
Probe in appendix
© TeachMeAnatomy

Sub hepatic caecum

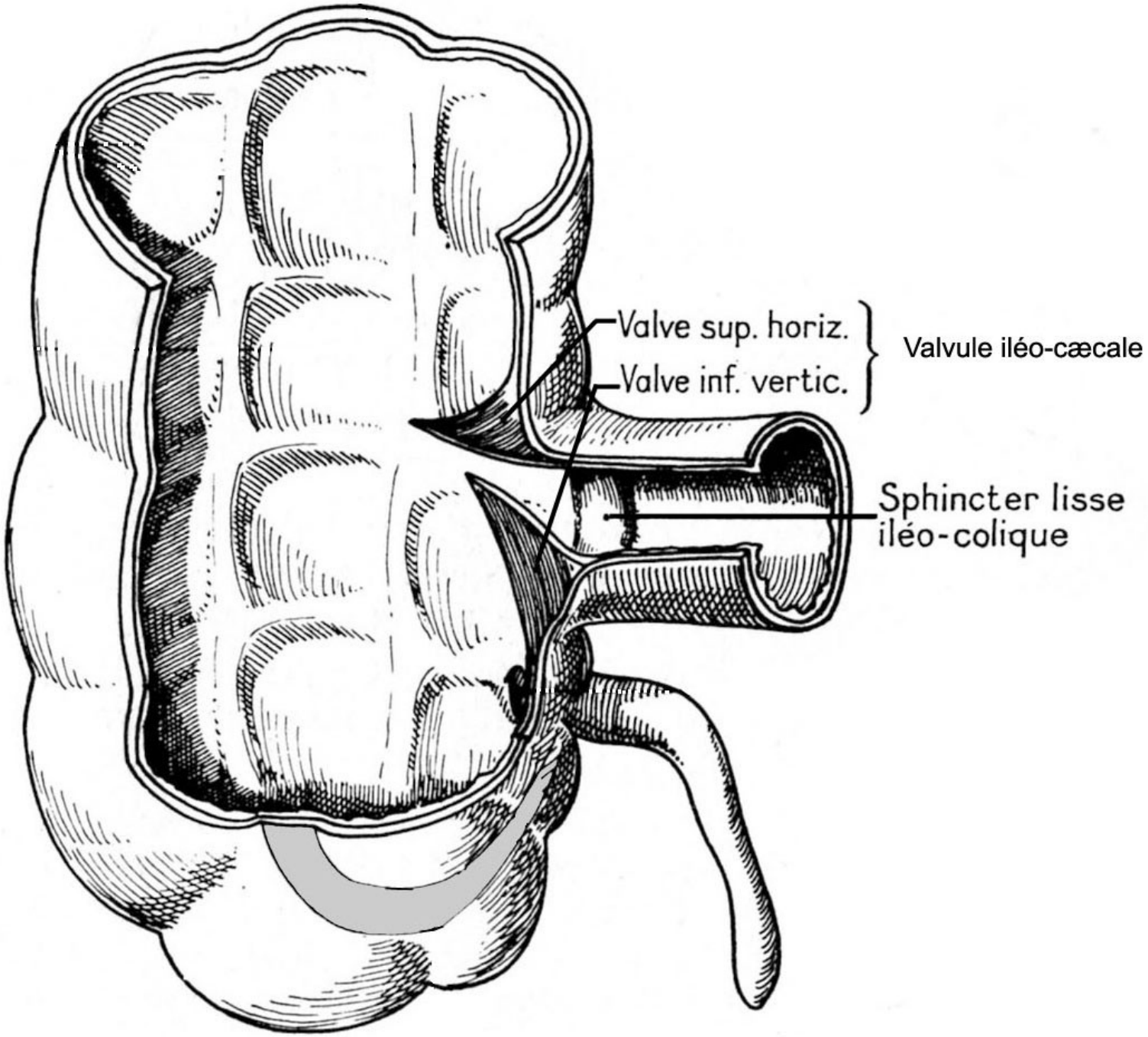
Case courtesy of Dr Dalia Ibrahim, Radiopaedia.org, rID: 38206

Long caecum

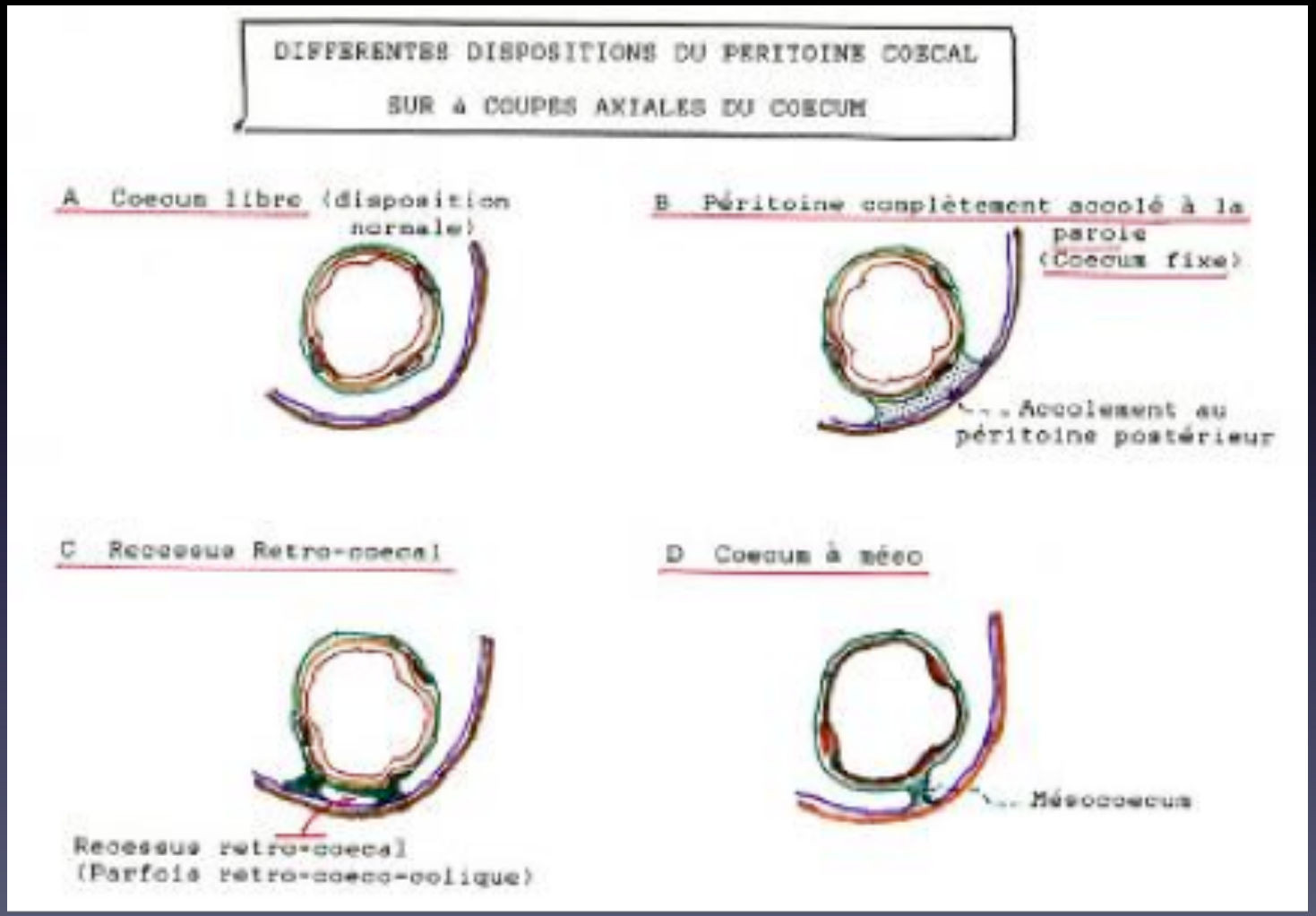


Case courtesy of Dr Roberto Schubert, Radiopaedia.org, rID: 19013

- covered by peritoneum, except posteriorly (layer of loose connective tissue, it has a variable mesentery),
- Between the cecum and ileum : **ileocaecal valve** (prevents reflux of large bowel contents into the ileum during peristalsis).

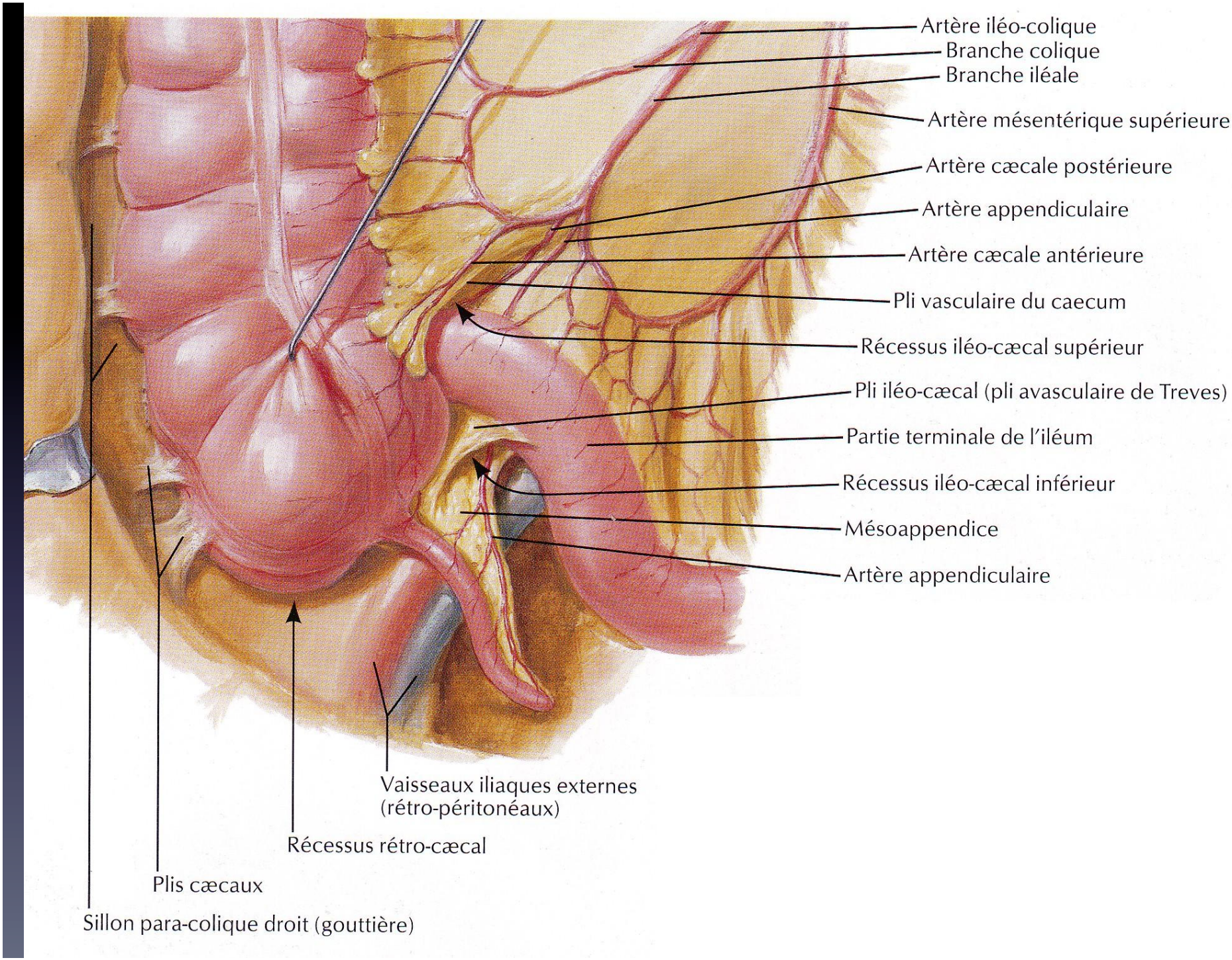


Variations in attachment



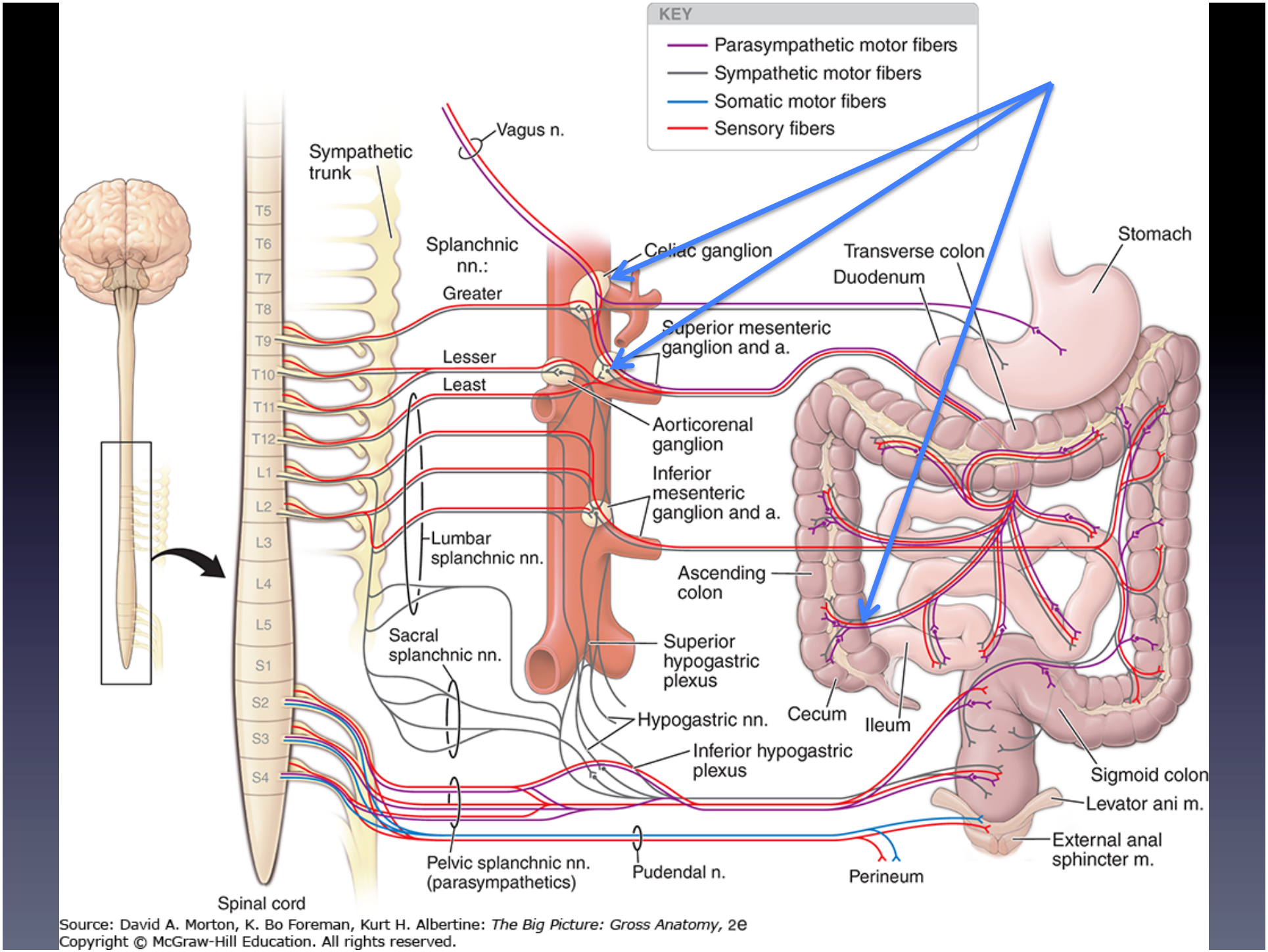
Vascularization

- Arteries :
  - Anterior and posterior cecal arteries from the colic artery, a branch of the ileocolic artery (superior mesenteric artery)
- Veins :
  - Run with corresponding arteries to the superior mesenteric vein, a tributary of the portal venous system


Artère iléo-colique
Branche colique
Branche iléale
Artère mésentérique supérieure
Artère cæcale postérieure
Artère appendiculaire
Artère cæcale antérieure
Pli vasculaire du caecum
Récessus iléo-cæcal supérieur
Pli iléo-cæcal (pli avasculaire de Treves)
Partie terminale de l'iléum
Récessus iléo-cæcal inférieur
Mésoappendice
Artère appendiculaire
Vaisseaux iliaques externes (rétro-péritonéaux)
Récessus rétro-cæcal
Plis cæcaux
Sillon para-colique droit (gouttière)

Nerve supply

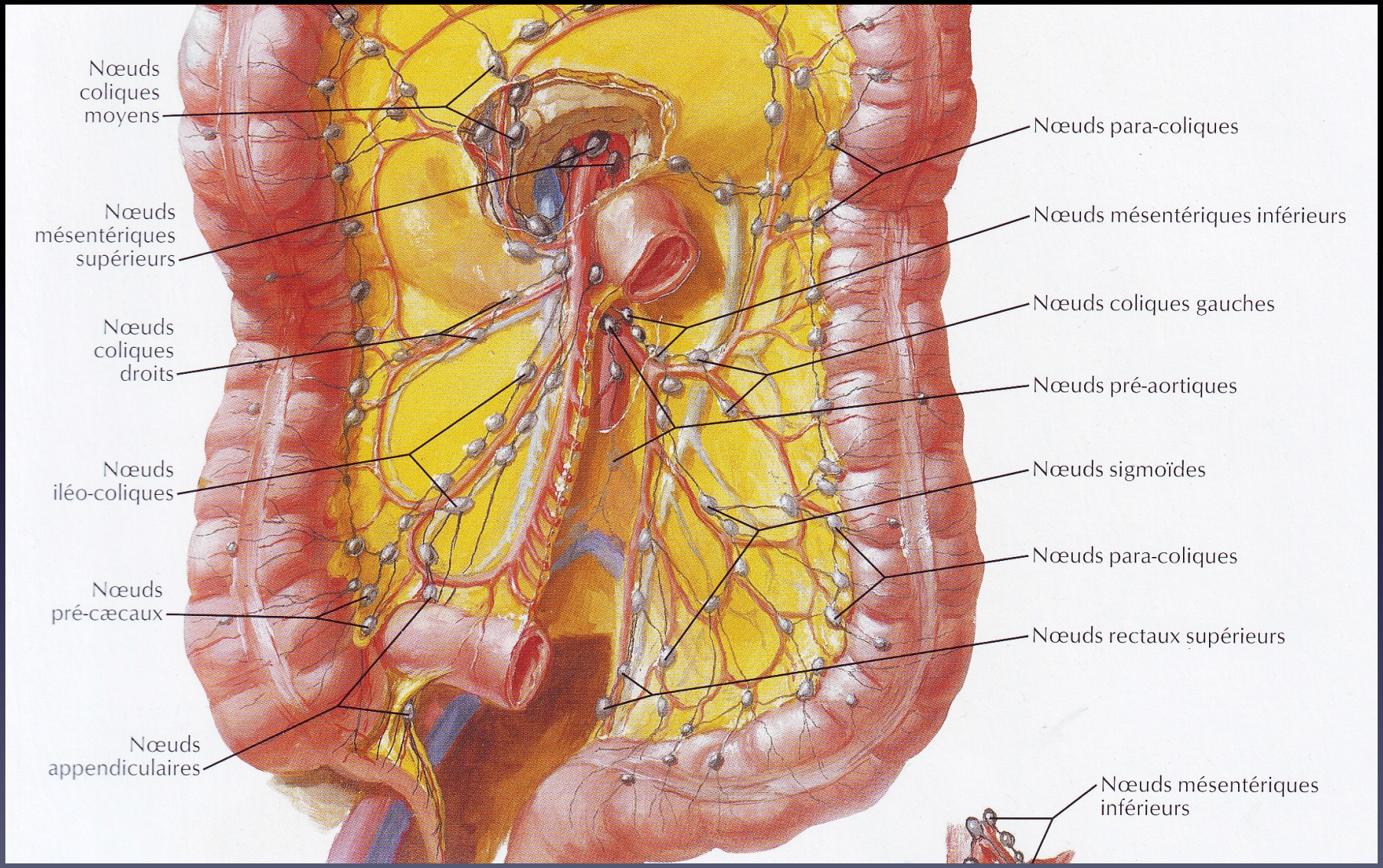
- From the coeliac and superior mesenteric plexuses,
- Origin from the vagus nerves and greater + lesser splanchnic nerves (T5-T12).



Source: David A. Morton, K. Bo Foreman, Kurt H. Albertine: *The Big Picture: Gross Anatomy*, 2e

Lymphatic drainage

- Lymph from the caecum drains into the **ileocolic lymph nodes** (which surround the ileocolic artery)


Nœuds coliques moyens
Nœuds mésentériques supérieurs
Nœuds coliques droits
Nœuds iléo-coliques
Nœuds pré-cæcaux
Nœuds appendiculaires
Nœuds para-coliques
Nœuds mésentériques inférieurs
Nœuds coliques gauches
Nœuds pré-aortiques
Nœuds sigmoïdes
Nœuds para-coliques
Nœuds rectaux supérieurs
Nœuds mésentériques inférieurs

Histology

- The caecum consists of four distinct tissue layers that work together :
  - **Innermost layer** : the mucosa. Goblet cells secrete mucus to lubricate and protect the surface. Absorption of nutrients by the epithelial cells,
  - **Submucosa layer** contains the blood vessels and nerves,
  - The **muscularis** contains smooth muscle tissue (longitudinal and transverse bands) to contract the walls of the cecum. Contraction results in mixing of chyme with bacteriae and the propulsion of chyme into the ascending colon.
  - The **outermost layer** : the serosa, simple squamous epithelial tissues. Produces a slick serous fluid that lubricates the exterior of the caecum and protects it from friction with the surrounding tissues of the abdomen.

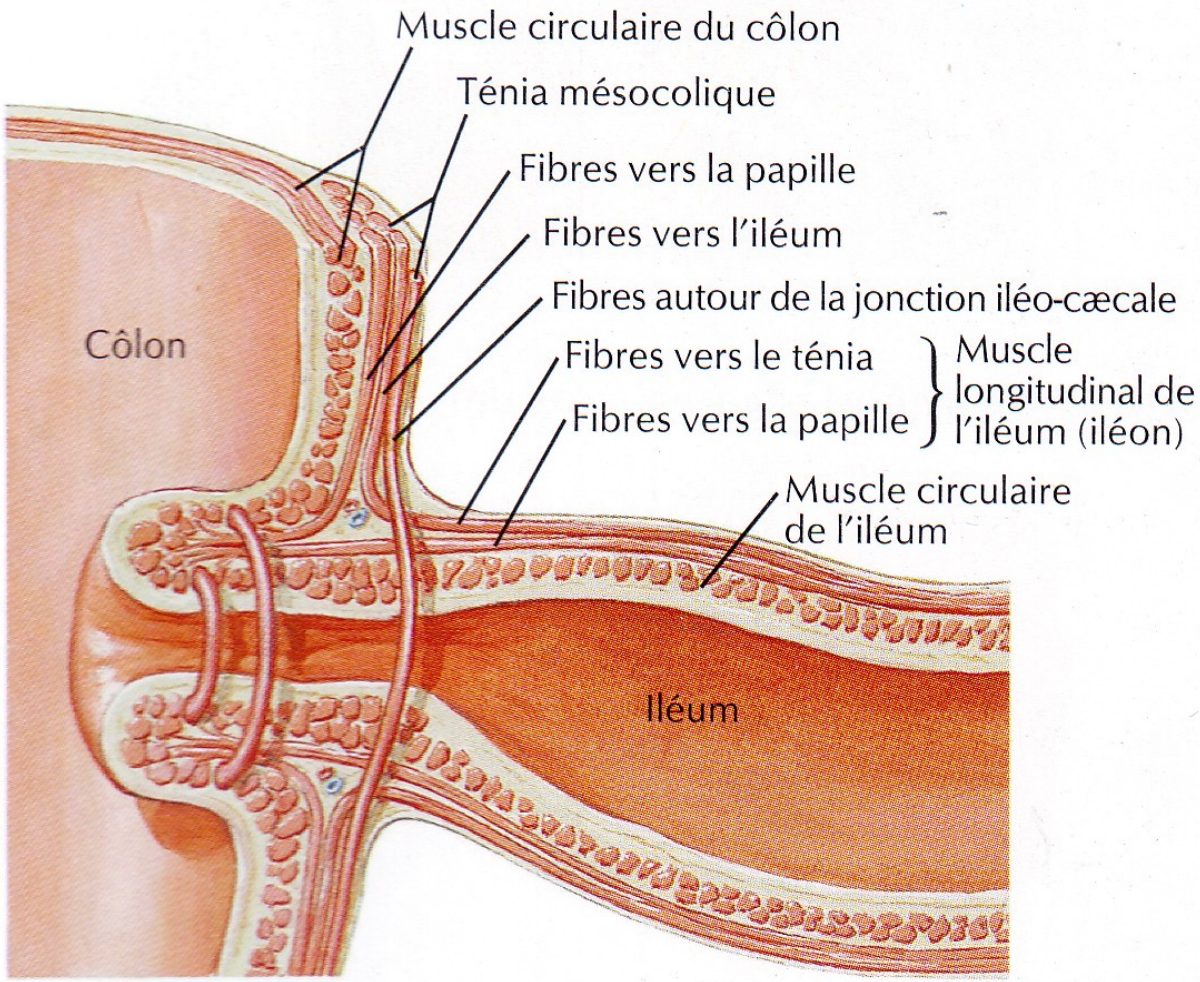


Schéma des fibres musculaires au niveau de l'orifice iléal

Ileocaecal valve

Separates the terminal ileum from the caecum and regulates flow between these two structures,

Prevents reflux from the caecum into the small intestine.

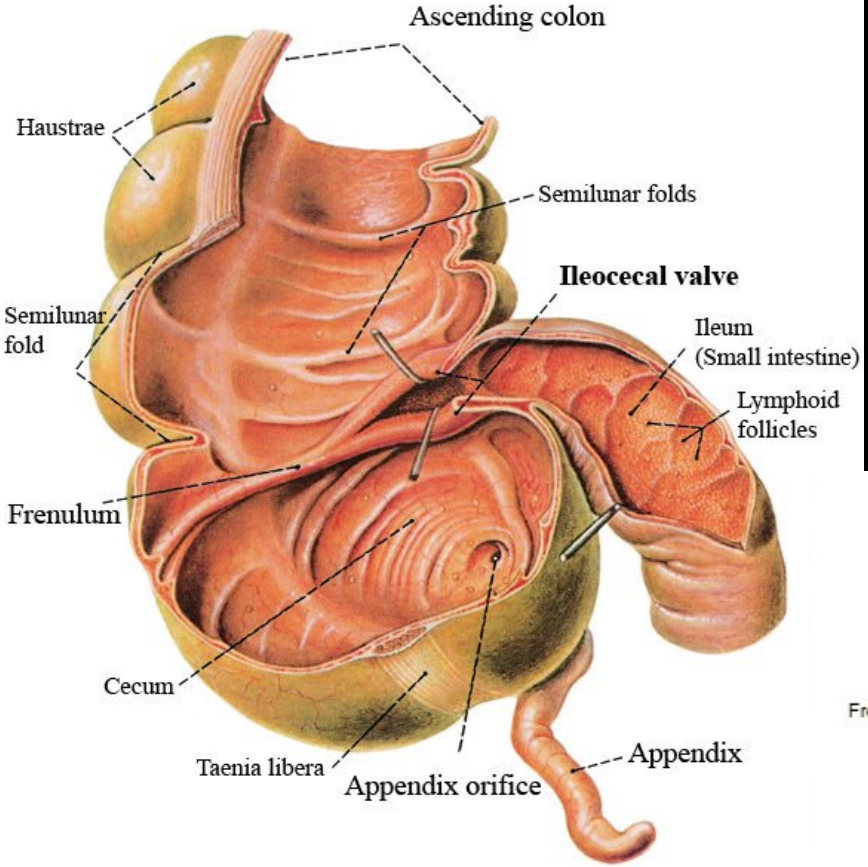
Consists of two muscular layers of ileum, an **upper and lower lip**, that are covered by mucosa and protrude into the lumen of the caecum supported by mucosal folds (**frenulum**).

The morphology has be described on endoscopy as :

- **labial-type**: slit-like opening (most common)
- **papillary-type**: dome-shaped
- **lipomatous**: significant amount of fat demonstrated in the lips

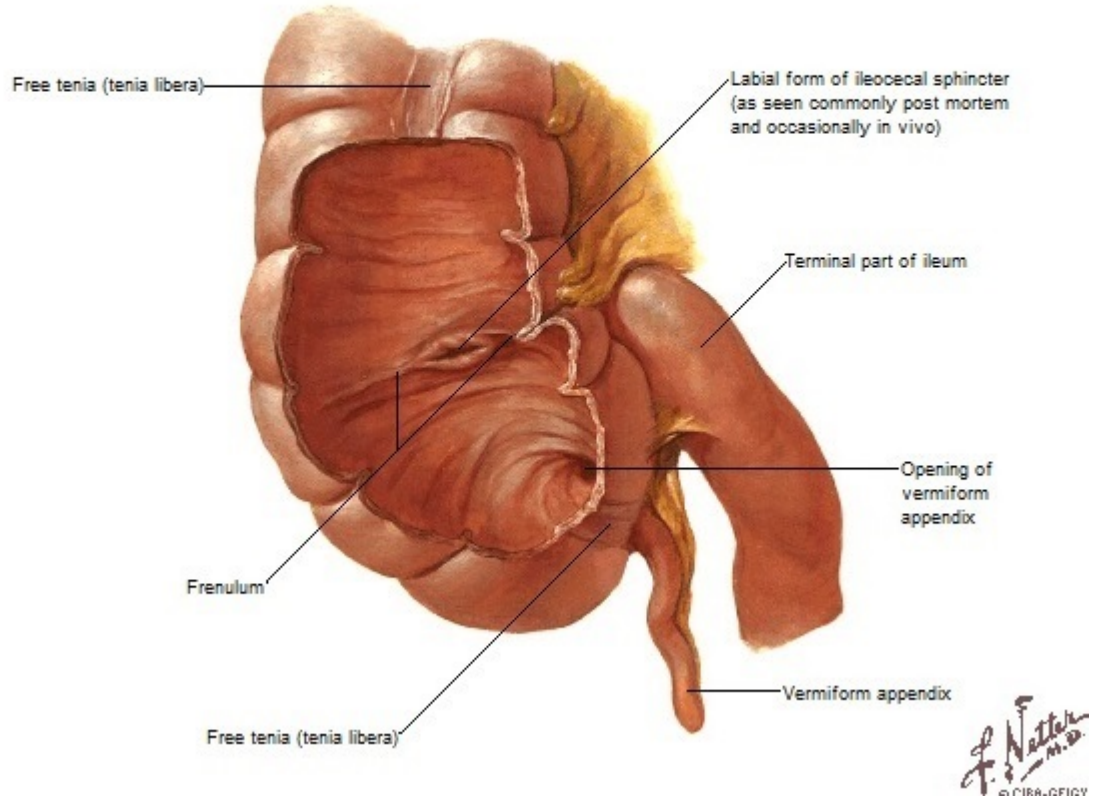
Variant anatomy :

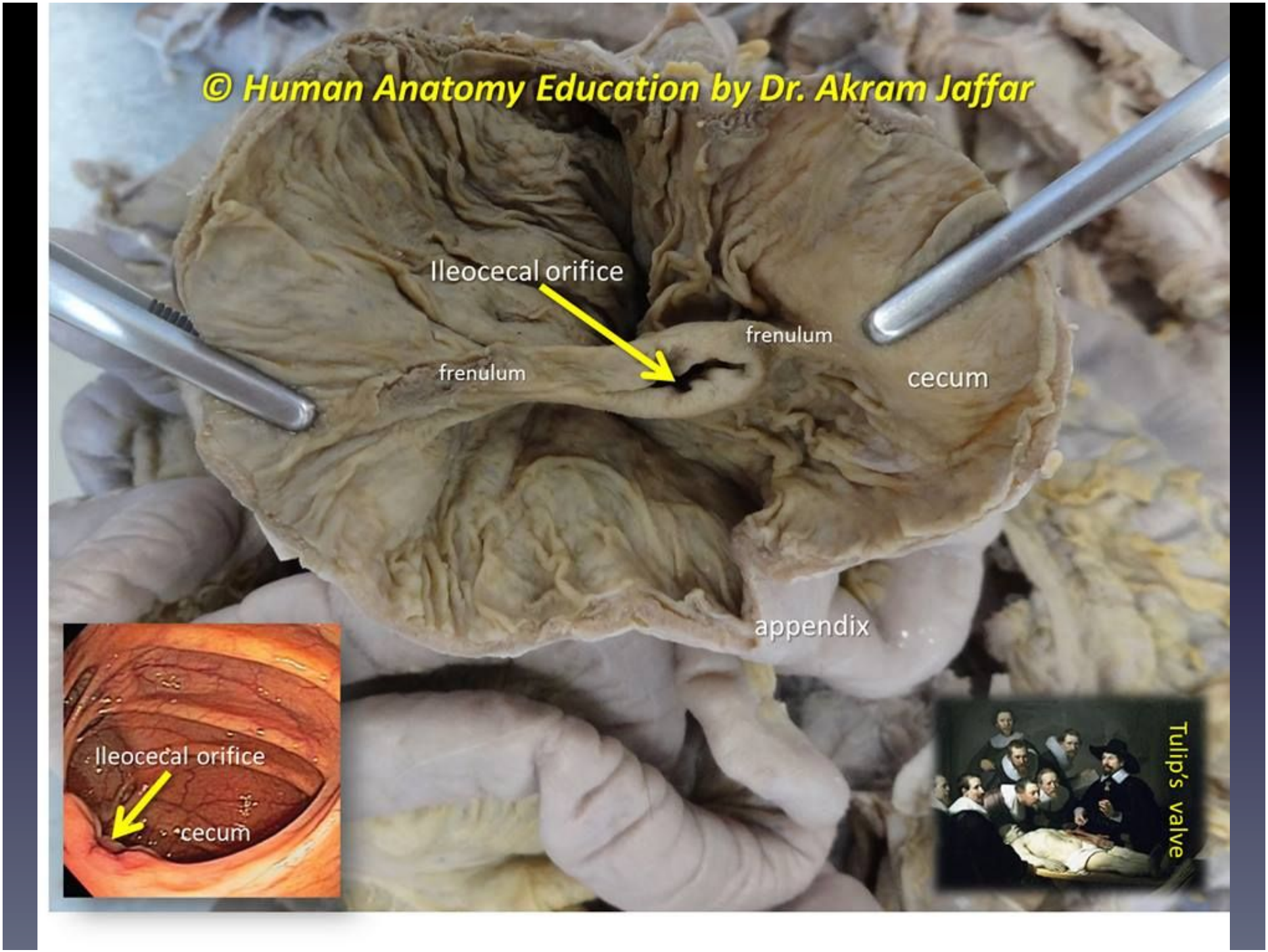
lateral (~7.5%) or posterior opening (~5%)



Ileocecal Region

Labial Form of Ileocecal Sphincter




© Human Anatomy Education by Dr. Akram Jaffar
Ileocecal orifice
frenulum
frenulum
cecum
appendix
Ileocecal orifice
cecum
Tulip's valve

Gut. 1993 Feb;34(2):222-6.

Does the ileocolonic junction differentiate between solids and liquids?

Hammer J[1], Camilleri M, Phillips SF, Aggarwal A, Haddad AM.

Author information

Division of Gastroenterology, Mayo Clinic, Rochester, MN 55905.

Abstract

…incorporating a solid phase radiolabel (111In labeled resin pellets) and a liquid phase marker (99mTc-DTPA), was infused into the ileum. Transit of both labels from the ileum to colon was quantified scintigraphically and ileal motility was also recorded. When markers were infused into the proximal ileum, 100 cm proximal to the ileocolonic junction (six), there were clear cut examples of discriminant transit, when **liquids moved more rapidly from the small to the large bowel than did solids**. When isotopes were instilled into the distal ileum, less than 50 cm from the ileocolonic junction, **no separate transit of the solid and liquid phases was observed**. No specific motor pattern of the ileum was regularly associated with bolus filling of the colon. **These results support the hypothesis that the distal ileum can discriminate between solids and liquids but that the ileocecal junction cannot**.

PMID: 8432477 PMCID:PMC1373974 DOI:10.1136/gut.34.2.222

Neurogastroenterol Motil. 2012 Jan;24(1):86-93, e14. doi: 10.1111/j.1365-2982.2011.01810.x. Epub 2011 Nov 14.

Effects of denervation at ileocecal junction and ileocecal resection in dogs.

Morita H[1], Mochiki E, Ogawa A, Yanai M, Toyomasu Y, Tabe Y, Ohno T, Tsutsumi S, Asao T, Kuwano H.

Author information

Department of General Surgical Science (Surgery 1), Gunma University, Graduate School of Medicine, Maebashi, Gunma, Japan. m09702031@gunma-u.ac.jp

METHODS: Continuous strain gauge recordings of stomach, terminal ileum, ileocecal sphincter (ICS), and colon were performed in dogs. The dogs were divided into four groups, namely control (CONT), extrinsic denervation at ICJ (ED), intrinsic denervation at ICJ (ID), and ICR groups. Colonic activity was recorded 2 h before a meal, in the early postprandial period (first 2 h), and in the late postprandial period (4-6 h after a meal). The meal lasted 5 min.

KEY RESULTS: Motility index was significantly increased at the ICS ($P = 0.0056$) and proximal colon ($P = 0.0059$) after feeding. However, such changes **were not observed in the ED and ID groups**. The amplitude of contractions at proximal colon in the interdigestive state was significantly decreased by ED. In the ID and ICR groups, the numbers of nonmigrating contractions were significantly decreased ($P < 0.05$), and colonic migrating motor complex (CMMC) ratio was significantly higher than that of the CONT group ($P < 0.001$). The dogs in these two groups had diarrhea.

CONCLUSIONS & INFERENCES:

Gastrocolonic response at the ICJ **may require both intrinsic and extrinsic innervation**. When ID was performed, CMMC ratio increased. As a result, intraluminal water absorption may have decreased. ID may be one of the causes of diarrhea after ICR.

Caecum in osteopathy

- Warning signs :
  - Pain in the right iliac fossa, sudden, and disappearing few seconds or minutes later (often teenagers) = appendicitis subcrisis
  - After appendicectomy (later than one month)
  - Pain in the right knee (femoral and lateral femoral cutaneous nerves)
  - Psoas spasm
  - Lower thoracic pain (greater/lesser splanchnic nerves)
  - Sacro iliac joint dysfunction (non mechanical)

PRACTICE

Tests of the caecum

- Palpation of the caecum and ileocaecal junction

Tests of the caecum

- Mobility of the caecum :
  - Flexion/extension ?
  - Rotation ?

Tests of the caecum

- Test of the ileocaecal junction

Corrections of the caecum

- Caecum in dysfunction of extension (adhesions ?)

Corrections of the caecum

- Caecum in dysfunction of Flexion

Corrections of the caecum

- Caecum in dysfunction of Flexion and external rotation

Corrections of the caecum

- Ileocaecal junction :
  - Ileocaecal penetration
  - Ileocaecal sphincter spasm

Ascending colon

Anatomy

- secondarily retroperitoneal,
- has its own mesentery in approximately 25% of patients,
- 15 – 20 cm long,
- Ends under the liver where he forms the right colic flexure.

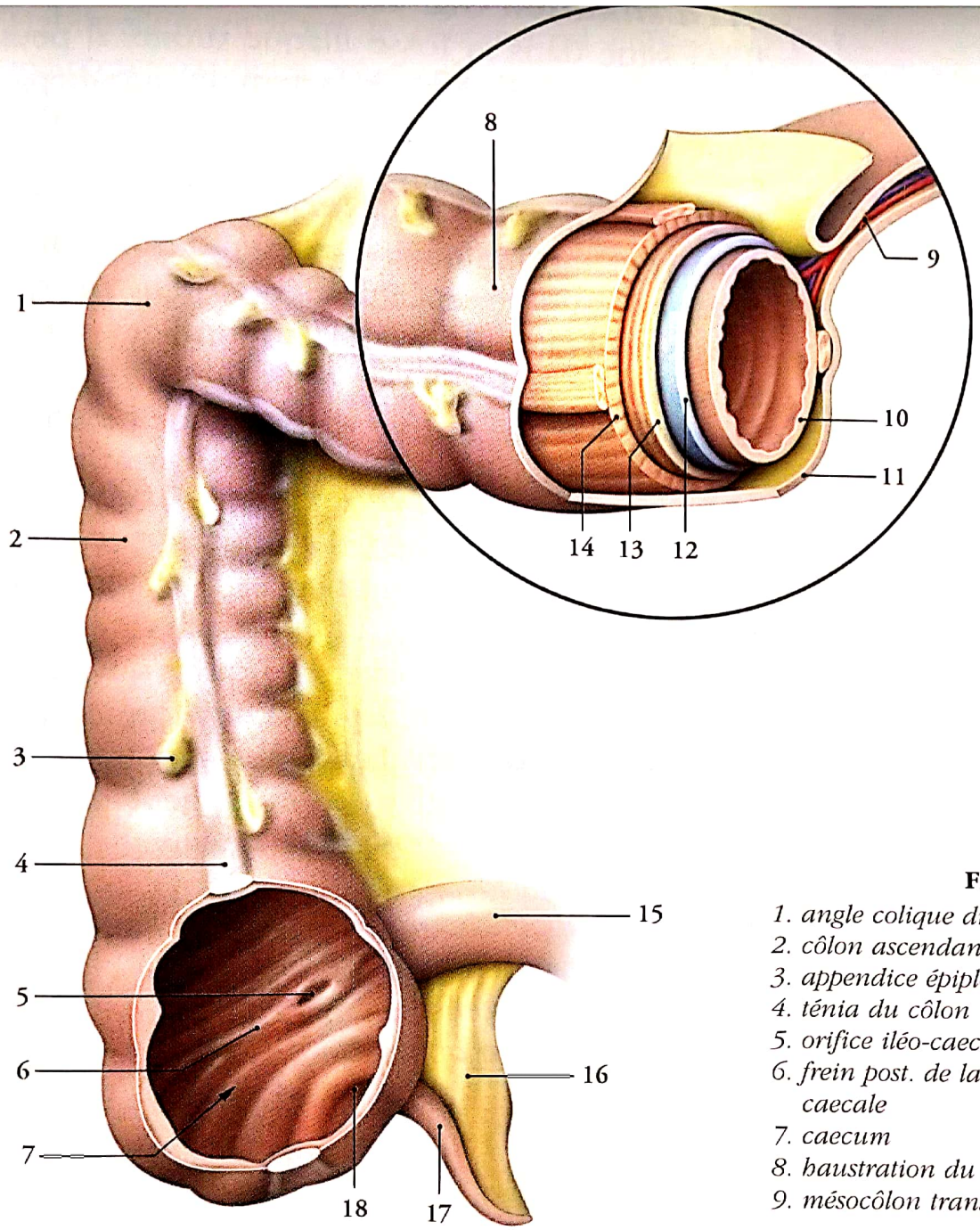


FIG. 16.46. Structures du côlon

1. *angle colique droit*
2. *côlon ascendant*
3. *appendice épiploïque*
4. *ténia du côlon*
5. *orifice iléo-caecal*
6. *frein post. de la valve iléo-caecale*
7. *caecum*
8. *haustration du côlon*
9. *mésocôlon transverse*
10. *muqueuse*
11. *séreuse*
12. *sous-muqueuse*
13. *couche circulaire*
14. *couche longitudinale*
15. *iléum*
16. *méso-appendice*
17. *appendice vermiforme*
18. *orifice de l'appendice vermiforme*

- Posteriorly separated by a fascia (Toldt's fascia) from iliac fascia, iliolumbar lig., quadratus lumborum, anterior renal fascia and right kidney,
- Lies on lateral cutaneous nerve, ilioinguinal and iliohypogastric nerves.

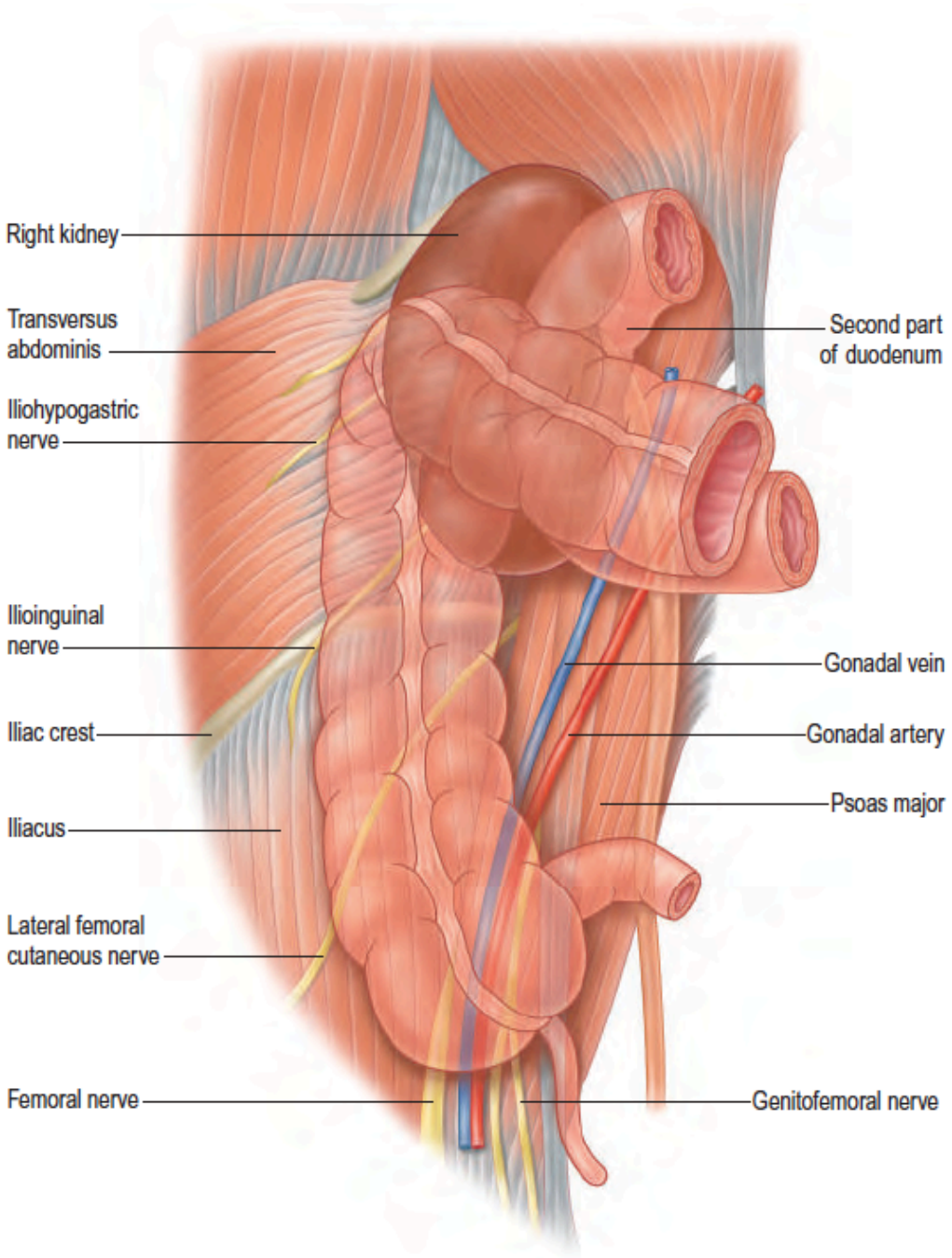


Fig. 66.21 Posterior relations of the ascending colon.

Blood supply

- **Arteries :**
- Ileocolic artery (superior mesenteric art.) near the caecum,
- Right colic artery (idem) near the right flexure.
- **Veins :**
- Ileocolic vein + right colic vein -> … -> superior mesentery vein -> portal vein.

Chirurg. 1989 Aug;60(8):517-20.

[The arterial blood supply of the ascending colon].

[Article in German]

Kaufmann HP[1].

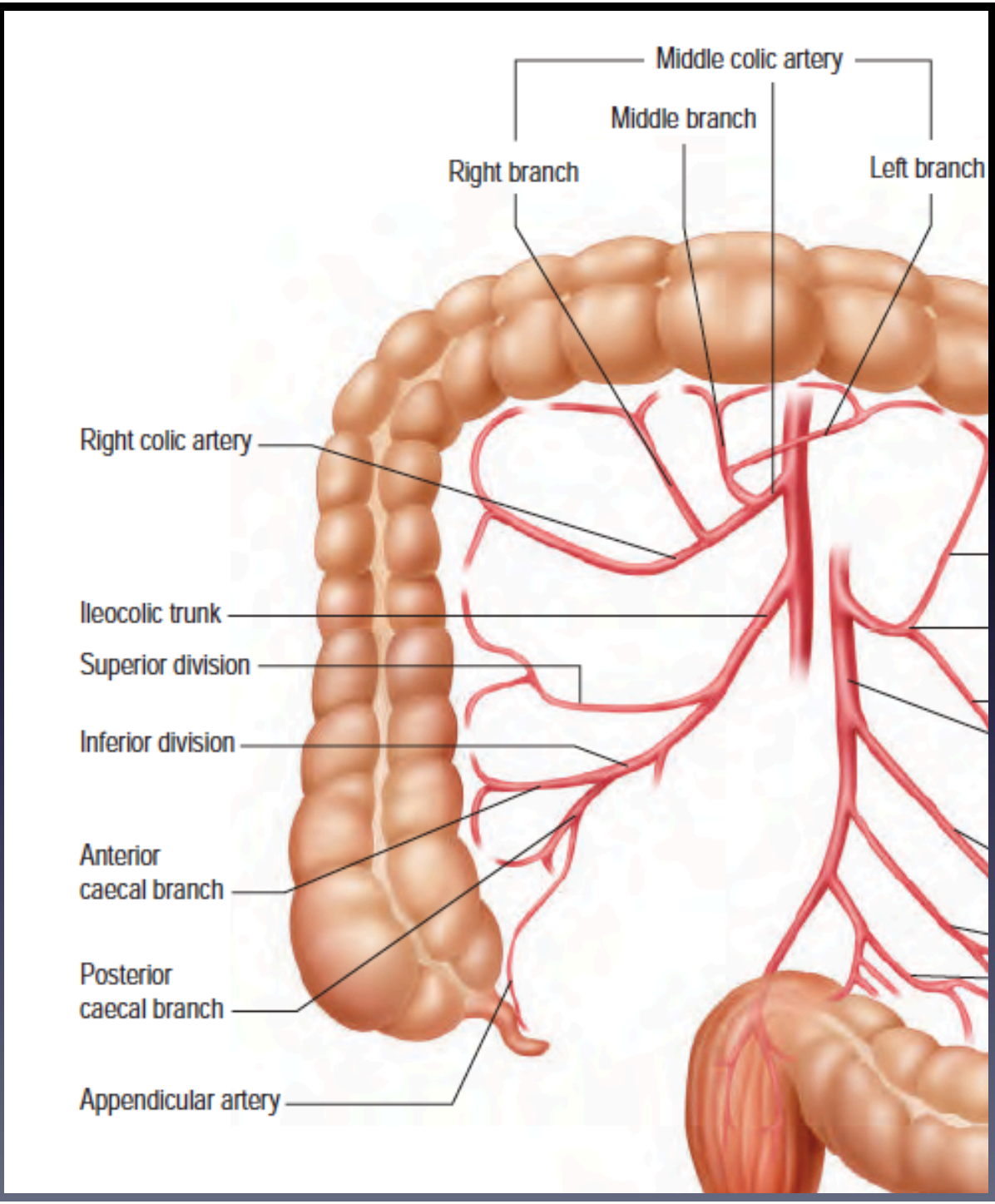
Author information

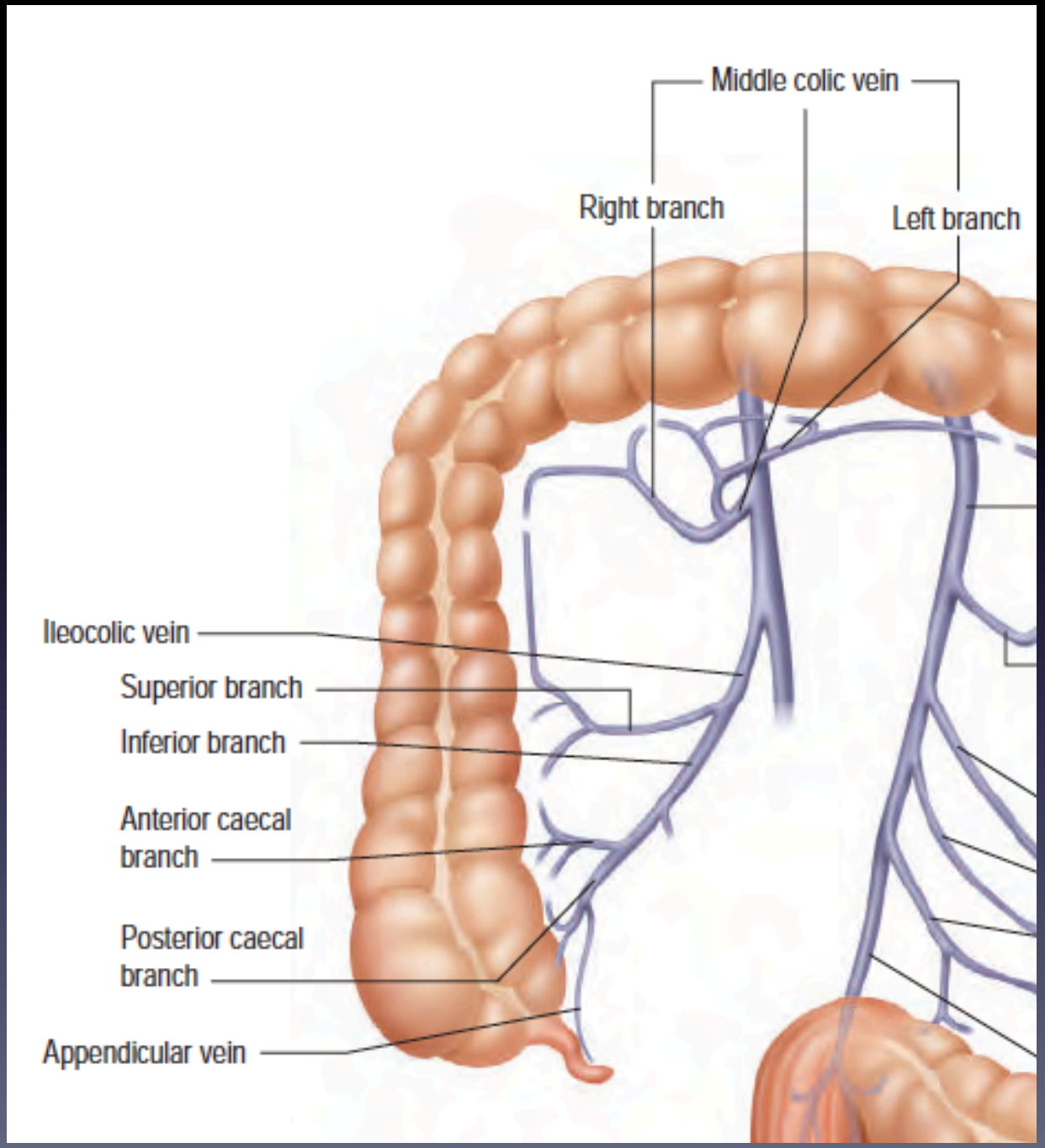
1Anatomische Anstalt, Universität München.

Abstract

The arterial blood supply of the ascending colon was studied by means of the injection technique in 10 post-mortem samples taken from children. In 9 of the 10 cases a complete marginal artery was found. It was supplied by the **ileocolic artery in the region of the cecum and by the right colic artery near the right colic flexure**. Accessory arteries supplying the ascending colon were infrequent. The narrow calibre of the marginal artery, together with the absence of accessory arteries, may result in a deficient blood supply to the middle part of the ascending colon.

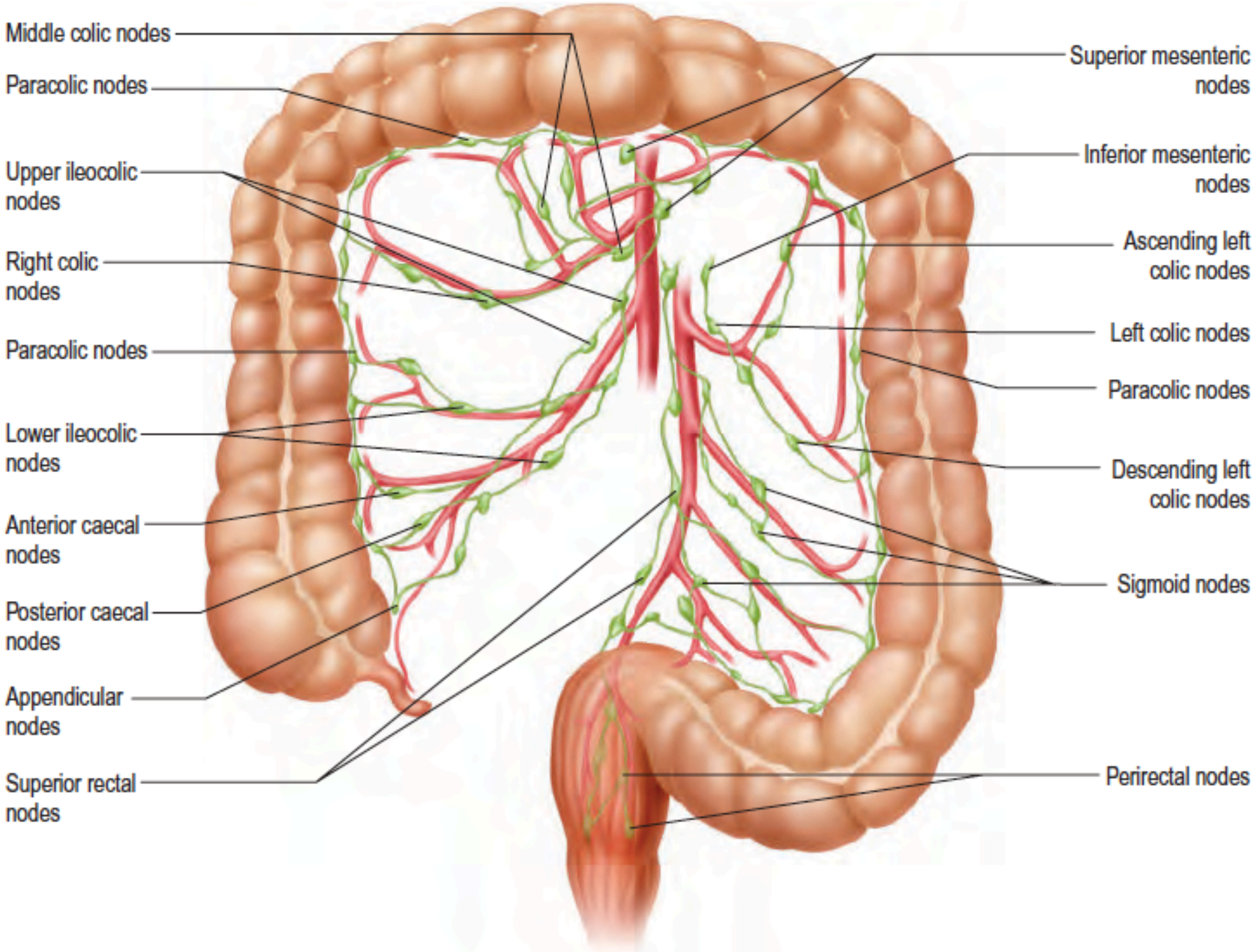
PMID: 2791740


Middle colic artery
Middle branch
Right branch
Left branch
Right colic artery
Ileocolic trunk
Superior division
Inferior division
Anterior caecal branch
Posterior caecal branch
Appendicular artery


Middle colic vein
Right branch
Left branch
Ileocolic vein
Superior branch
Inferior branch
Anterior caecal branch
Posterior caecal branch
Appendicular vein

Lymphatic drainage

- Lymph from the ascending colon drains into the **right colic lymph nodes** and the superior mesenteric lymph nodes


Middle colic nodes
Paracolic nodes
Upper ileocolic nodes
Right colic nodes
Paracolic nodes
Lower ileocolic nodes
Anterior caecal nodes
Posterior caecal nodes
Appendicular nodes
Superior rectal nodes
Superior mesenteric nodes
Inferior mesenteric nodes
Ascending left colic nodes
Left colic nodes
Paracolic nodes
Descending left colic nodes
Sigmoid nodes
Perirectal nodes

Histology

- **Mucosa** forms the innermost layer of the ascending colon (epithelial tissue and secretes mucus to lubricate feces).
- The cells of the mucosa absorb vitamins and water from feces.
- **Submucosa** layer contains the blood vessels, nerves, and connective tissues that support the mucosa.
- The **muscularis layer** surrounds the submucosa and provides several layers of smooth muscle tissue to move food through the colon via peristalsis. The pouches are formed by the contraction of smooth muscle in the muscularis.
- The **outermost layer** is covered by the peritoneum on the anterior side and by areolar connective tissue on the posterior side.

Electromotor activity of the cecum and ascending colon: the concept of 'individual pacemakers'.

Shafik A[1], Mostafa RM, El-Sibai O, Shafik IA.

Author information

Department of Surgery and Experimental Research, Faculty of Medicine, Cairo University, Cairo, Egypt.
shafik@ahmed-shafik.org

METHODS: The electric activity was recorded from 2 monopolar electrodes applied each to the cecum, CCJ and AC. The CCJ was then anesthetized by xylocaine and the electric waves of the cecum, CCJ and AC were registered after 10 and 90 min. The test was repeated using normal saline instead of xylocaine.

CONCLUSION:

The electric wave parameters of the cecum differed from those of the CCJ and AC, suggesting that **the motile activity of the CCJ and AC is not a continuation of the motile activity of the cecum and that it might be evoked by 2 different pacemakers**. The similarity in frequency and conduction velocity of electric waves of the CCJ and AC, however, most likely denotes that the AC waves are a continuation of those of the CCJ, and that both are evoked by the same **pacemaker probably located in the CCJ**. The higher amplitude of cecal waves might be due to the thicker cecal musculature compared to that of the AC.

 PMID: 15359094 DOI:10.1159/000079916

Clin Anat. 2010 Oct;23(7):851-61. doi: 10.1002/ca.21026.

A study of an anatomic-physiological cecocolonic sphincter in humans.

Shafik AA, Shafik A, Asaad S, Wahdan M.

We hypothesized an anatomical/physiological sphincter and investigated this hypothesis in current communication. The histomorphologic and morphometric studies were carried out in 14 cadavers and radiologic studies in 20; endoscopy studies were done in 16 healthy volunteers. Longitudinal sections along cecum, cecocolonic junction, and ascending colon were stained with H & E and Masson's trichrome stain…A cecocolonic fold was identified 2-2.5 cm distal to ileocecal nipple. It extended along gut circumference, shelf-like, and was marked by a shallow groove on outer aspect of colon. Microscopically, cecocolonic fold consisted of mucosa, submucosa, and muscularis externa. **The circular muscle layer was thicker than that of cecum or ascending colon.** Branching cells with ovoid nuclei representing probably intestinal cells of Cajal were identified in muscularis externa. Also morphometric study showed that **circular muscle layer was significantly thicker than that of cecum or ascending colon, whereas longitudinal muscle exhibited no significant difference**. Radiologic studies demonstrated narrowing at cecocolonic junction, which became wider on cecal contraction and narrower or closed on colonic contraction. … Our findings suggest an "anatomic" sphincter at cecocolonic junction as evidenced histomorphometrically, radiologically and endoscopically. Detection of interstitial cells of Cajal in cecocolonic fold postulates possible existence a pacemaker in cecocolonic fold, a point that needs further study. Clin. Anat. 23:851-861, 2010. © 2010 Wiley-Liss, Inc.

Surg Radiol Anat. 2003 Apr;25(1):16-20. Epub 2003 Feb 4.

Study of the functional activity of the cecocolonic junction with identification of a "physiologic sphincter", "cecocolonic inhibitory reflex" and "colocecal excitatory reflex".

Shafik A, Mostafa RM, Shafik AA, Ahmed I.

Source Department of Surgery and Experimental Research, Faculty of Medicine, Cairo University, Cairo, Egypt.

Radiologic, endoscopic and histomorphologic studies have suggested the presence of a sphincter at the cecocolonic junction (CCJ), while some investigators have denied its existence. To investigate the physiologic activity at the CCJ, the right colon was exposed during right hemicolectomy for early colonic cancer in 11 patients (mean age 43.6+/-12.3 years; 8 men). Three manometric catheters were introduced through colotomy to be separately located in the cecum, CCJ and ascending colon. We determined the CCJ pressure response to cecal and colonic distension by means of a balloon filled with saline in increments of 10 ml. The test was repeated after individual anesthetization of cecum, CCJ and ascending colon. The CCJ measured 1.6+/-0.6 cm in length and had a higher pressure ($p<0.05$) than the cecum or colon. Large-volume cecal distension effected a significant CCJ pressure reduction which was augmented as the distension increased. Latency decreased upon increase of the distending volume. In contrast, the CCJ responded to large-volume colonic distension by pressure elevation which increased upon increase of the distending volume. Latency diminished with increased distension. Small-volume cecal or colonic distension effected no CCJ pressure response. The anesthetized CCJ did not respond to distension of the cecum or colon. Likewise, the CCJ did not exhibit a pressure response to distension of the anesthetized cecum or colon. **The CCJ is a high-pressure zone which reacts to cecal or colonic distension by dilatation or narrowing, respectively**. These data presumably denote the existence of a physiologic sphincter at the CCJ. We suggest that the CCJ pressure response to cecal or colonic distension is reflex and mediated through the cecocolonic inhibitory and colocecal excitatory reflexes, respectively. The role of the CCJ and related reflexes in colonic motility disorders needs to be studied.

PMID:12819947

Ascending colon in osteopathy

- Warning signs :
  - Bloating
  - Pain in the right hypochondrium
  - Lower thoracic pain (greater/lesser splanchnic nerves territory)

PRACTICE

Tests of the ascending colon

- Mobility of the ascending colon
  - Internal ascending colon : cf caecum F+RE / mesentery root.

Tests of the ascending colon

- Right Toldt fascia test
  - Difficult stretching.

Corrections

- Correction of an internal ascending colon :
  - Correction of the hepatic flexure and caecum/ mesentery root

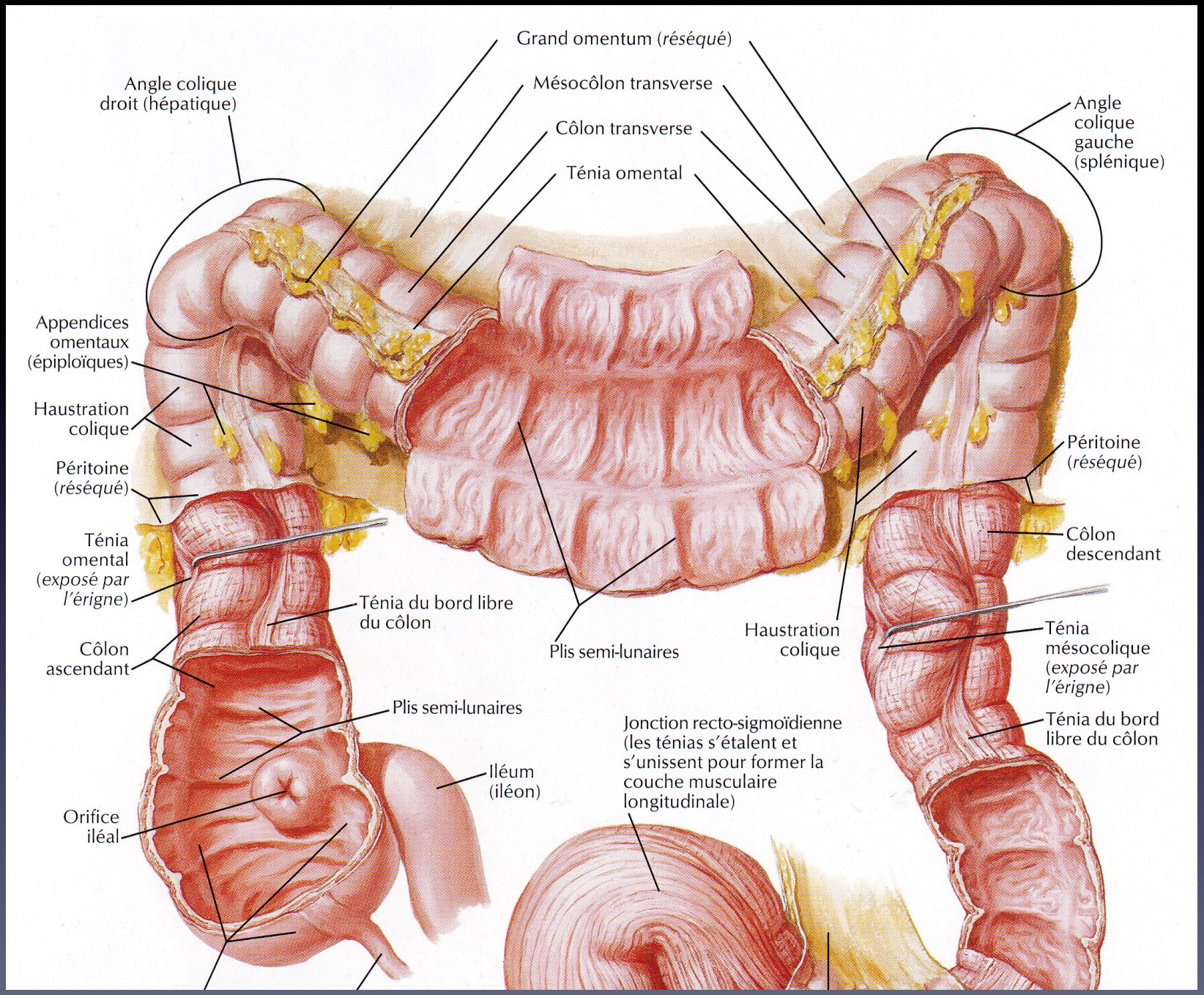
Corrections

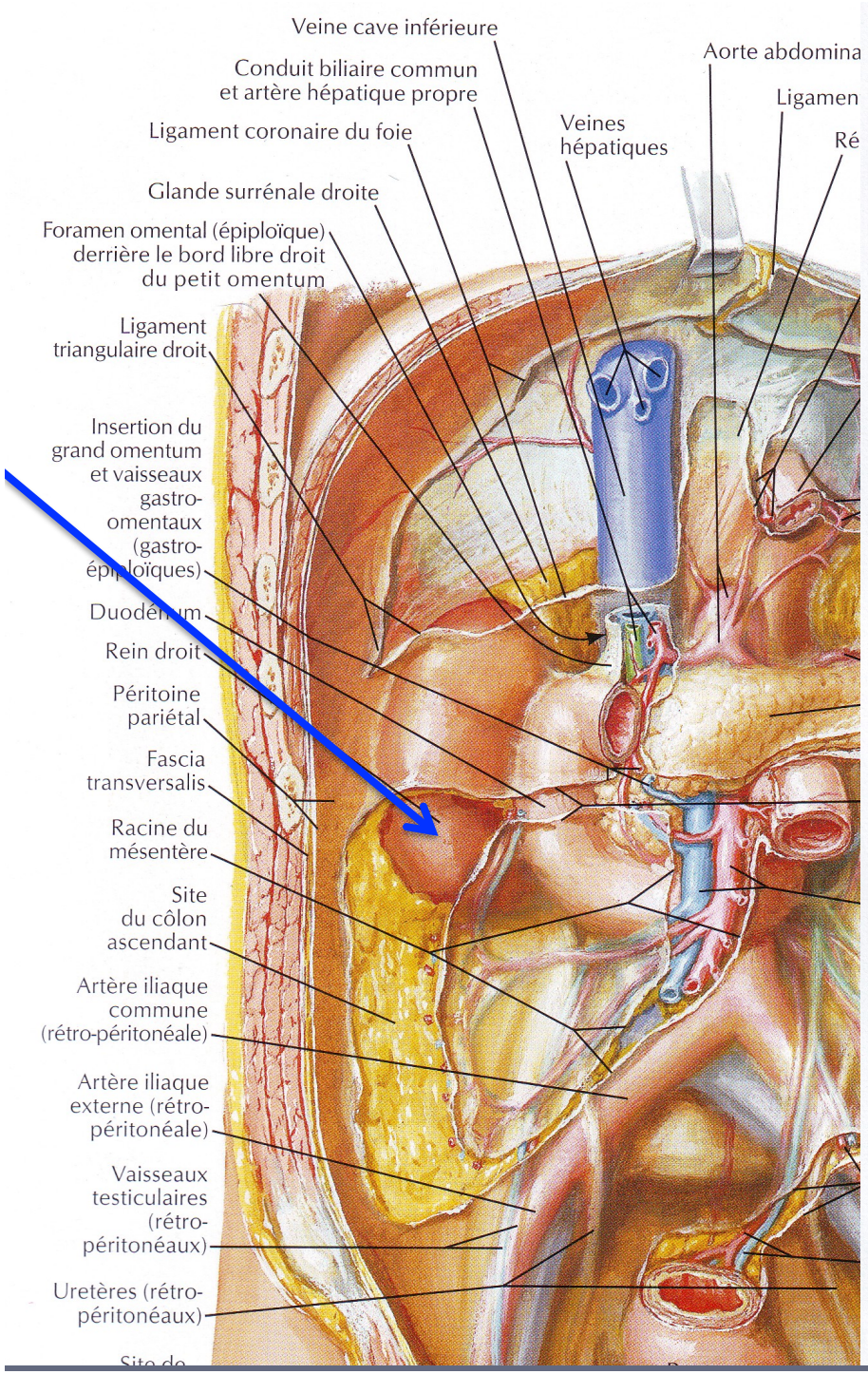
- Correction of the right Toldt fascia

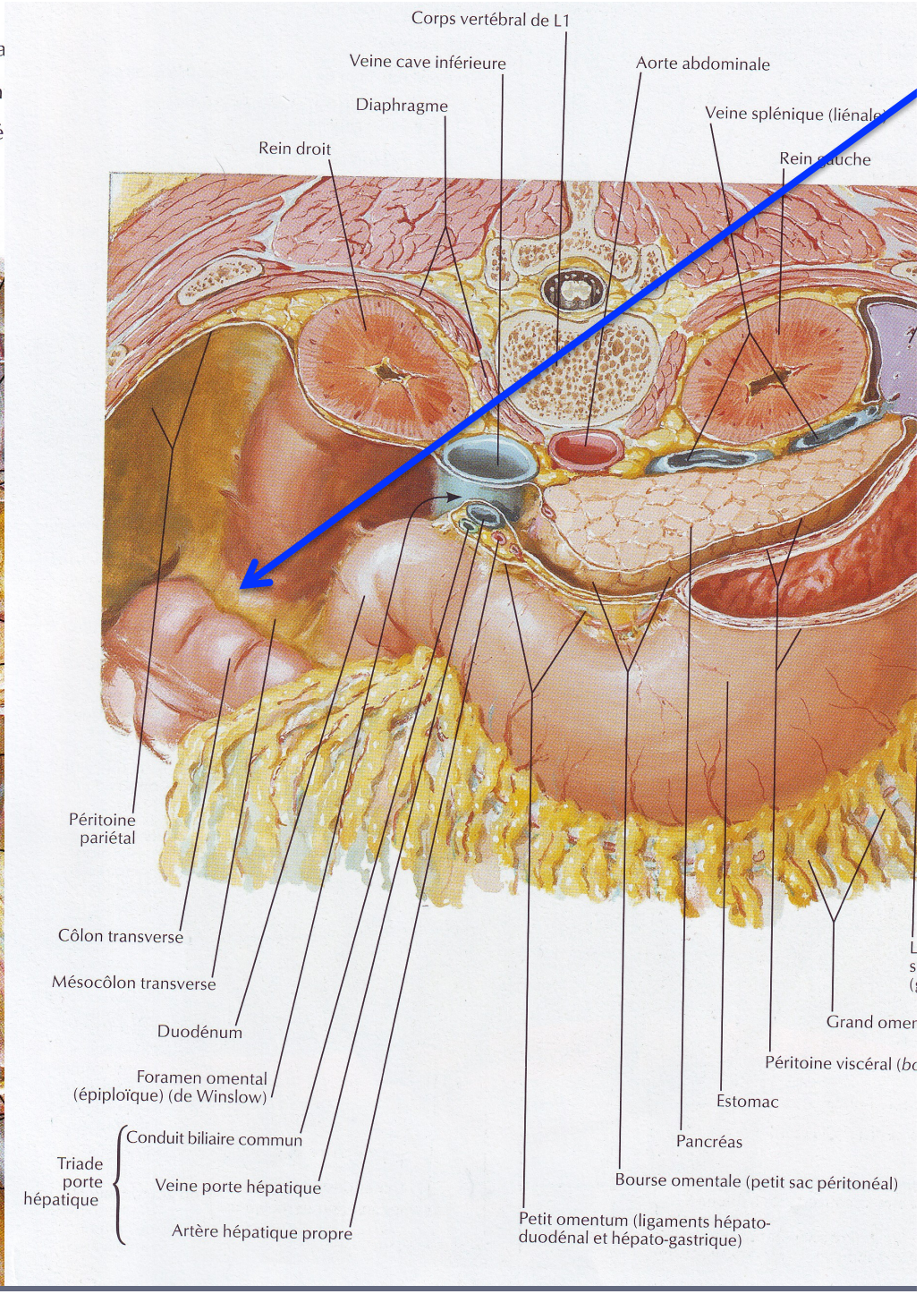
Right colic flexure (hepatic flexure)

Anatomy

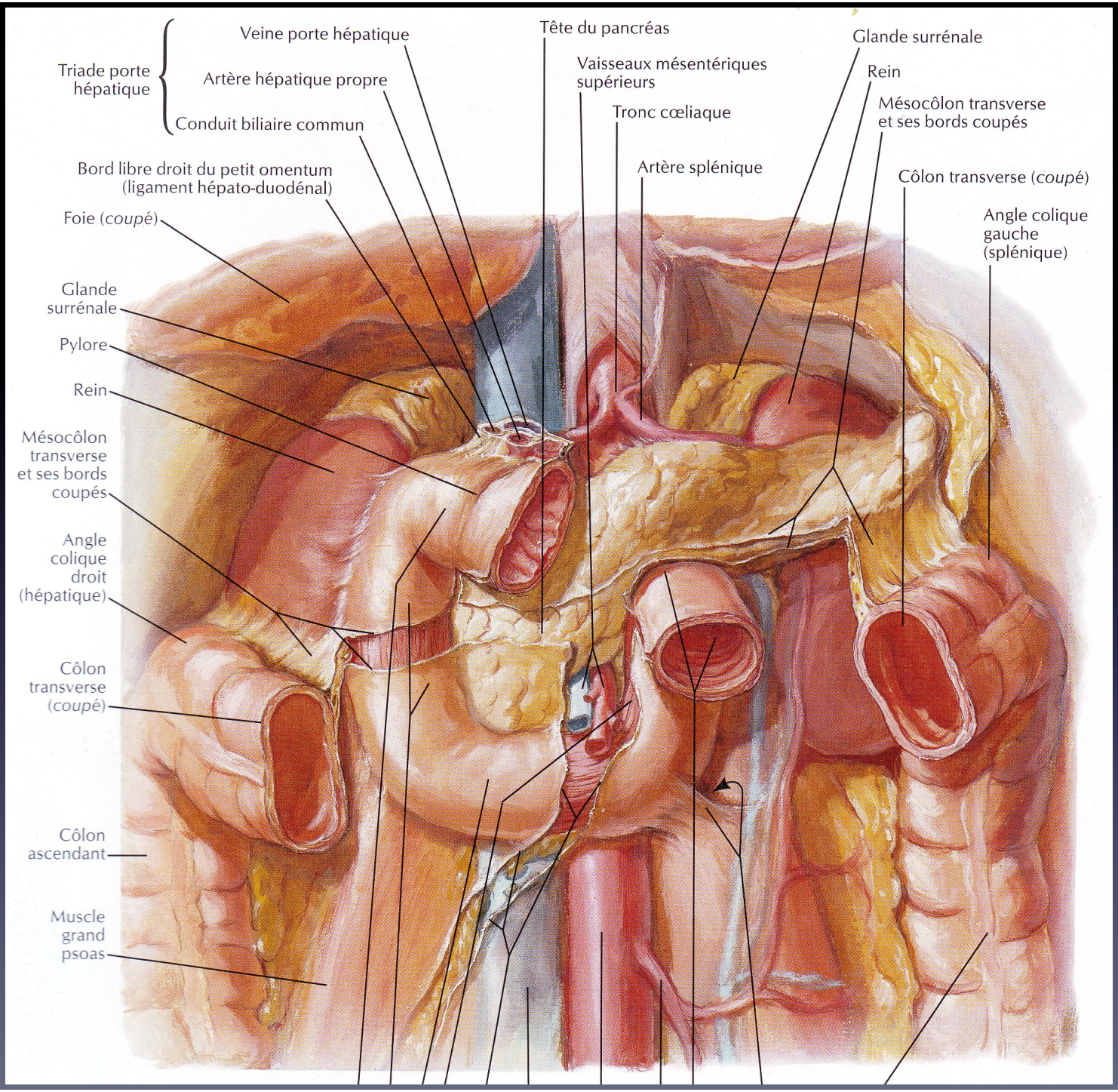
- Variable in position
- Anterior to the lower part of right kidney, inferior to the right hepatic lobe, lateral to the duodenum, posterolateral to the gallbladder fundus
- The posterior part is not covered by peritoneum, and is in direct contact with the renal fascia

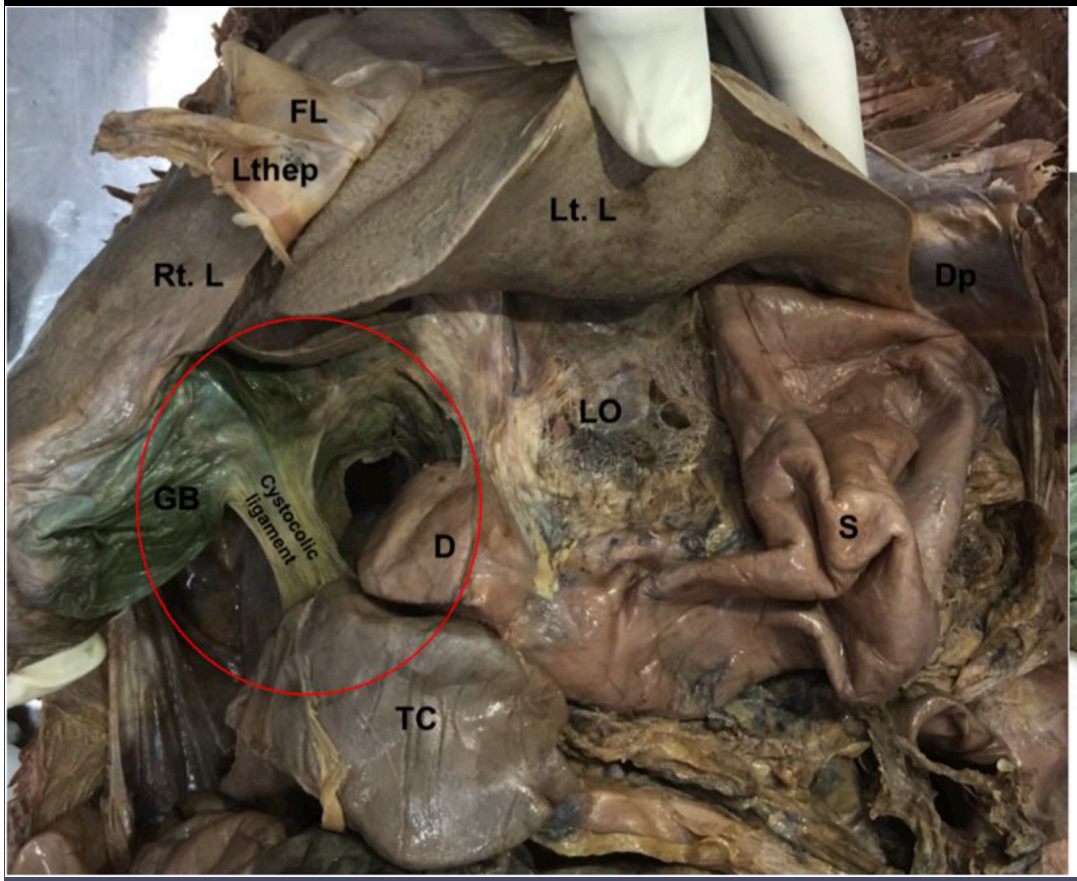

Grand omentum (*réséqué*)
Angle colique droit (hépatique)
Mésocôlon transverse
Côlon transverse
Ténia omental
Angle colique gauche (splénique)
Appendices omentaux (épiploïques)
Haustration colique
Péritoine (*réséqué*)
Ténia omental (*exposé par l'érigne*)
Ténia du bord libre du côlon
Côlon ascendant
Plis semi-lunaires
Haustration colique
Péritoine (*réséqué*)
Côlon descendant
Ténia mésocolique (*exposé par l'érigne*)
Ténia du bord libre du côlon
Plis semi-lunaires
Iléum (iléon)
Orifice iléal
Jonction recto-sigmoïdienne (les ténias s'étalent et s'unissent pour former la couche musculaire longitudinale)

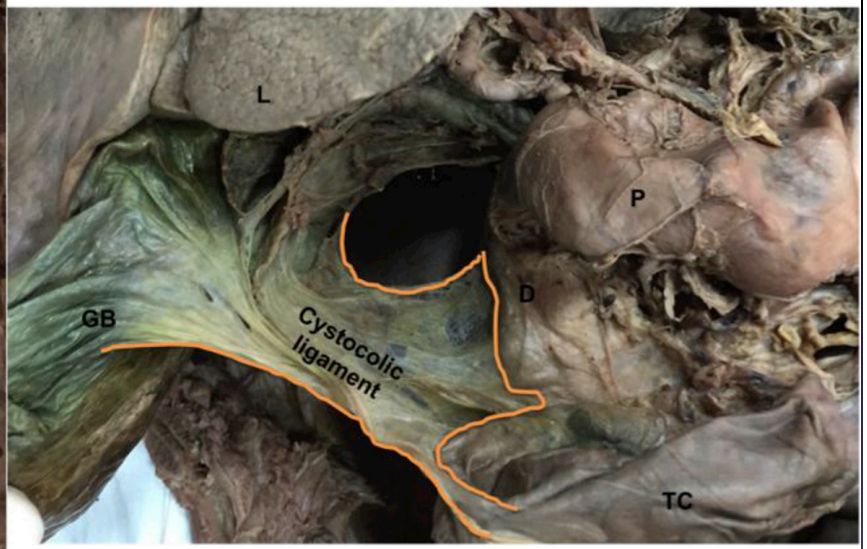

Veine cave inférieure
Conduit biliaire commun et artère hépatique propre
Ligament coronaire du foie
Veines hépatiques
Aorte abdomina
Ligamen
Ré
Glande surrénale droite
Foramen omental (épiploïque) derrière le bord libre droit du petit omentum
Ligament triangulaire droit
Insertion du grand omentum et vaisseaux gastro-omentaux (gastro-épiploïques)
Duodénum
Rein droit
Péritoine pariétal
Fascia transversalis
Racine du mésentère
Site du côlon ascendant
Artère iliaque commune (rétro-péritonéale)
Artère iliaque externe (rétro-péritonéale)
Vaisseaux testiculaires (rétro-péritonéaux)
Uretères (rétro-péritonéaux)


Corps vertébral de L1
Veine cave inférieure
Aorte abdominale
Diaphragme
Veine splénique (liénale)
Rein droit
Rein gauche
Péritoine pariétal
Côlon transverse
Mésocôlon transverse
Duodénum
Foramen omental (épiploïque) (de Winslow)
Triade porte hépatique
Conduit biliaire commun
Veine porte hépatique
Artère hépatique propre
Grand omen
Péritoine viscéral (bo
Estomac
Pancréas
Bourse omentale (petit sac péritonéal)
Petit omentum (ligaments hépato-duodénal et hépato-gastrique)

- The greater omentum extends from the transverse colon on the hepatic flexure,
- Sometimes ligaments are described (inconstant) :
  - Phrenicocolic (more on the left side),
  - Hepatocolic,
  - Cystoduodenocolic.


Triade porte hépatique
Veine porte hépatique
Artère hépatique propre
Conduit biliaire commun
Bord libre droit du petit omentum (ligament hépato-duodénal)
Foie (coupé)
Glande surrénale
Pylore
Rein
Mésocôlon transverse et ses bords coupés
Angle colique droit (hépatique)
Côlon transverse (coupé)
Côlon ascendant
Muscle grand psoas
Tête du pancréas
Vaisseaux mésentériques supérieurs
Tronc cœliaque
Artère splénique
Glande surrénale
Rein
Mésocôlon transverse et ses bords coupés
Côlon transverse (coupé)
Angle colique gauche (splénique)


FL
Lthep
Lt. L
Rt. L
Dp
LO
GB
Cystocolic ligament
D
S
TC


L
P
D
GB
Cystocolic ligament
TC

- The vascularization depends on the superior mesenteric artery/vein,
- Lymphatics depend on the colic lymph nodes and the superior mesenteric lymph nodes.

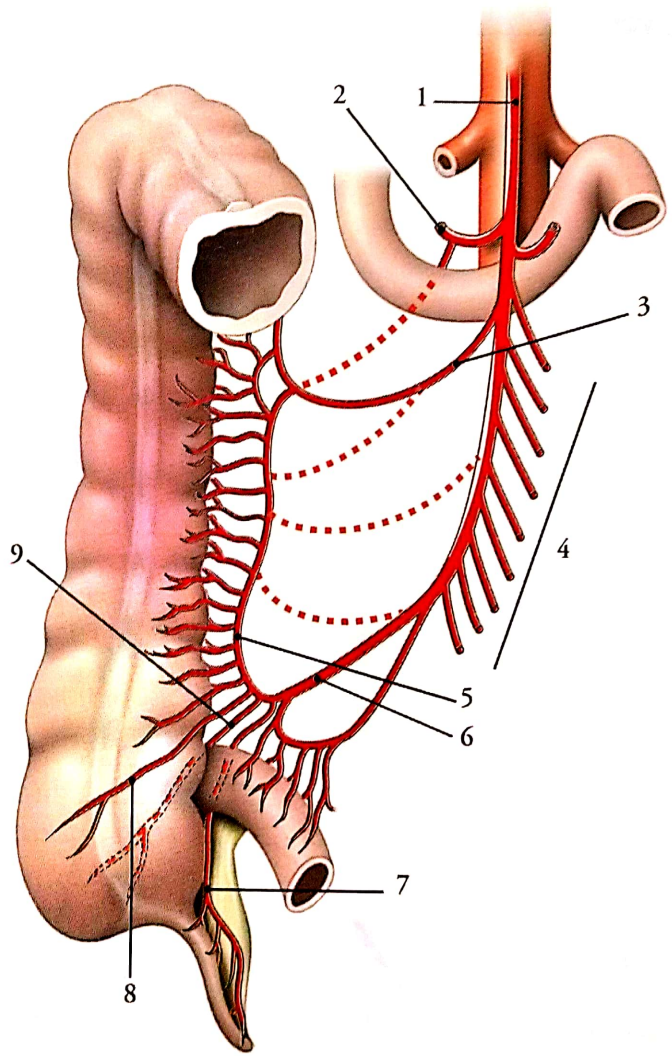


FIG. 16.57. Artères coliques droites accessoires (18%)
(en pointillé, les variations d'origine)

1. *a. mésentérique supérieure*
2. *a. colique moyenne*
3. *a. colique droite*
4. *aa. jéjunales*
5. *a. colique ascendante*
6. *a. iléo-colique*
7. *a. appendiculaire*
8. *a. caecale antérieure*
9. *a. caecale postérieure*

Hepatic flexure in osteopathy

- Depends on the liver dysfunctions
- Bloating (flexure too tight/closed)
- Relationship with right shoulder pain

PRACTICE

Tests of the hepatic flexure

- Opening test of the hepatic flexure :

Origin : ascending colon / transverse colon

Tests of the hepatic flexure

- Test of the suspensory ligaments of the hepatic flexure :
  - Phrenicocolic ligament,
  - Hepatocolic ligament.

Corrections of the hepatic flexure

- Closed angle :
  - Origin : transverse colon
  - Origin : ascending colon

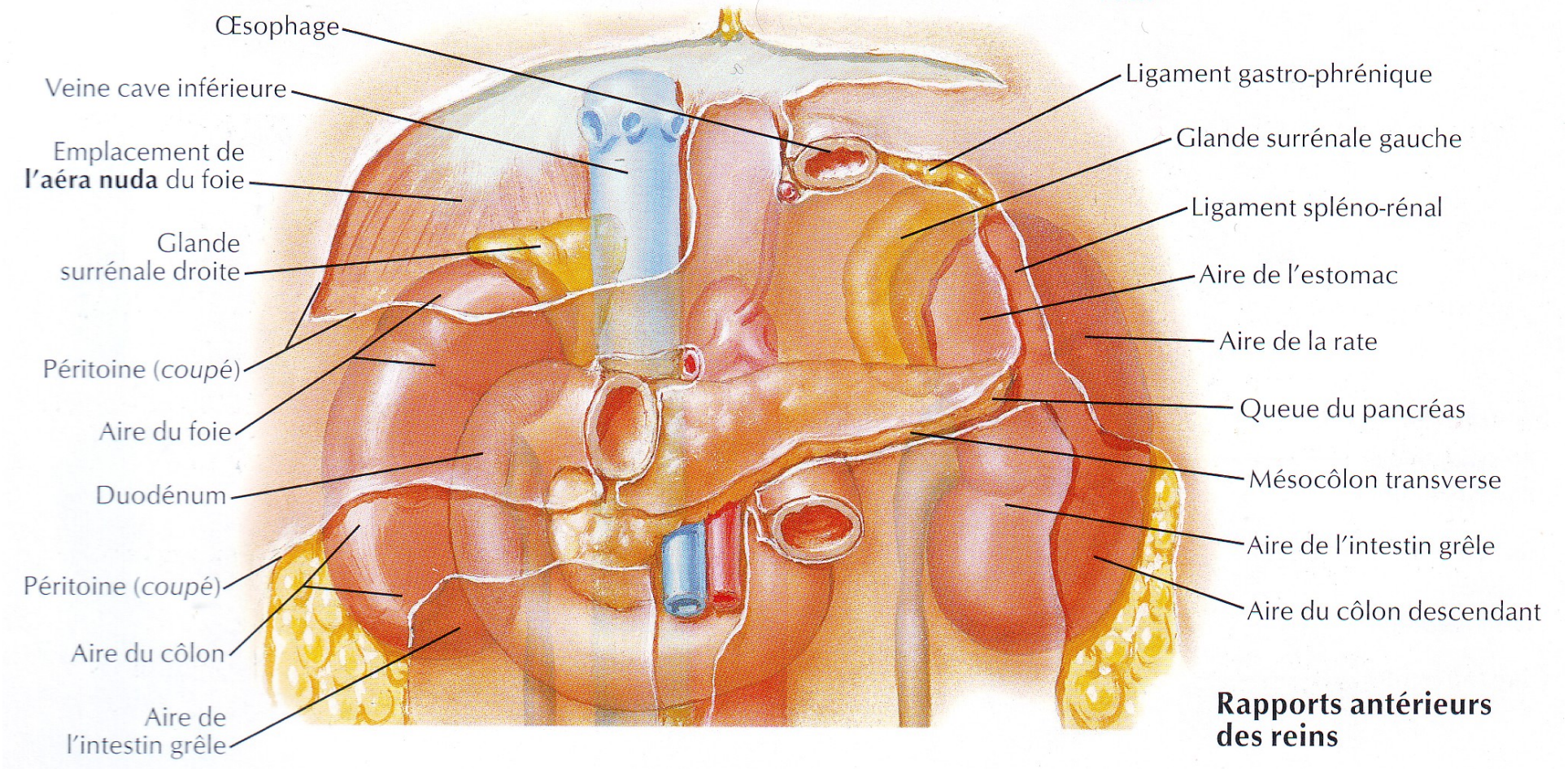
Corrections of the hepatic flexure

- Correction of the ligaments :
  - Too tense : release
  - To soft : rebound

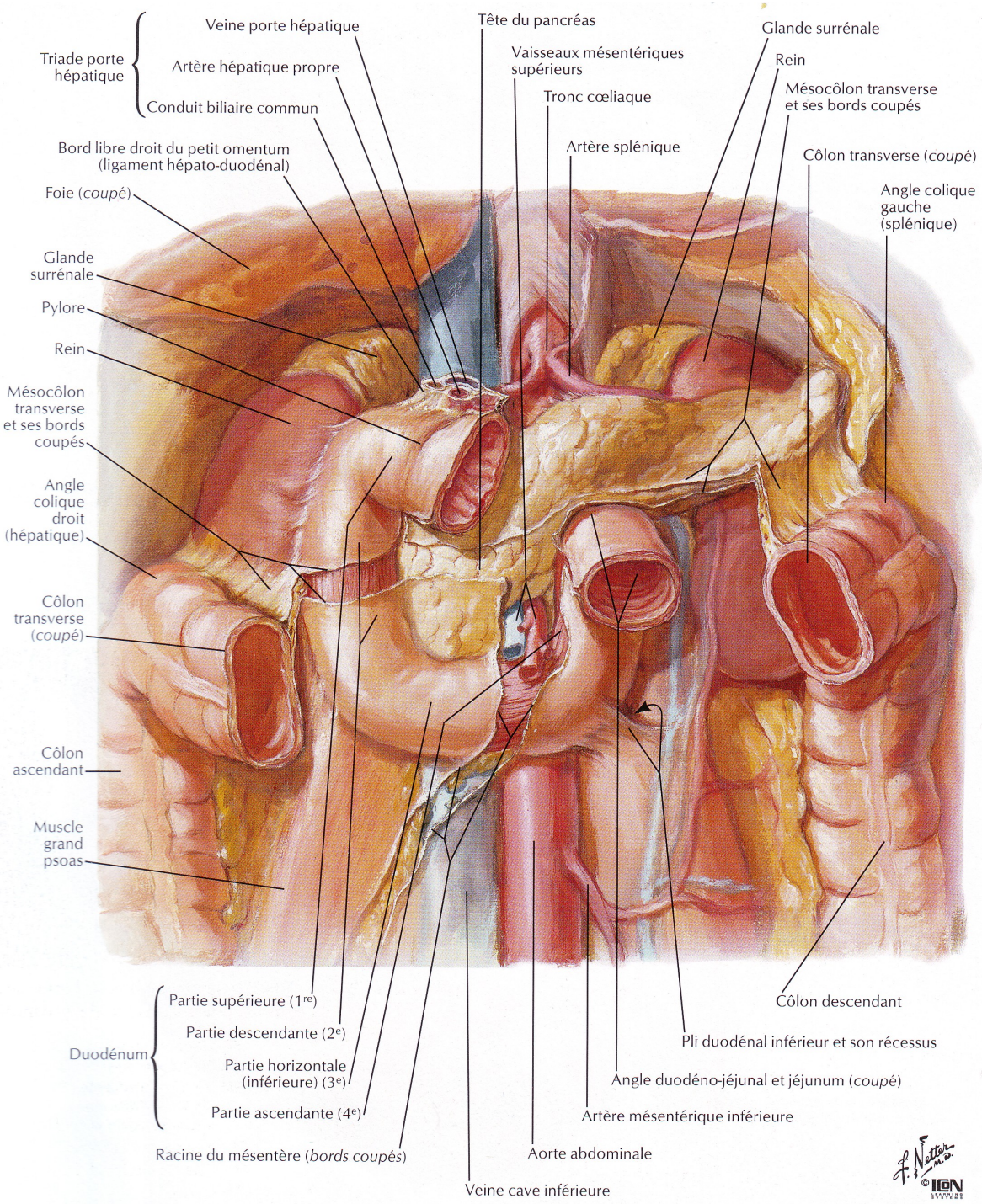
Transverse colon

Anatomy

- Intraperitoneal,
- Many variations in length and shape !
- The transverse mesocolon attaches in front of the right kidney, 2nd duodenum, pancreas, left kidney
- The greater omentum comes from the fusion between gastrocolic ligament and the transverse colon



Rapports antérieurs des reins


Triade porte hépatique
Veine porte hépatique
Artère hépatique propre
Conduit biliaire commun
Bord libre droit du petit omentum (ligament hépato-duodénal)
Foie (coupé)
Glande surrénale
Pylore
Rein
Mésocôlon transverse et ses bords coupés
Angle colique droit (hépatique)
Côlon transverse (coupé)
Côlon ascendant
Muscle grand psoas
Tête du pancréas
Vaisseaux mésentériques supérieurs
Tronc cœliaque
Artère splénique
Glande surrénale
Rein
Mésocôlon transverse et ses bords coupés
Côlon transverse (coupé)
Angle colique gauche (splénique)
Duodénum
Partie supérieure (1re)
Partie descendante (2e)
Partie horizontale (inférieure) (3e)
Partie ascendante (4e)
Racine du mésentère (bords coupés)
Veine cave inférieure
Aorte abdominale
Artère mésentérique inférieure
Angle duodéno-jéjunal et jéjunum (coupé)
Pli duodénal inférieur et son récessus
Côlon descendant

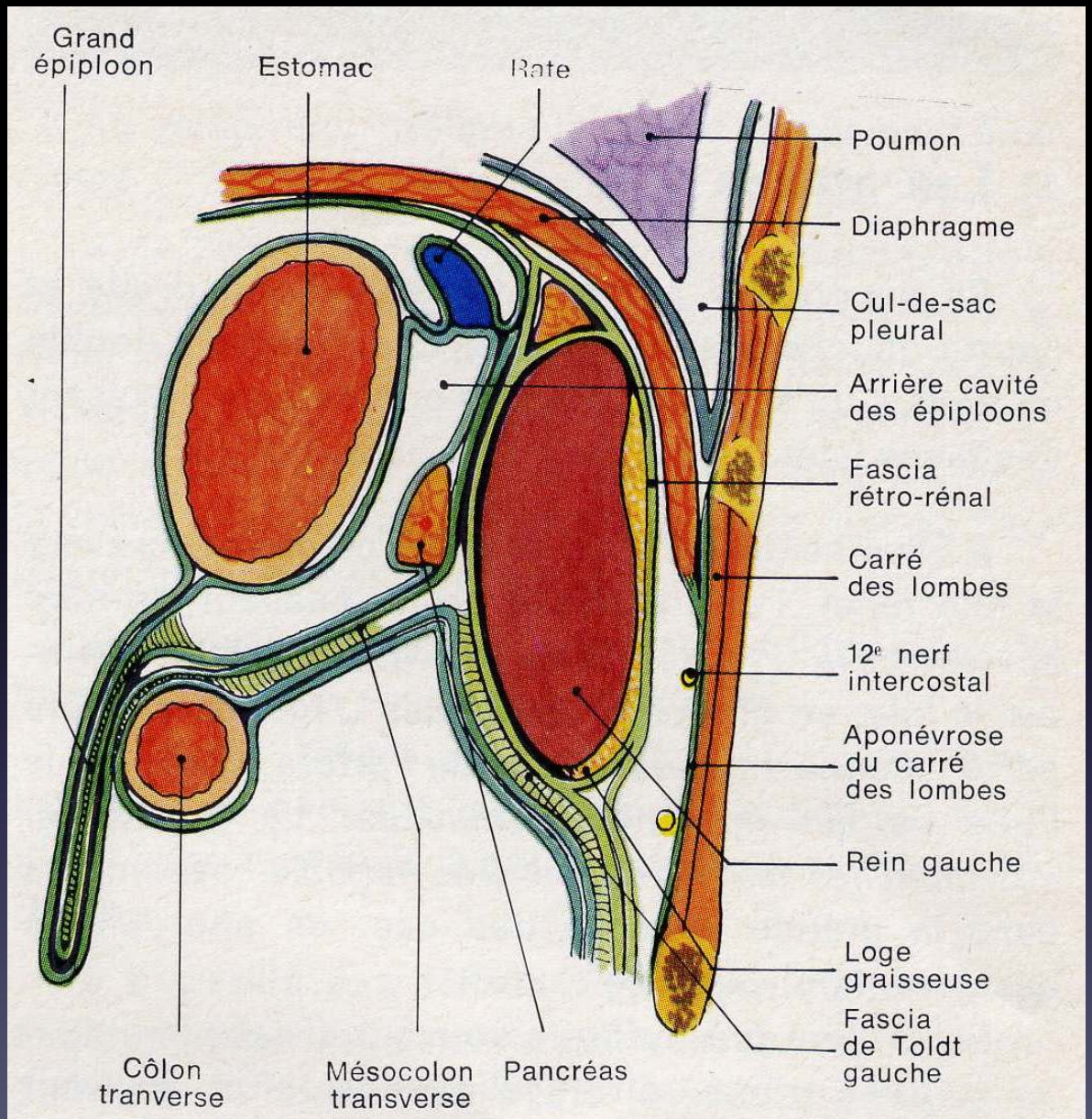
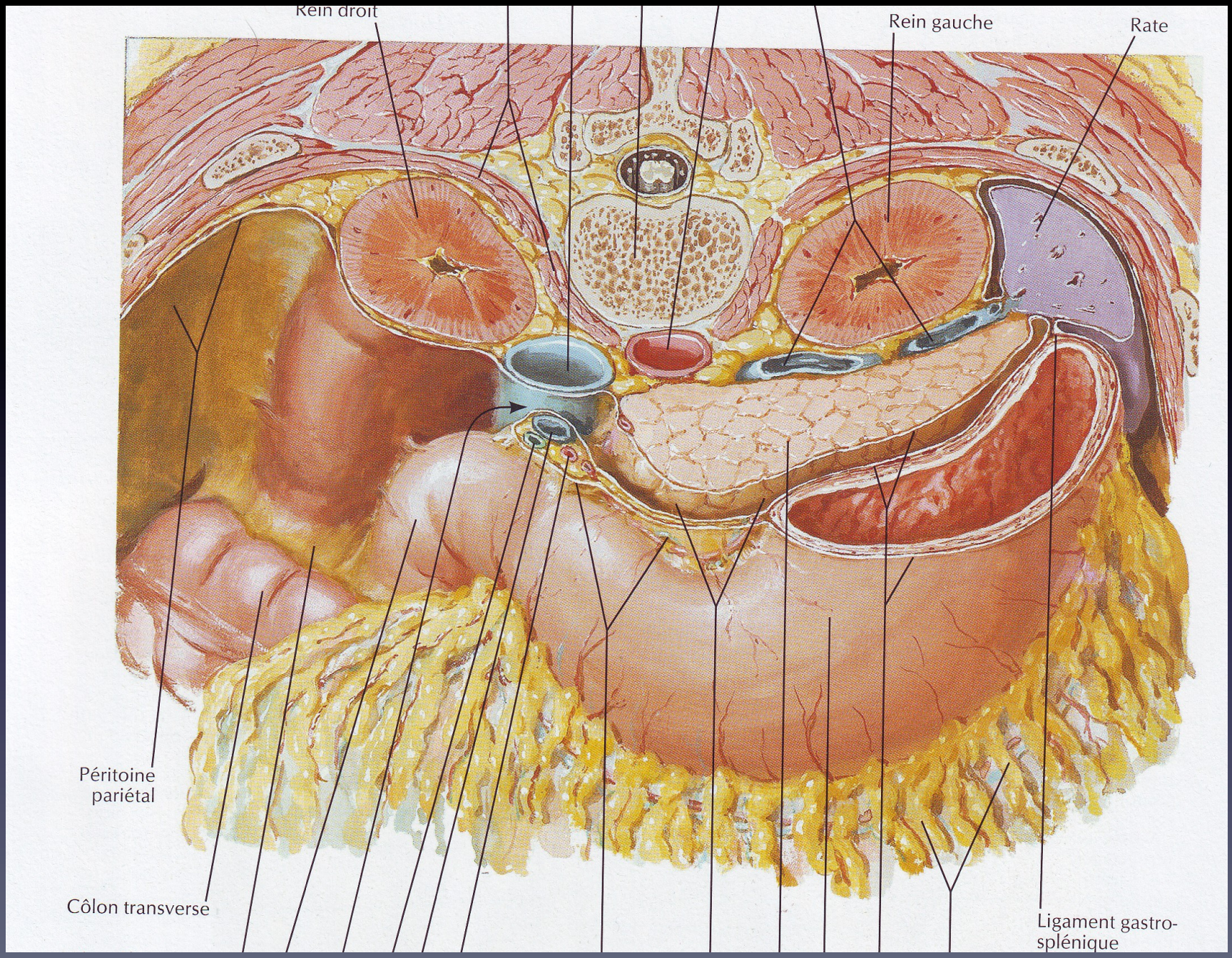
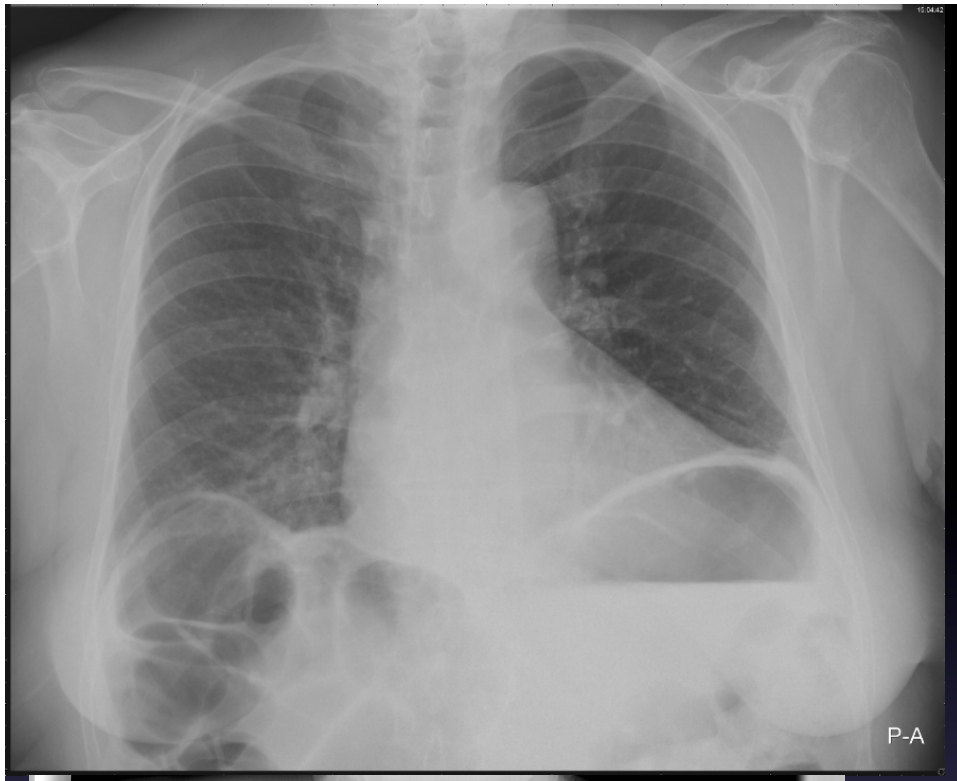
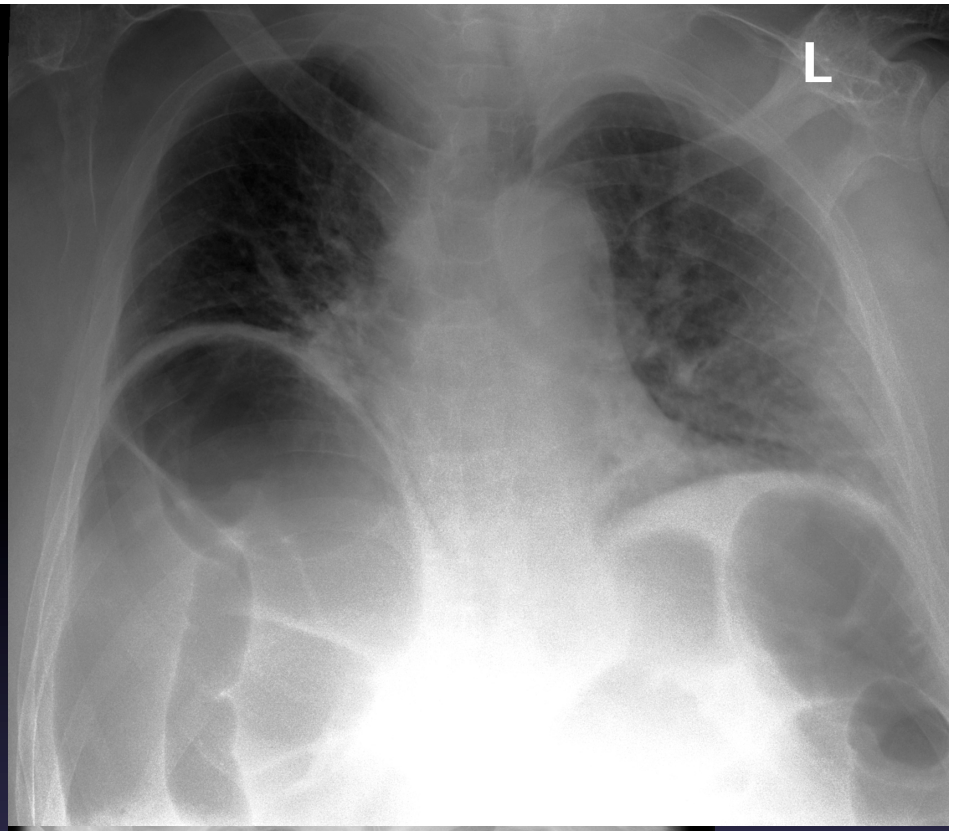


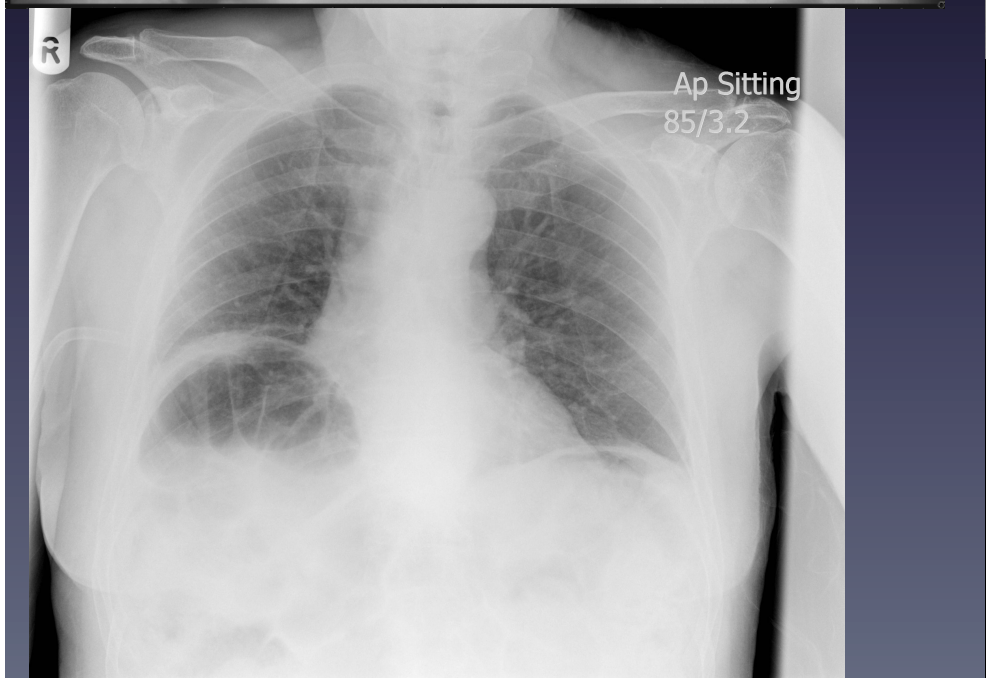
Fig. 18. — *Coupe sagittale du rein gauche.*

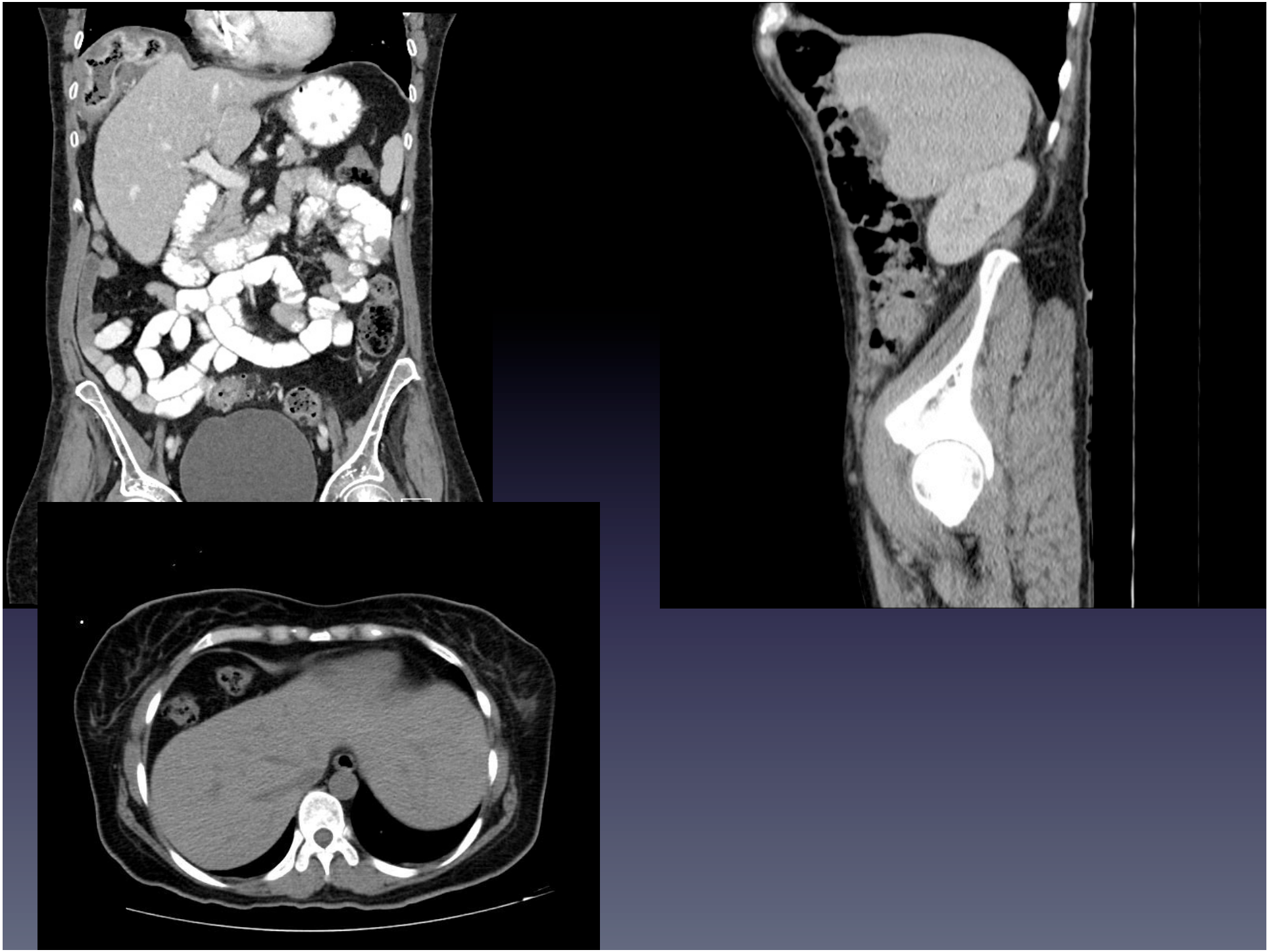

Rein droit
Rein gauche
Rate
Péritoine pariétal
Côlon transverse
Ligament gastro-splénique

- The transverse colon can be between the liver and the diaphragm (chilaiditi's syndrome).


P-A


L

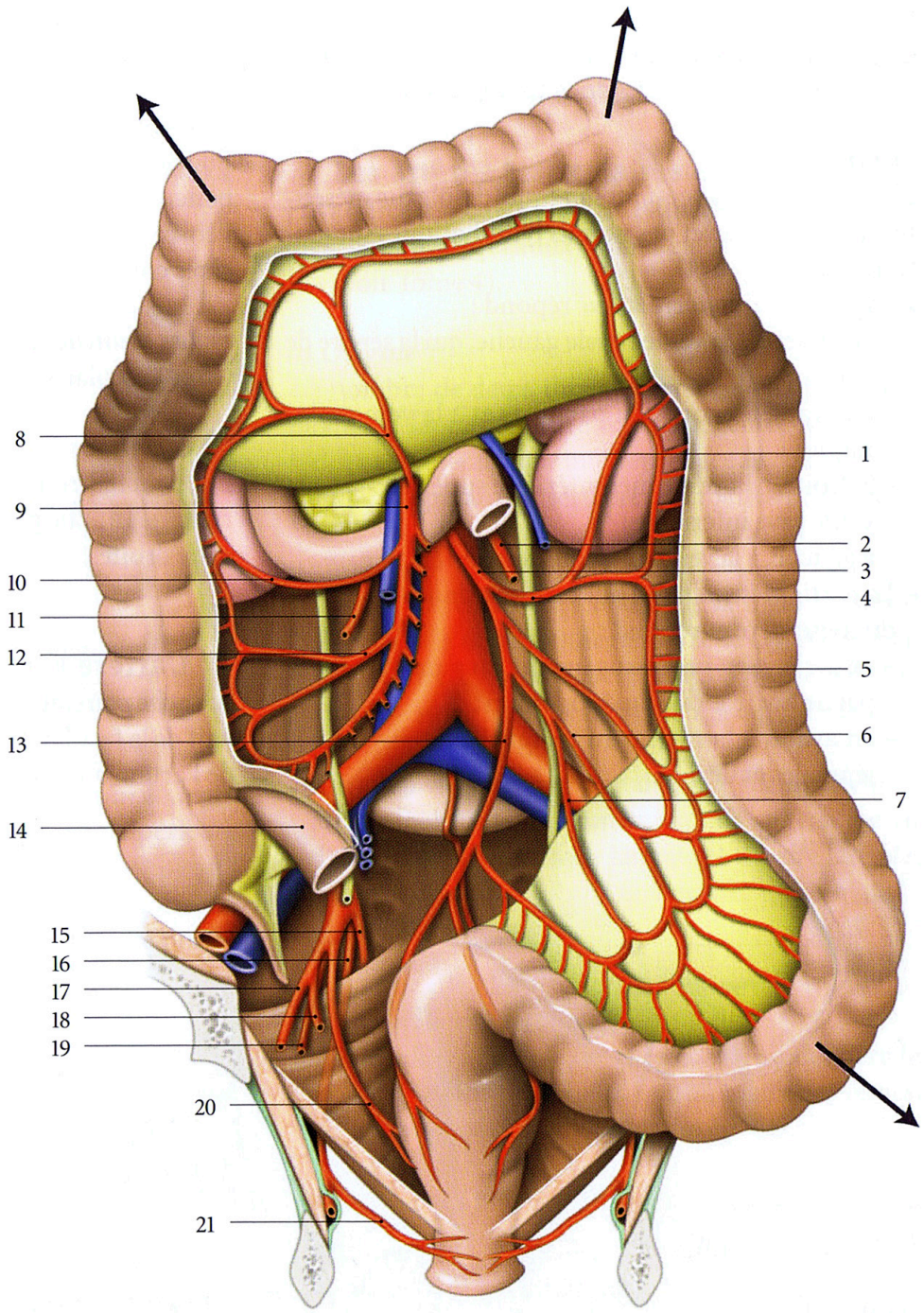

R
Ap Sitting
85/3.2

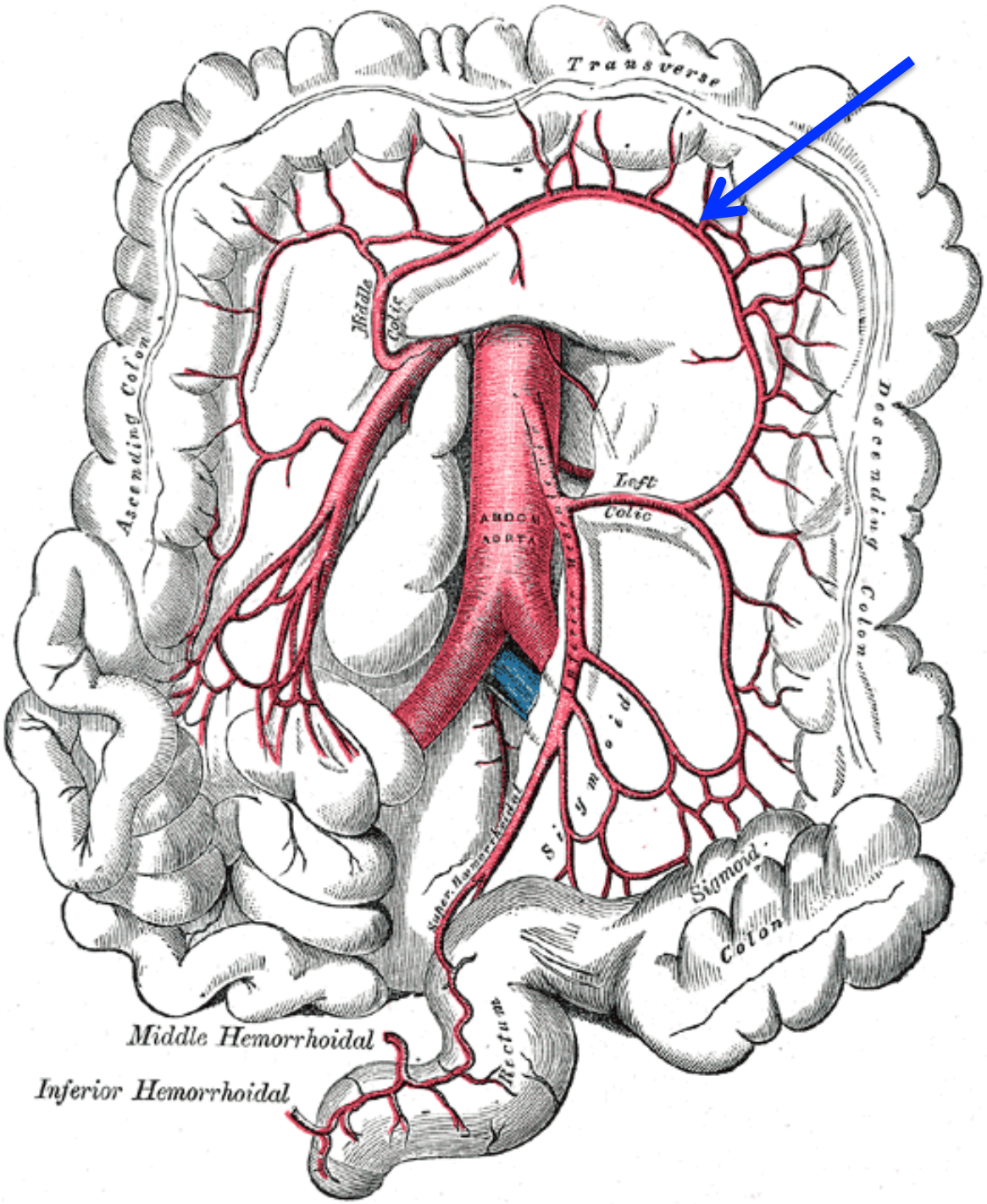


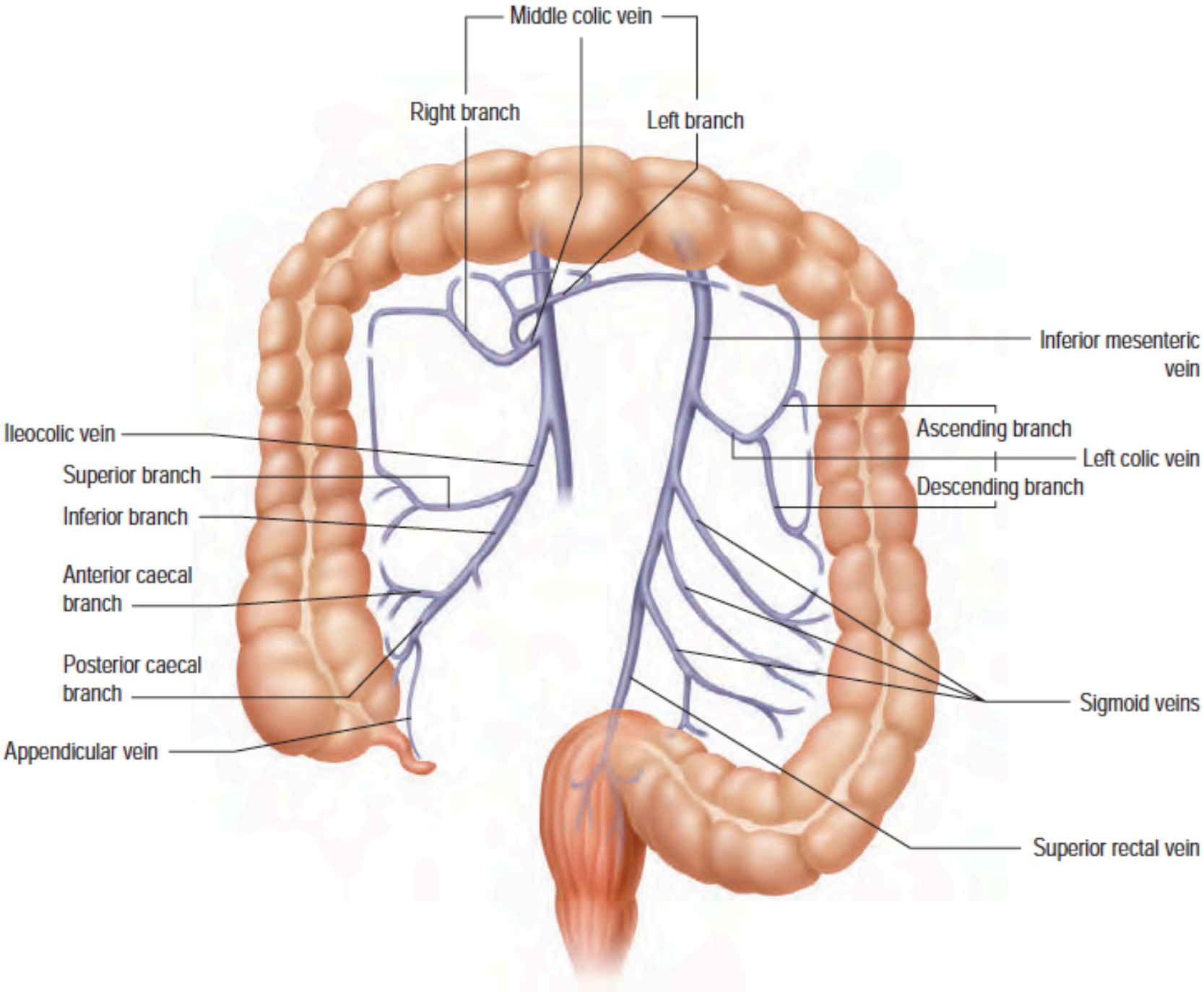
- Transverse colon is the junction between the midgut and the hindgut (embryology)
- The blood supply depends on it :
  - Right part of the TC : superior mesentery art/v.
  - Left part of the TC : inferior mesentery art/v.
- The marginal artery of Drummond (or arch of Riolan) joins the middle colic art. and left colic art.

FIG. 10.20. Artères mésentériques

1. v. mésentérique inf.
2. a. gonadique gauche
3. a. mésentérique inf.
4. a. colique gauche
5. a. sigmoïdienne sup.
6. a. sigmoïdienne moyenne
7. a. sigmoïdienne inf.
8. a. colique moyenne
9. a. mésentérique sup.
10. a. colique droite
11. a. gonadique droite
12. a. iléo-colique
13. a. rectale sup.
14. iléum
15. a. glutéale inf.
16. a. pudendale interne
17. a. ombilicale
18. a. utérine ou du conduit déférent
19. a. obturatrice
20. a. rectale moyenne
21. a. rectale inf.




Transverse
Middle Colic
Ascending Colon
Descending Colon
Left Colic
Sigmoid Colon
Middle Hemorrhoidal
Inferior Hemorrhoidal
Rectum


Middle colic vein
Right branch
Left branch
Inferior mesenteric vein
Ileocolic vein
Superior branch
Inferior branch
Ascending branch
Left colic vein
Descending branch
Anterior caecal branch
Posterior caecal branch
Appendicular vein
Sigmoid veins
Superior rectal vein

Transverse colon in osteopathy

- Warning signs :
  - Bloating (epigastric area, or under the umbilicus)
  - Feeling of a rubber ring (especially if constipation)
  - Pain in the high lumbar level (L2 about)

PRACTICE

Tests of the transverse colon

- Palpation of the transverse colon :
  - Location/level,
  - Spasms evaluation

Tests of the transverse colon

- Test of the transverse mesocolon :
  - Decubitus

Tests of the transverse colon

- Test of the root of the transverse mesocolon :
  - Sitting
  - Decubitus

Tests of the transverse colon

- Mobility of the transverse colon :
  - Global/Side by side

Corrections of the transverse colon

- Correction of the spasms

Corrections of the transverse colon

- Correction of the transverse mesocolon :
  - Too tense
  - Too soft (ptosis)

Corrections of the transverse colon

- Correction of the root of the transverse mesocolon

Corrections of the transverse colon

- Correction of the mobility of the transverse colon

Left colic angle or (sub)splenic angle

Anatomy

- Very acute (closed angle)
- Usually inferomedial to the lower pole of the spleen
- It may be even above the splenic hilum
- Posterior link with the left kidney !!

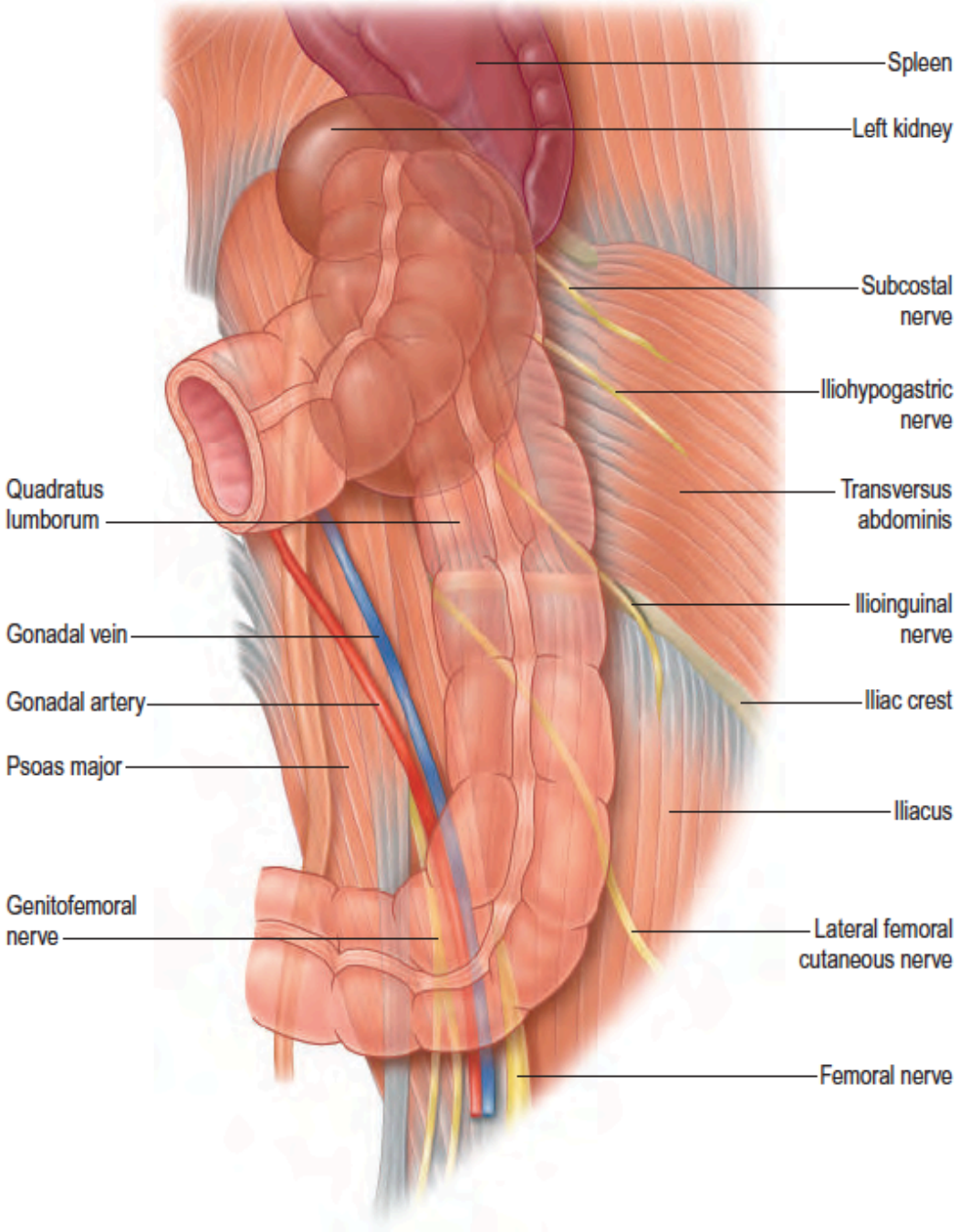
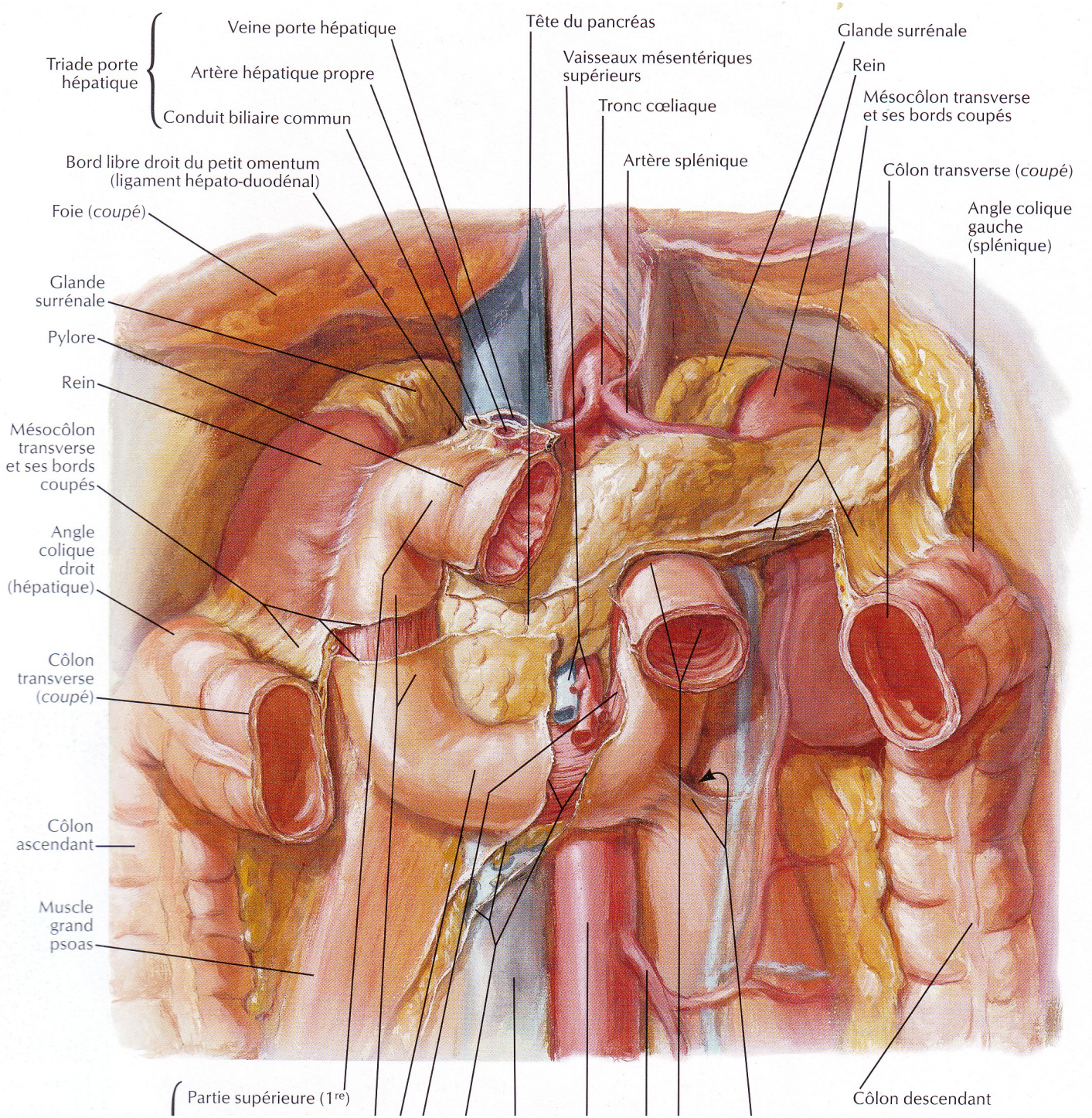
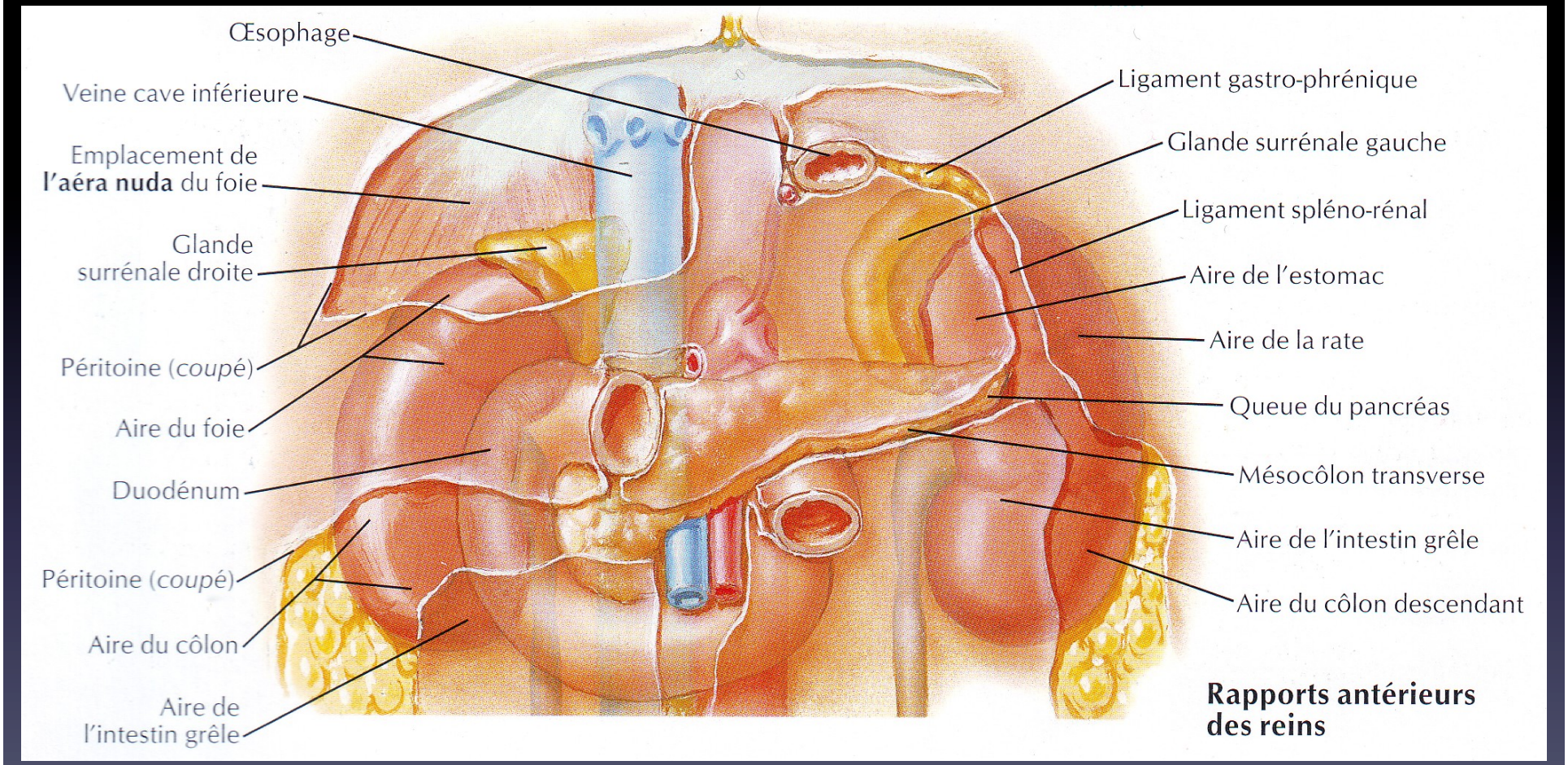


Fig. 66.27 Posterior relations of the descending colon.

- The subsplenic angle is held by phrenicocolic ligament (peritoneum), on which the spleen sits,
- The phrenicocolic ligament is related to the tail of the pancreas (pancreaticosplenic ligament).

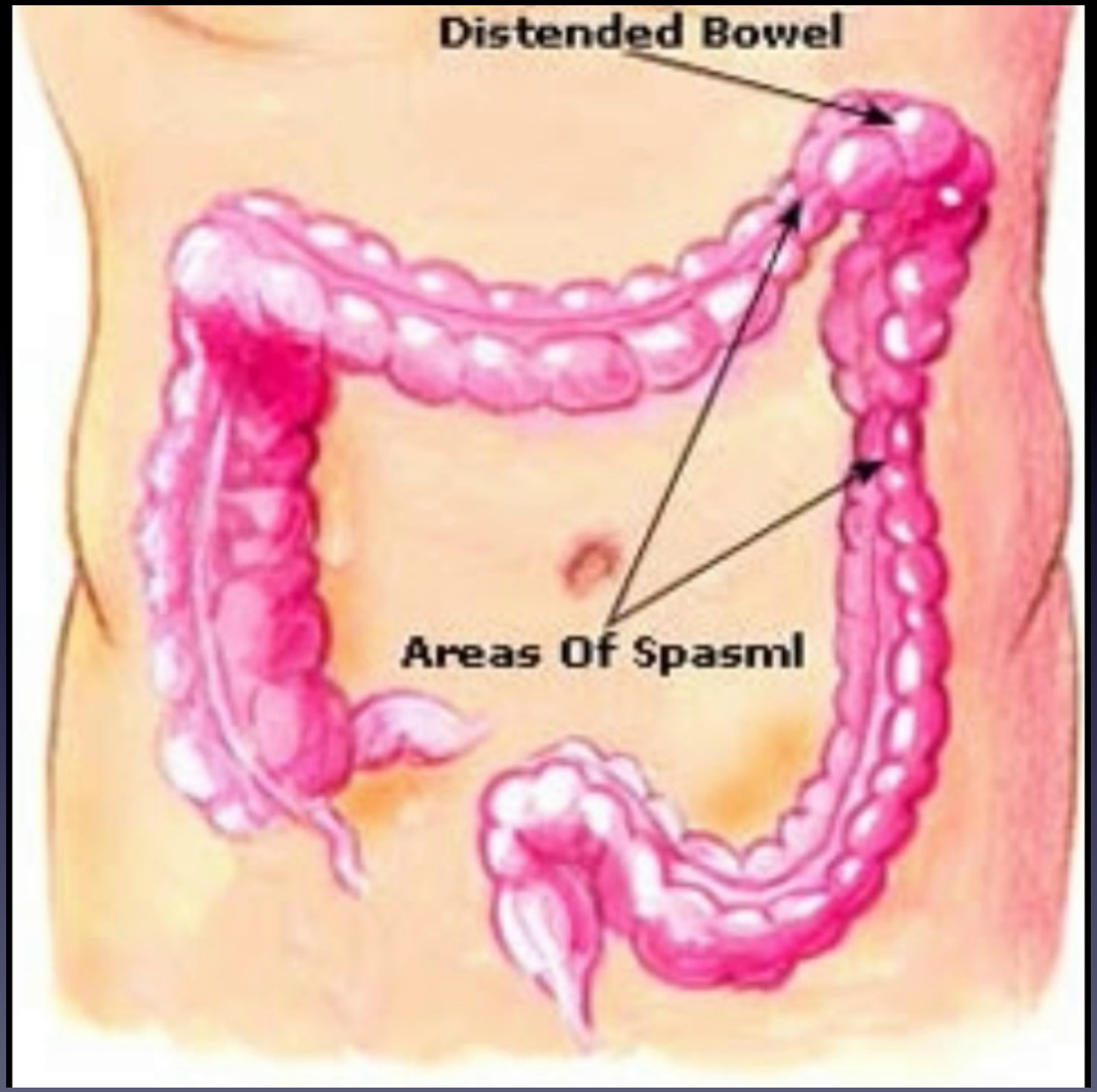

Triade porte hépatique
Veine porte hépatique
Artère hépatique propre
Conduit biliaire commun
Tête du pancréas
Vaisseaux mésentériques supérieurs
Tronc cœliaque
Artère splénique
Glande surrénale
Rein
Mésocôlon transverse et ses bords coupés
Côlon transverse (coupé)
Angle colique gauche (splénique)
Bord libre droit du petit omentum (ligament hépato-duodénal)
Foie (coupé)
Glande surrénale
Pylore
Rein
Mésocôlon transverse et ses bords coupés
Angle colique droit (hépatique)
Côlon transverse (coupé)
Côlon ascendant
Muscle grand psoas
Partie supérieure (1re)
Côlon descendant

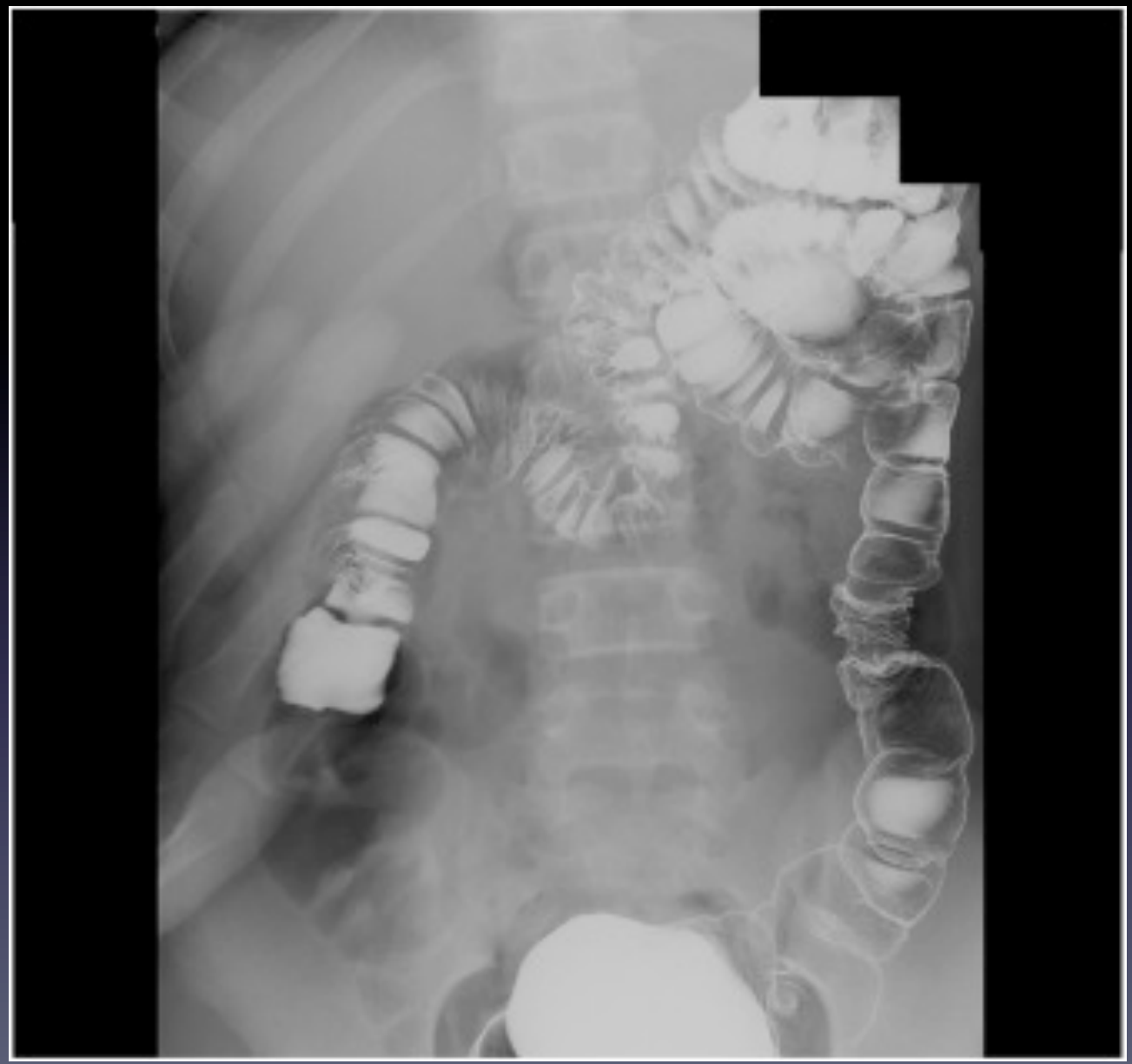


Rapports antérieurs des reins

Subsplenic syndrome

- Precordial pain (= heart pain) : origin in the left epigastrium, then chest pain, left shoulder +/- abdomen
- Sudden, lasts after few minutes -> hours,
- Breathlessness, palpitations+++,
- Patient often wants to eructate or expel flatus,
- Gurgling noise in the left hypochondrium is often heard during crisis.


Distended Bowel
Areas Of Spasml



Subsplenic angle in osteopathy

- Warning signs (with the descending colon) :
  - Lower ribs dysfunctions on the left,
  - Pain in the left hypochondrium (related to a spasm of the sigmoid colon),
  - Higher lumbar pain (lumbar splanchnic nerve).

PRACTICE

Tests of the supsplenic angle

- Opening test of the supsplenic angle :
  - Cause : transverse colon/descending colon (rare).

Tests of the subsplenic angle

- Test of the left phrenicocolic ligament

Corrections of the subsplenic angle

- Opening of the subsplenic angle :
  - Cause transverse colon
  - Cause descending colon (rare)

Corrections of the subsplenic angle

- Correction of a ptosis of the subsplenic angle (left phrenicocolic ligament)
- Correction of a tense left phrenicocolic ligament

Descending colon

Anatomy

- Simple descending tube, smaller diameter,
- Attached posteriorly by the left Toldt fascia (retroperitoneal),
- Direct link with the prerenal fascia (no peritoneum) = nephritic syndrome like !

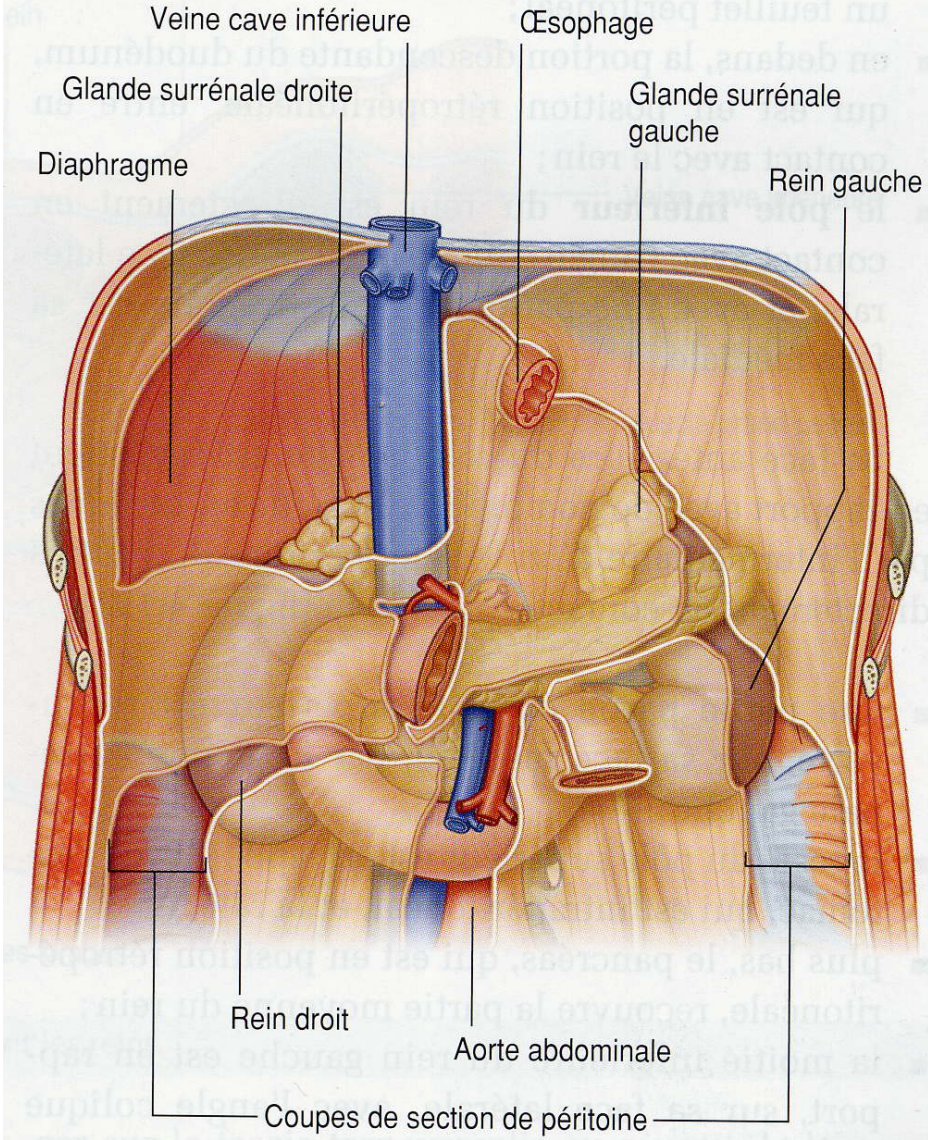
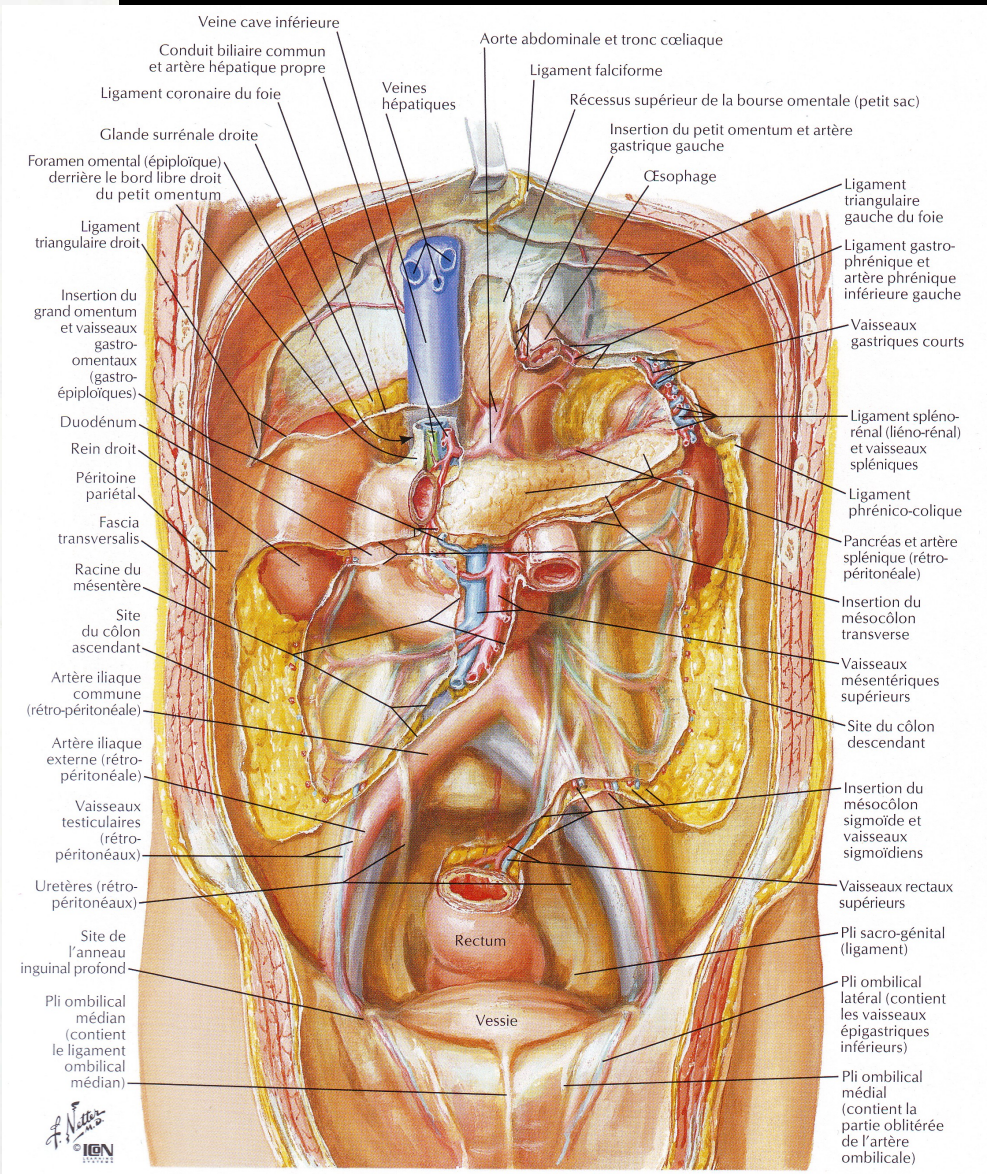


Figure 4.120. Situation rétropéritonéale des reins au sein de la région postérieure de l'abdomen.



- Left colic arteries come from the inferior mesenteric artery,
- The veins follow the same path (inferior mesenteric vein),
- Lymphatics drain in the left colic nodes and the inferior mesenteric nodes.

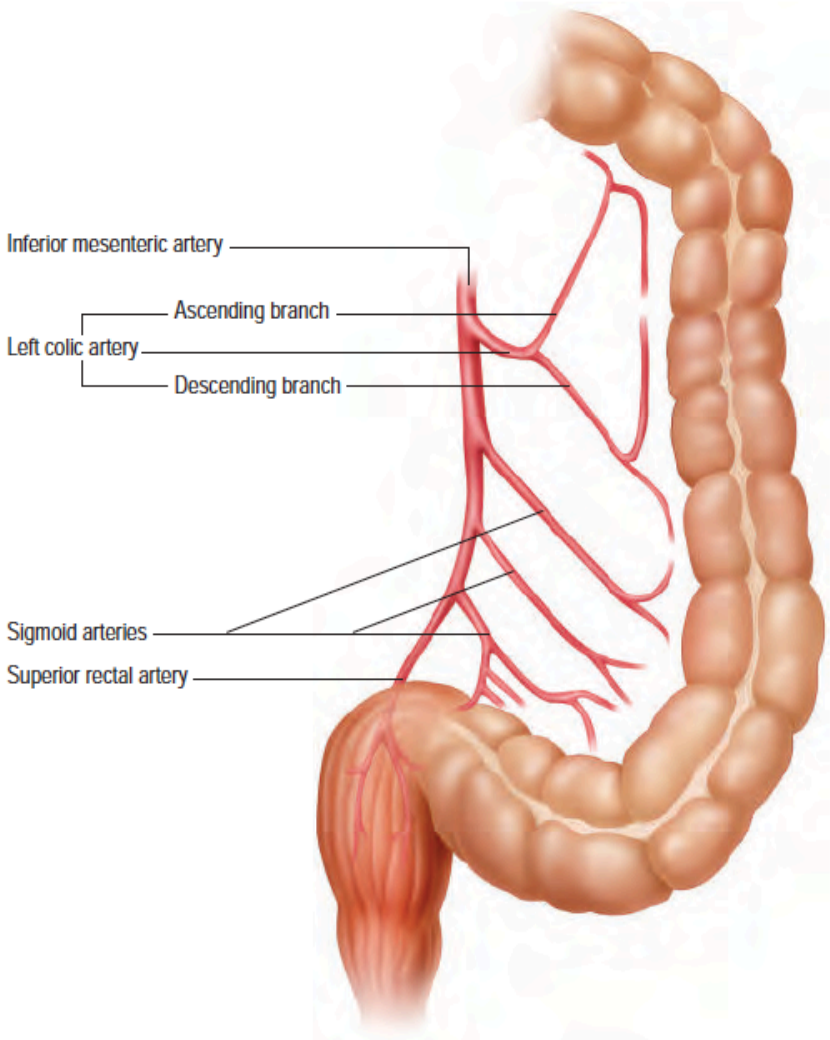
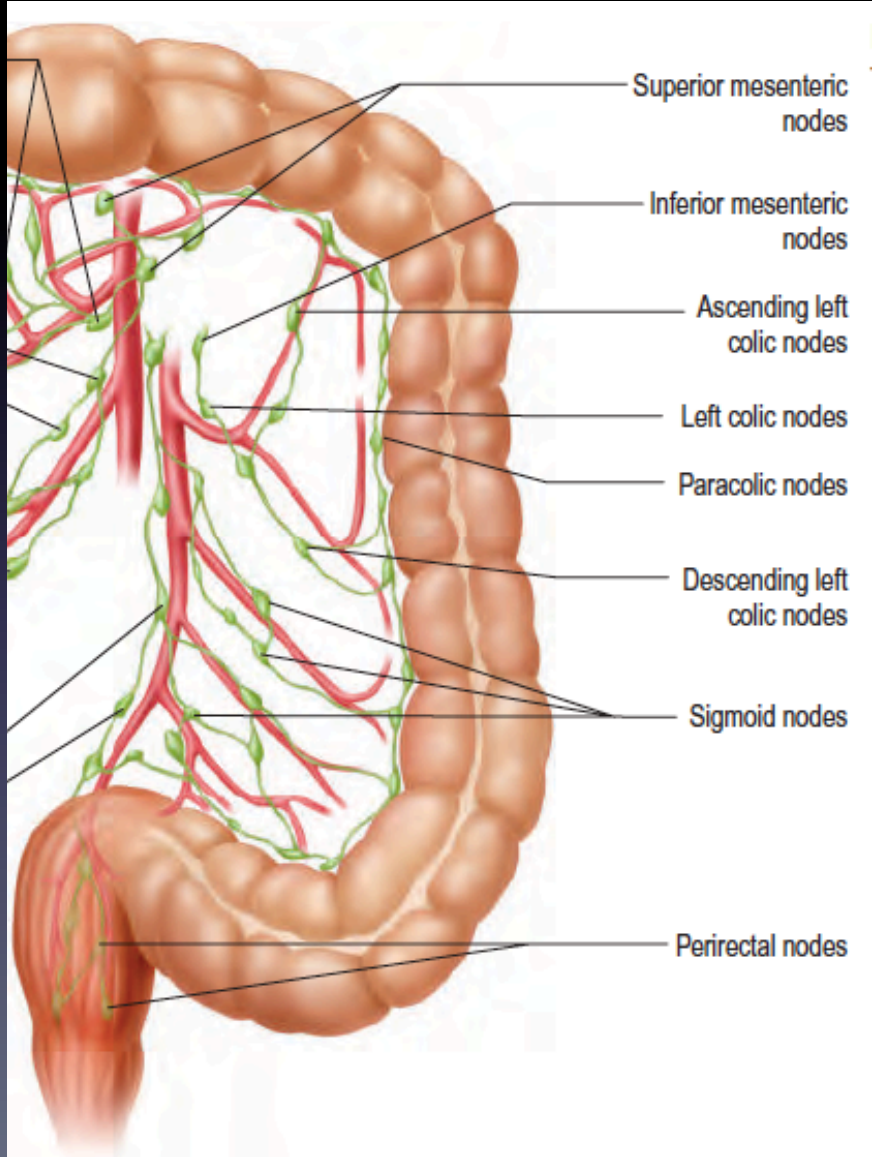


Fig. 66.38 The inferior mesenteric artery.



PRACTICE

Tests of the descending colon

- Test of the left Toldt fascia

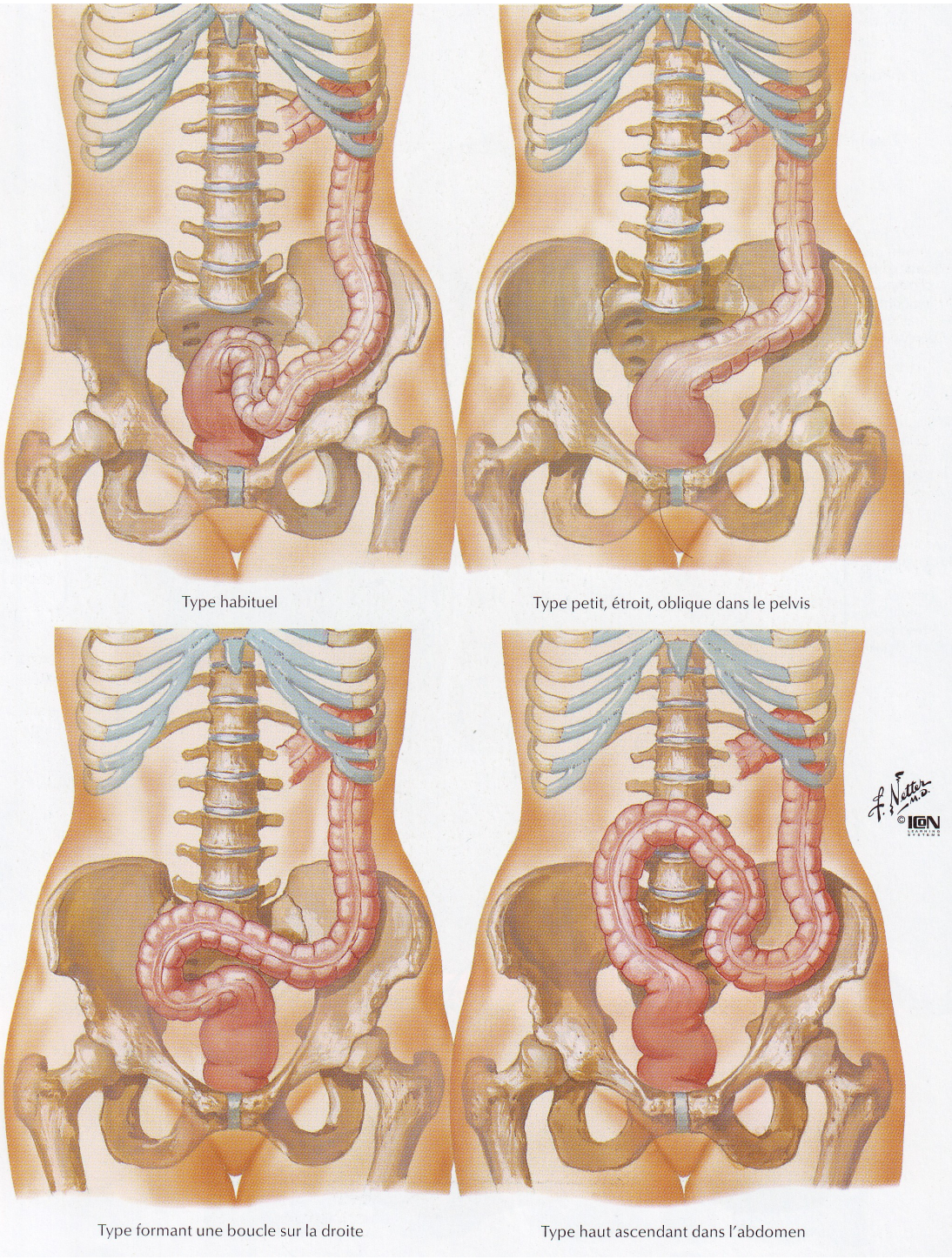
Corrections of the descending colon

- Correction of the left Toldt fascia

Sigmoid colon

Anatomy

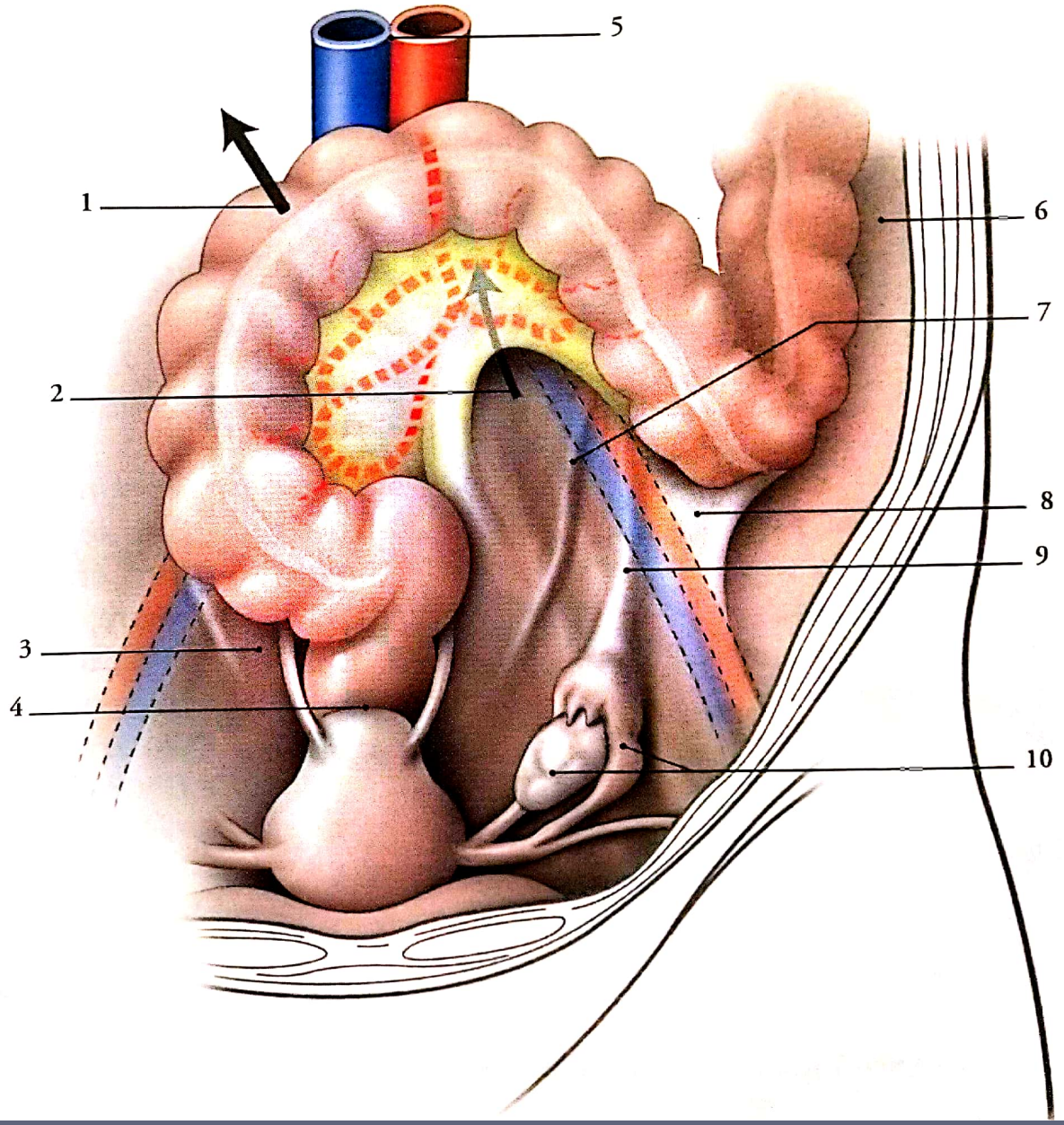
- Begins around the superior aperture of the pelvis,
- Curves back on itself, and descends into the pelvis (S-shape), can be short or long (longer with age),
- Intraperitoneal (unlike the rectum, ascending and descending colon, which are retroperitoneal),


Type habituel
Type petit, étroit, oblique dans le pelvis
Type formant une boucle sur la droite
Type haut ascendant dans l'abdomen
F. Netter M.D.
© ICON LEARNING SYSTEMS

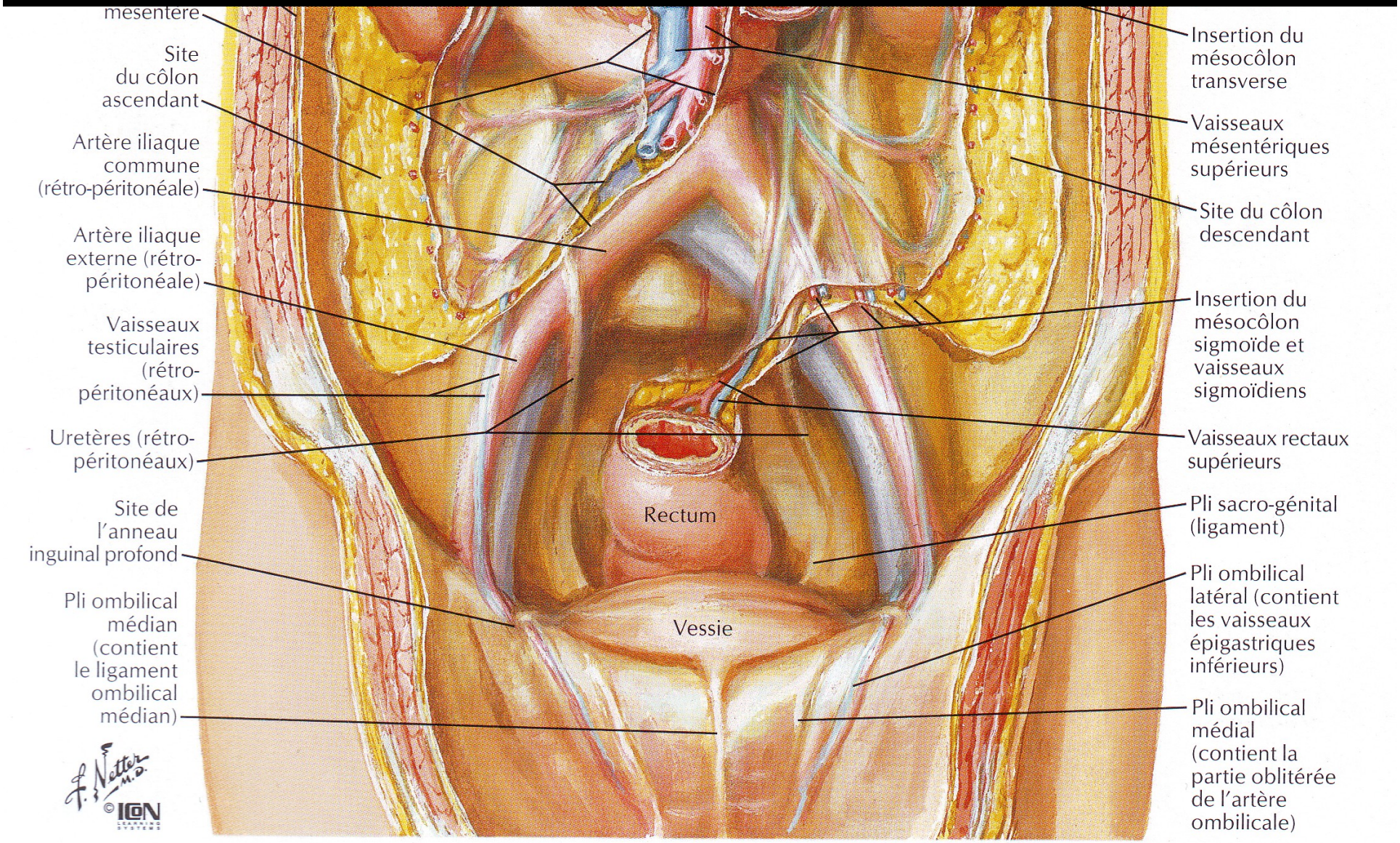
- Covered in mesentery = sigmoid mesocolon, allowing it a range of mobility.
- The lower part of the mesentery is shorter : rectum and descending colon are relatively stable.

FIG. 16.56. Récessus intersigmoïdien
(chez la femme)

1. *côlon sigmoïde relevé*
2. *récessus intersigmoïdien*
3. *fosse pararectale*
4. *cul-de-sac recto-utérin*
5. *v. cave inf. et aorte*
6. *sillon paracolique gauche*
7. *pli de l'uretère gauche*
8. *racine du mésosigmoïde*
9. *lig. suspenseur de l'ovaire*
10. *ovaire et trompe gauches*



- The root of the mesosigmoid colon is an inverted « V » shape,
- The primary root (vertical) goes from S3 to the bifurcation of the left common iliac vessels,
- The secondary root (oblique) follows the psoas or external iliac vessels.


mésentère
Site du côlon ascendant
Artère iliaque commune (rétro-péritonéale)
Artère iliaque externe (rétro-péritonéale)
Vaisseaux testiculaires (rétro-péritonéaux)
Uretères (rétro-péritonéaux)
Site de l'anneau inguinal profond
Pli ombilical médian (contient le ligament ombilical médian)
Insertion du mésocôlon transverse
Vaisseaux mésentériques supérieurs
Site du côlon descendant
Insertion du mésocôlon sigmoïde et vaisseaux sigmoïdiens
Vaisseaux rectaux supérieurs
Pli sacro-génital (ligament)
Pli ombilical latéral (contient les vaisseaux épigastriques inférieurs)
Pli ombilical médial (contient la partie oblitérée de l'artère ombilicale)
Rectum
Vessie
F. Netter M.D.
©IGN

- Receives its blood supply from the two to five sigmoidal branches of inferior mesenteric artery,
- Venous drainage of the sigmoid colon follows the arterial supply (and drained by the inferior mesenteric vein),
- Lymphatic drainage follows the course of the inferior mesenteric vessels.

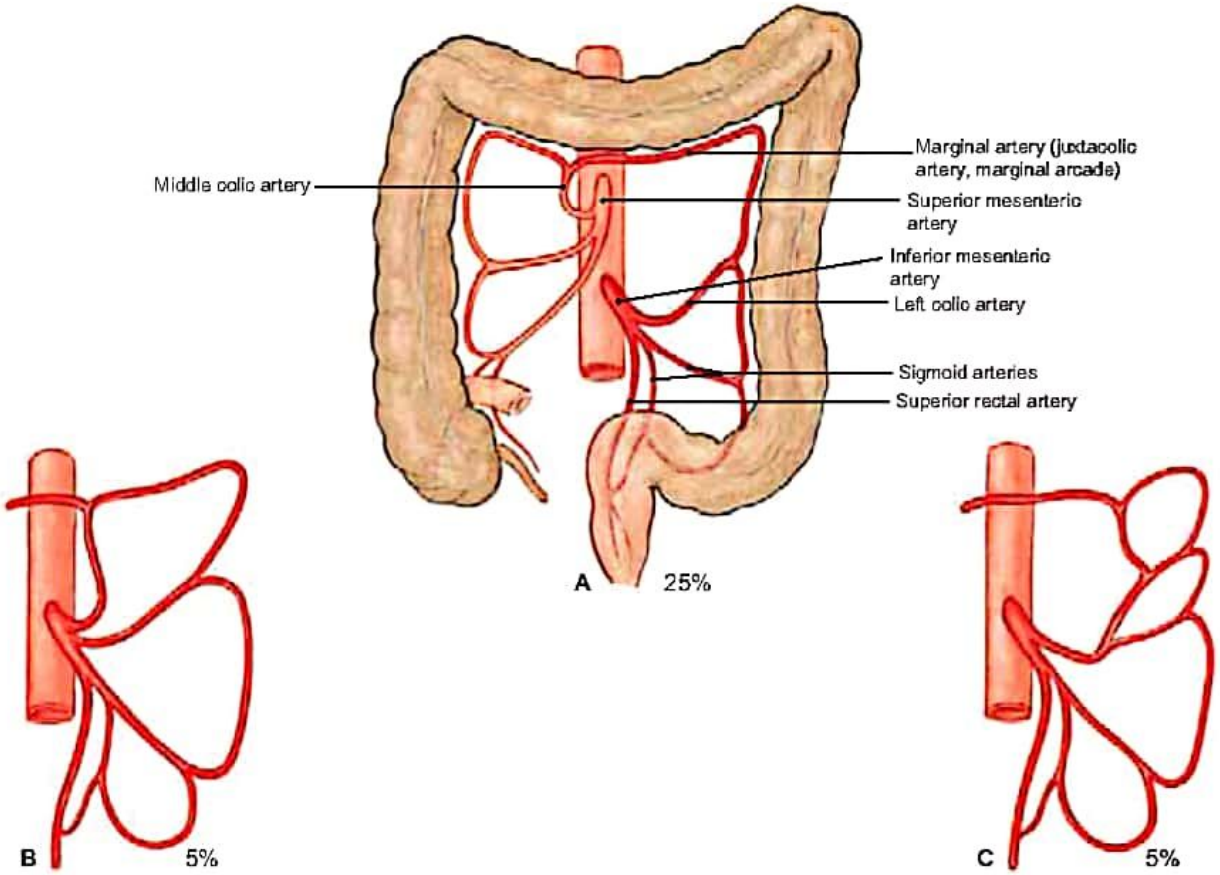


FIGURE 297.2 **Variations in the Branching of the Inferior Mesenteric Artery**

NOTE: (1) Single trunk that divides into three branches (for descending colon, sigmoid colon and rectum);
(2) An accessory middle colic artery branching from the inferior mesenteric artery;
(3) An accessory middle colic artery from the left colic artery. (For "normal pattern," see Fig. 294.)

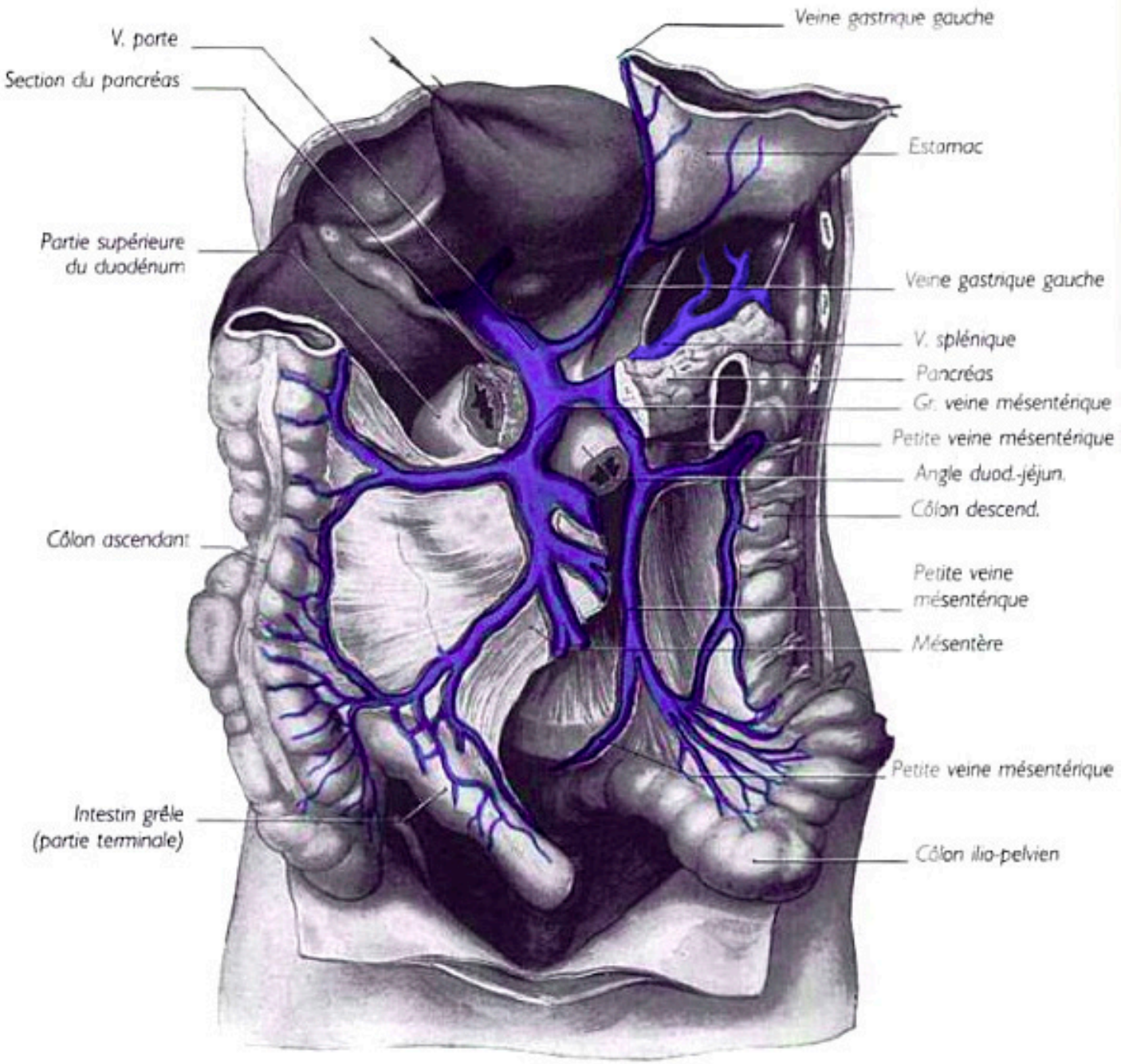


Fig. 156 • Veine porte.

Sigmoid colon in osteopathy

- Sciatic-like pain (radiations in left posterior pelvis, posterior thigh)
- Pain in the left iliac fossa
- Diarrhea

PRACTICE

Tests of the sigmoid colon

- Test of the sigmoid colon :
  - Medial/external

Tests of the sigmoid colon

- Location of the mesosigmoid roots :
  - Primary root : L_4 -> ant face of sacrum (S_2),
  - Secondary root : L_4 -> along the psoas.

Tests of the sigmoid colon

- Test of the roots

Corrections of the sigmoid colon

- Correction of the mobility of the sigmoid :
  - Medial/External.

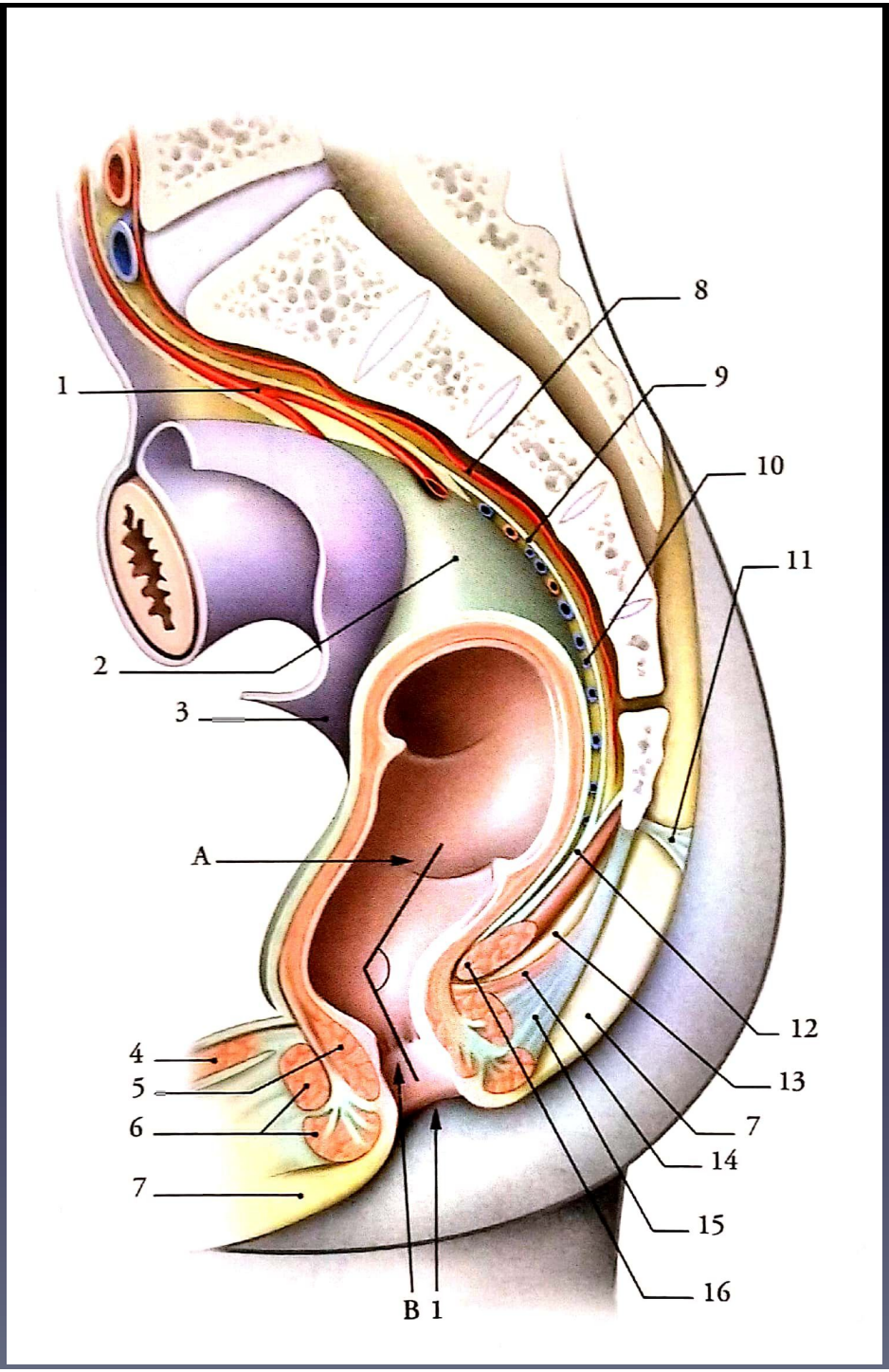
Corrections of the sigmoid colon

- Correction of the mesosigmoid roots :
  - Primary root
  - Secondary root

Rectum

Anatomy

- Continues the sigmoid colon at the height of S3, finishes with the anal canal,
- Anorectal angle : between the rectum and the anal canal,
- About 15 cm long, above the anal margin.


1
2
3
A
4
5
6
7
B 1
8
9
10
11
12
13
7
14
15
16

- Dilatation at the inferior part of the rectum,
- No taeniae coli in the rectal walls : they transform into a continuous layer of longitudinal muscle,
- Some fibers pass from the rectal wall to the perineal body and urethra (rectourethralis muscle),

- The lower 1/3 is below the peritoneum,
- Presence of the rectovesical pouch (men) or Douglas pouch (women),
- The retrorectal space is between the presacral fascia and mesorectum,
- Fixed by the rectovesical fascia (anterior) and lateral ligaments of the rectum

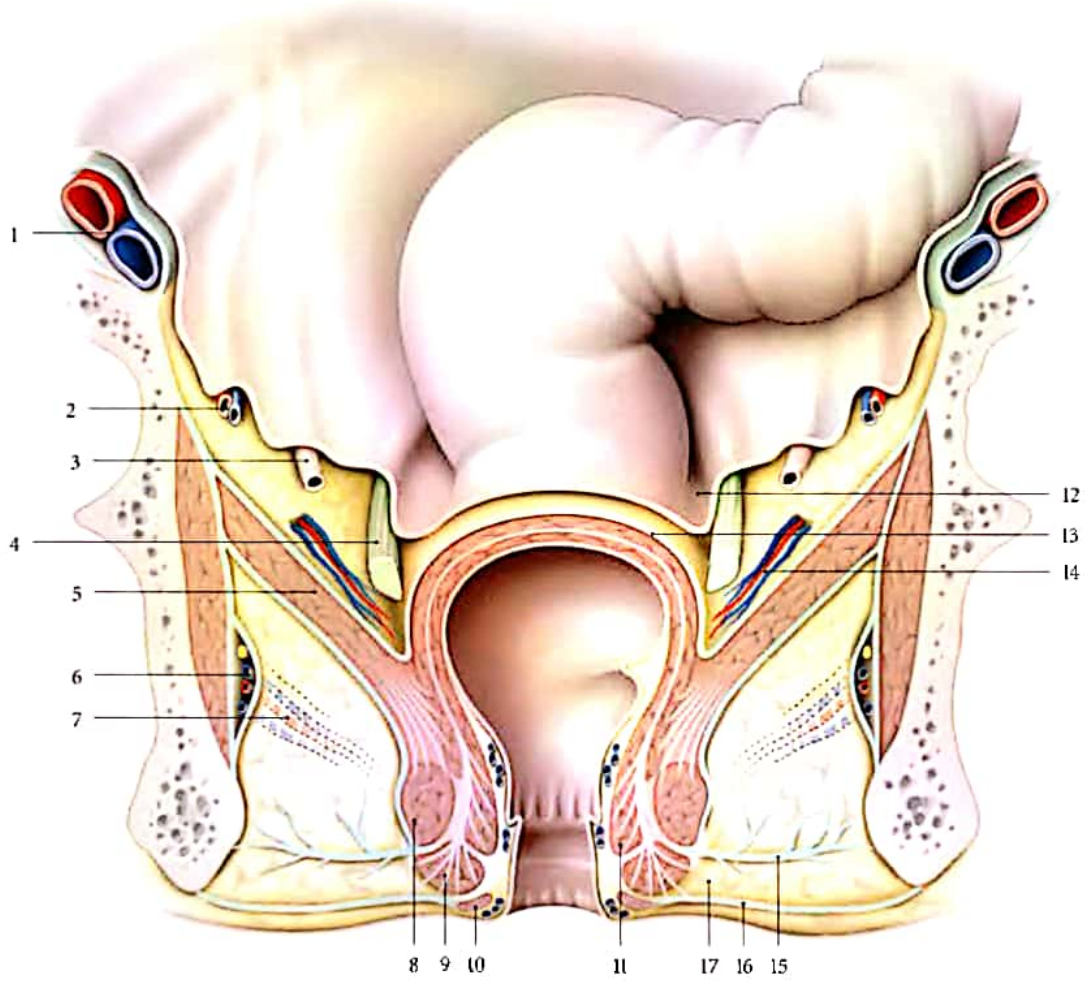


FIG. 16.70. Espaces pelviens et périnéaux postérieurs (coupe frontale du petit bassin féminin)

1. a. et v. iliaques externes
2. vaisseaux ovariques
3. uretère
4. lig. urétro-sacral
5. m. élévateur de l'anus
6. pédicule pudendal dans son canal
7. a. et v. rectales inf. (fosse ischio-rectale)
8. m. sphincter externe de l'anus (partie profonde)
9. m. sphincter externe de l'anus (partie superficielle)
10. m. sphincter externe de l'anus (partie sous-cutanée)
11. m. sphincter interne de l'anus
12. fosse pararectale
13. fascia rectal
14. a. et v. rectales moyennes dans le lig. latéral du rectum (espace pararectal)
15. tractus fibreux de la fosse ischio-rectale
16. fascia périnéal superficiel
17. espace péri-anal

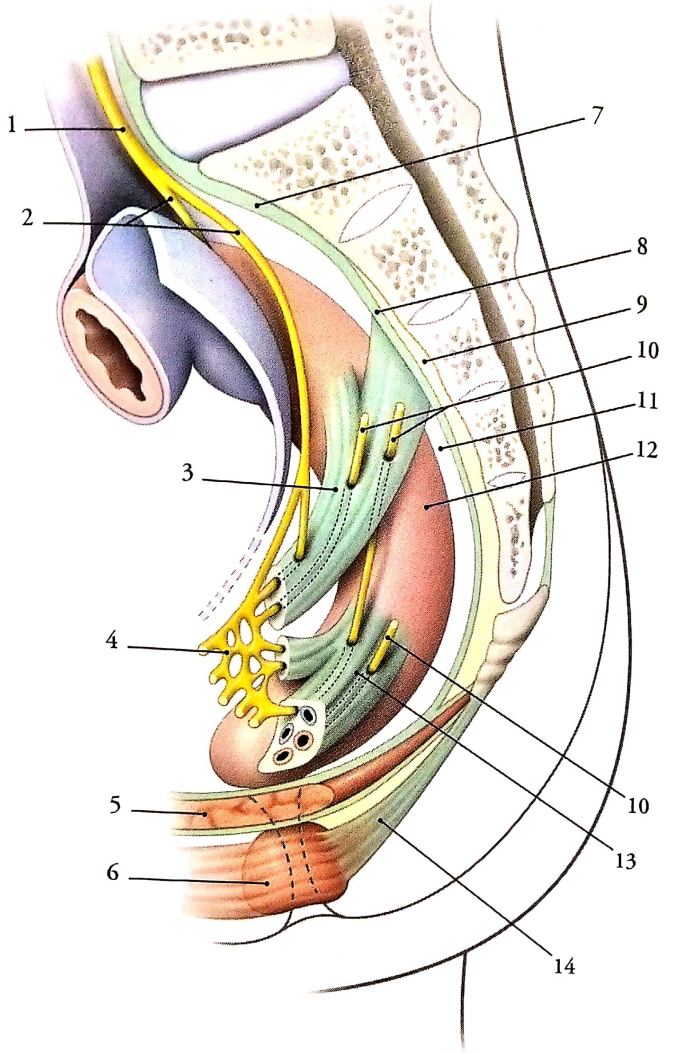


FIG. 16.69 Ligaments du rectum *(schématique)*

1. *n. présacral (plexus hypogastrique sup.)*
2. *nn. hypogastriques*
3. *lig. vésico-rectal (utéro-sacral chez la femme)*
4. *plexus hypogastrique inf.*
5. *m. élévateur de l'anus*
6. *sphincter externe de l'anus*
7. *lig. longitudinal antérieur*
8. *fascia présacral*
9. *espace présacral*
10. *nn. érecteurs*
11. *espace rétrorectal*
12. *rectum*
13. *lig. latéral du rectum*
14. *lig. ano-coccygien*

Arteries :

- Superior rectal artery (inferior mesenteric art.) -> sup. 2/3 of rectum,
- Middle rectal arteries (internal iliac art. or inf. vesical/vaginal art.) through lateral ligaments -> middle 1/3 of rectum,
- Inferior rectal arteries (internal pudendal art.) -> inf. 1/3 of rectum + anal sphincters + anal canal.

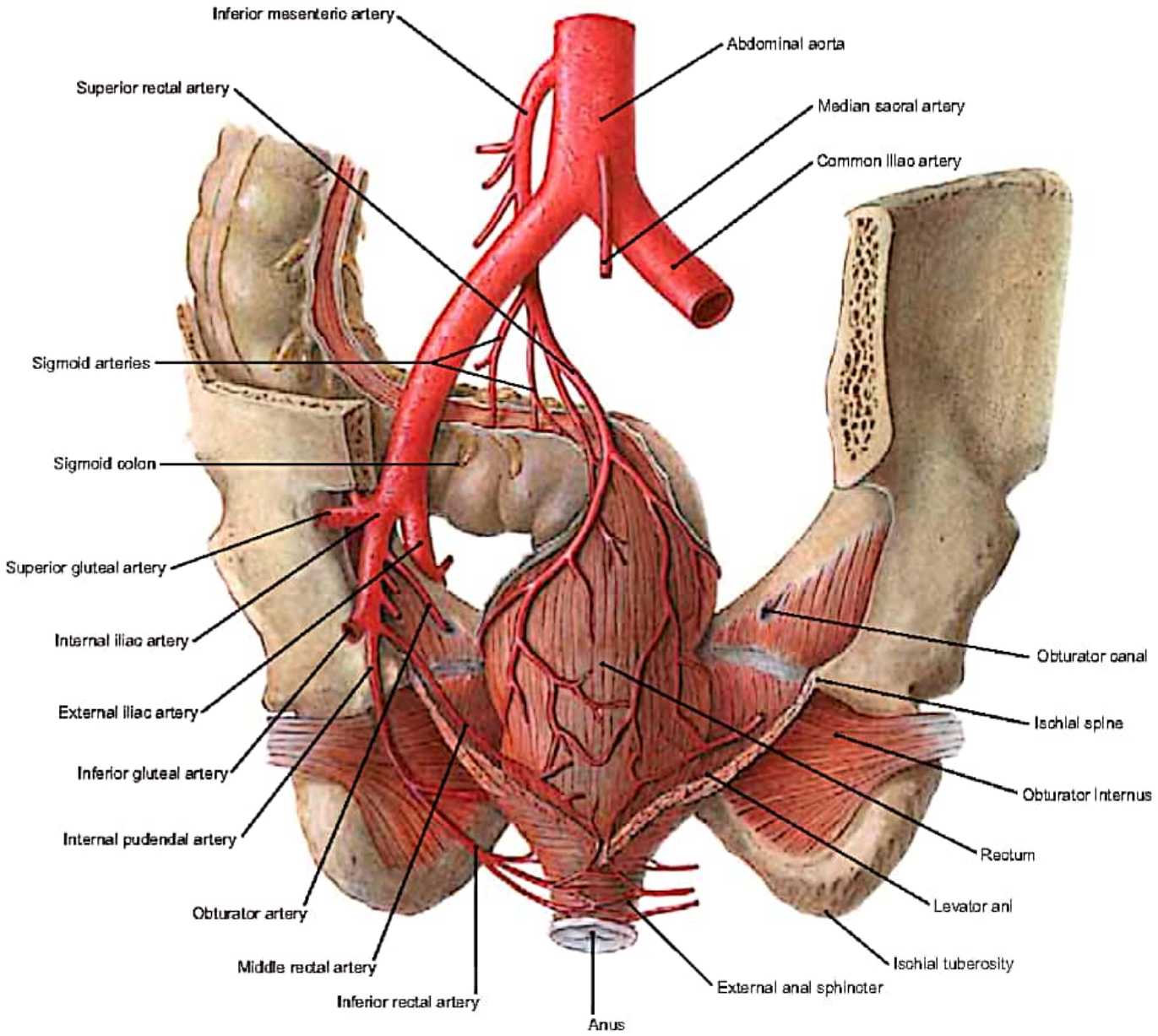


FIGURE 360.1 Arterial Blood Supply to the Rectum (Posterior View)

NOTE: (1) The superior, middle, and inferior rectal arteries form an anastomosis along the entire rectum.
(2) The **superior** rectal artery has an **abdominal source,** the **middle** rectal artery has a **pelvic source,** and the **inferior** rectal artery has a **perineal source.**

Veins : from venous plexus surrounding rectum

- Superior rectal vein -> inferior mesenteric vein (portal system),
- Middle rectal veins -> internal iliac vein,
- Inferior rectal veins -> internal pudendal veins,
- Communication between portal and systemic venous system.

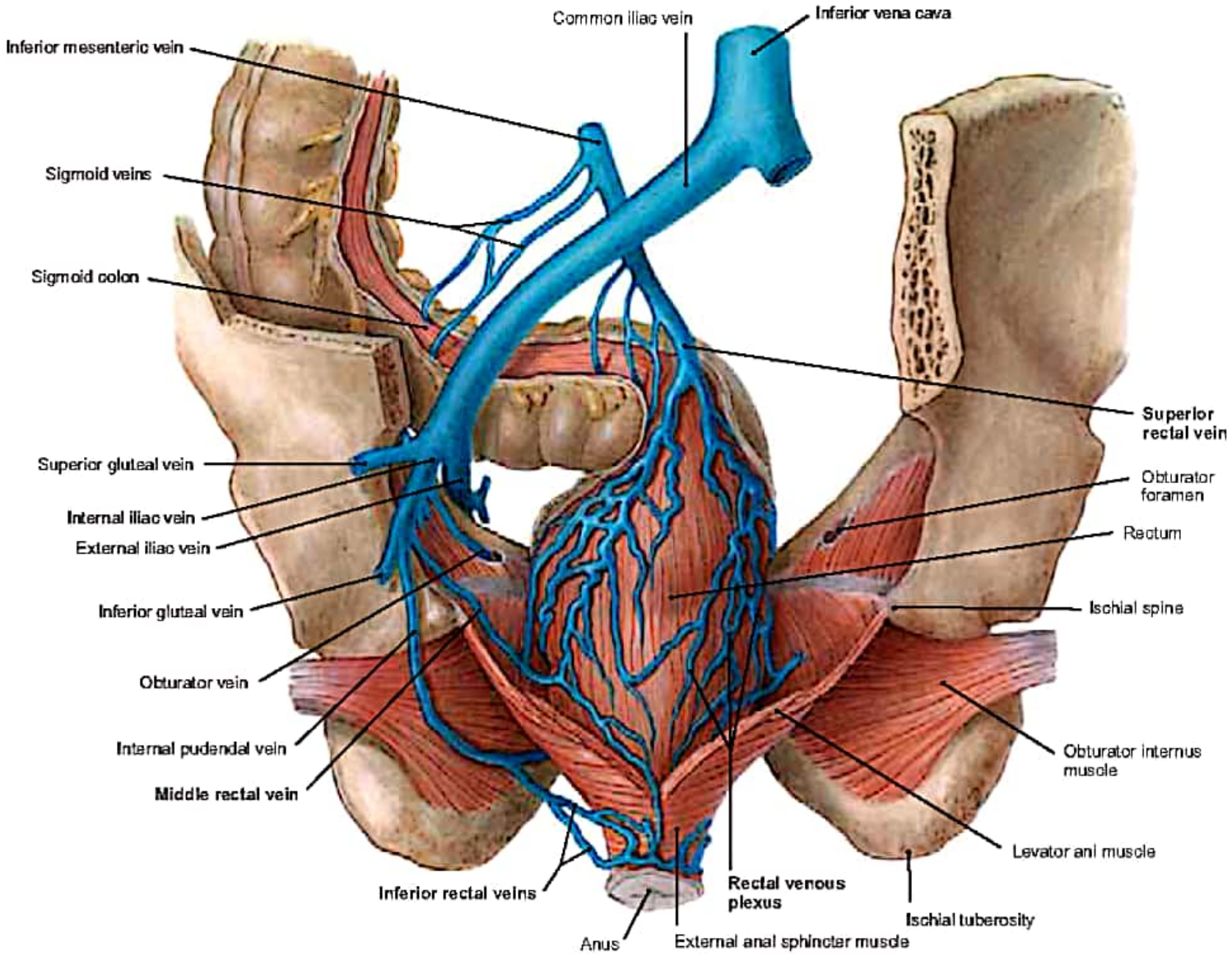


FIGURE 361.1 **Venous Drainage of the Rectum (Posterior View)**

NOTE: Blood from the middle and inferior rectal veins eventually drains into the inferior vena cava, while blood returning from the superior rectal vein drains into the portal circulation by way of the inferior mesenteric vein. This allows a route of **collateral circulation** between these two venous systems.

PRACTICE

Tests of the rectum

- Depending on the symptoms

Corrections of the rectum

- Correction of a rectal ptosis

Physiology of the transit

Colonic Motility: From Bench Side to Bedside.
Editors Sarna SK.
Source San Rafael (CA): Morgan & Claypool Life Sciences; 2010.
Integrated Systems Physiology: From Molecule to Function to Disease.

Infrequently occurring giant migrating contractions (GMCs) produce mass movements. .. Only the GMCs produce descending colon inhibition, which accommodates the large bolus being propelled without increasing muscle tone…

The dysregulation of GMCs is a major factor in colonic motility disorders: irritable bowel syndrome (IBS), inflammatory bowel disease (IBD), and diverticular disease (DD). Frequent mass movements by GMCs cause diarrhea in diarrhea predominant IBS, IBD, and DD, while a decrease in the frequency of GMCs causes constipation.

The transverse colon is a site for stock and mixing [40, 53]…

Movements :

- **Anterograde from the ascending colon,**
- **Retrograde from the descending colon (pressure gradient) [24, 42, 54, 55].**

[24] Moreno-Osset E, Bazzocchi G, Lo S, Trombley B, Ristow E, Reddy S, et al. Association between postprandial changes in colonic intraluminal pressure and transit. Gastroenterology 1989;96:1265-73.

[40] Krevsky B, Malmud LS, D'Ercole F, Maurer AH, Fisher RS. Colonic transit scintigraphy. A physiologic approach to the quantitative measurement of colonic transit in humans. Gastroenterology 1986;91:1102-12.

[41] Kaufman PN, Richter JE, Chilton HM, Keer RM, Cowan RC, Gelfand DW, et al. Effects of liquid versus solid diet on colonic transit in humans. Evaluation by standard colonic transit scintigraphy. Gastroenterology 1990;98:73-81.

[42] Picon L, Lémann M, Flourié B, Rambaud JC, Rain JD, Jian R. Right and left colonic transit after eating assessed by a dual isotopic technique in healthy humans. Gastroenterology 1992;103:80-5.

[44] Proano M, Camilleri M, Phillips SF, Brown ML, Thomforde GM. Transit of solids through the human colon : regional quantification in the unprepared bowel. Am J Physiol 1990;258:G856-62.

[52] Proano M, Camilleri M, Phillips SF, Thomforde GM, Brown ML, Tucker RL. Unprepared human colon does not discriminate between solids and liquids. Am J Physiol 1991;260:G13-6.

[53] Hammer J, Phillips SF. Fluid loading of the human colon : effects on segmental transit and stool composition. Gastroenterology 1993;105:988-98.

[54] Bazzocchi G, Ellis J, Villanuva-Meyer J, Jing J, Reddy SN, Mena I, et al. Postprandial colonic transit and motor activity in chronic constipation. Gastroenterology 1990;98:686-93.

[55] Cuillerier E, Lémann M, Coffin B, Flourié B, Charles F, Jouët P, et al. Etude de la réponse motrice colique au repas par une méthode scintigraphique simplifiée (résumé). Gastroenterol Clin Biol 1997;21:A117.

[56] Hammer J, Pruckmayer M, Bergmann H, Kletter K, Gangl A. The distal colon provides reserve storage

The descending colon is a simple tube [40, 44, 53].

The rectum and sigmoid colons would be a **brake** for the transit (few studies show that) [40, 53, 56].

[40] Krevsky B, Malmud LS, D'Ercole F, Maurer AH, Fisher RS. Colonic transit scintigraphy. A physiologic approach to the quantitative measurement of colonic transit in humans. Gastroenterology 1986;91:1102-12.
[41] Kaufman PN, Richter JE, Chilton HM, Keer RM, Cowan RC, Gelfand DW, et al. Effects of liquid versus solid diet on colonic transit in humans. Evaluation by standard colonic transit scintigraphy. Gastroenterology 1990;98:73-81.
[42] Picon L, Lémann M, Flourié B, Rambaud JC, Rain JD, Jian R. Right and left colonic transit after eating assessed by a dual isotopic technique in healthy humans. Gastroenterology 1992;103:80-5.

[52] Proano M, Camilleri M, Phillips SF, Thomforde GM, Brown ML, Tucker RL. Unprepared human colon does not discriminate between solids and liquids. Am J Physiol 1991;260:G13-6.
[53] Hammer J, Phillips SF. Fluid loading of the human colon : effects on segmental transit and stool composition. Gastroenterology 1993;105:988-98.
[54] Bazzocchi G, Ellis J, Villanuva-Meyer J, Jing J, Reddy SN, Mena I, et al. Postprandial colonic transit and motor activity in chronic constipation. Gastroenterology 1990;98:686-93.
[55] Cuillerier E, Lémann M, Coffin B, Flourié B, Charles F, Jouët P, et al. Etude de la réponse motrice colique au repas par une méthode scintigraphique simplifiée (résumé). Gastroenterol Clin Biol 1997;21:A117.
[56] Hammer J, Pruckmayer M, Bergmann H, Kletter K, Gangl A. The distal colon provides reserve storage

« Recto-esophagogastric reflex »

Int J Surg Investig. 2000;1(5):373-9.
Esophageal and gastric motile response to rectal distension with identification of a recto-esophagogastric reflex.
Shafik A1, El-Sibai O.

Rectal distension -> contraction of the pylorus and inferior esophageal sphincter + relaxation of the stomach and esophagus = slowing down the emptying of the stomach.

Link between rectum and stomach/esophagus dysfunctions ?

PMID: 11341593 [PubMed - indexed for MEDLINE]

Int J Surg Investig. 2000;1(5):373-9.

Esophageal and gastric motile response to rectal distension with identification of a recto-esophagogastric reflex.

Shafik A[1], El-Sibai O.

To investigate the effect of rectal distension with a balloon simulating fecal mass, on the motile activity of the esophagus and stomach

CONCLUSION:

Lower esophageal and pyloric sphincter contraction and esophageal and gastric relaxation during rectal distension appear to delay gastric emptying ... reflex which we call "recto-esophagogastric reflex". It is suggested that rectal lesions or dysfunction might disturb the esophageal or gastric motility and vice versa. The reflex may therefore prove to be of significance in the diagnosis of such disorders.

PMID: 11341593 [PubMed - indexed for MEDLINE]

Sphincters of the colon

Sphincters of the colon

- Many sphincters along the colon,
- Physiological, real… anatomists divergences,
- Important for the peristaltis of the feces.

- From the caecum to the rectum :
  - Busi,
  - Hirsch
  - Cannon’s point
  - Payr
  - Balli
  - Moutier-Rossi
  - Moutier

Busi

Busi

Cannon's point

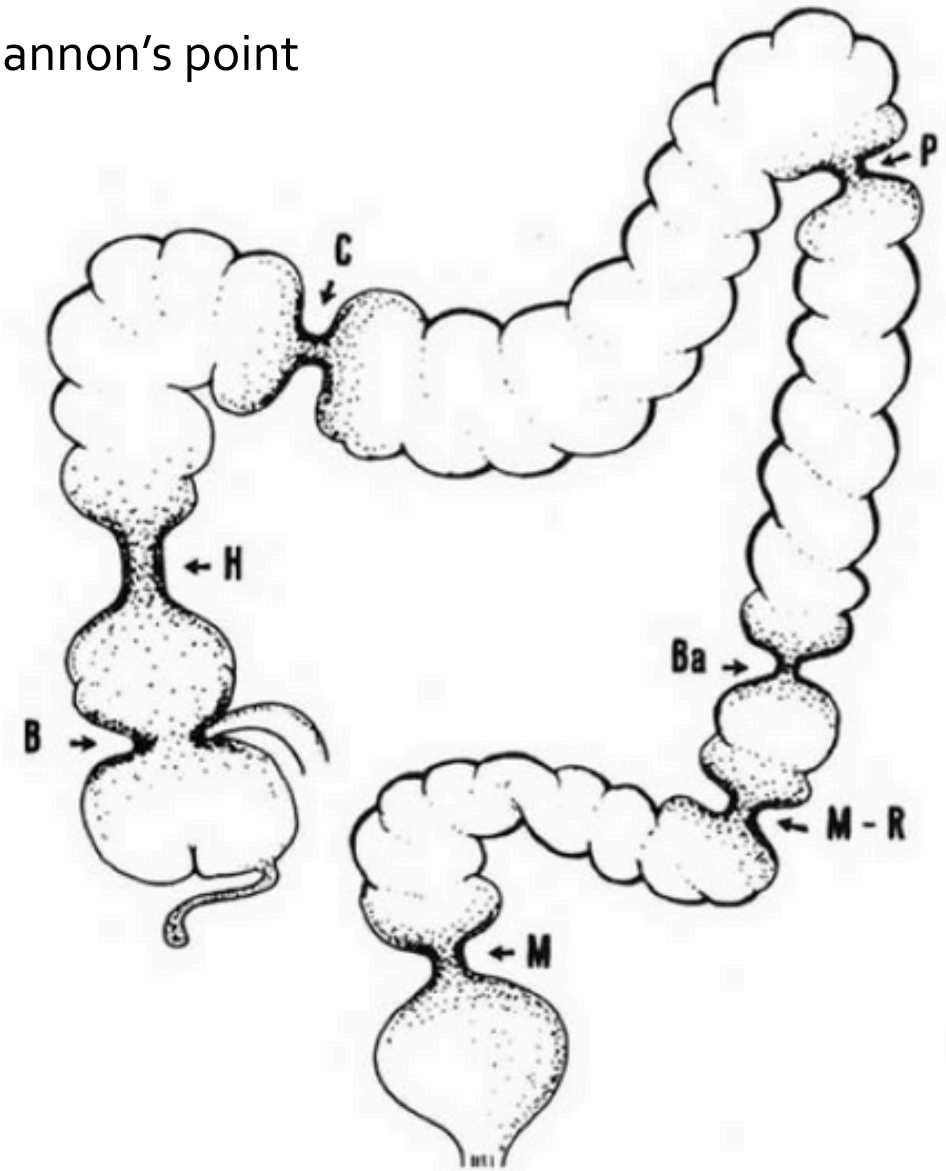


Fig. 11. Pseudo-sphincters of the colon. From the rectum towards the cecum: Moutier, Moutier-Rossi, Balli, Payr, Cannon, Hirsch and Busi sphincter

A functional colonic obstruction: Cannon's point Scott T. McKnight, MD; Andrew Myers, MD; Cherie L. Canon, M; and Mary Hawn, MD Radiology Case Reports Volume 6, Issue 4, 2011

(Dr. Cannon using X-rays in 1896)

… Area of narrowing in the midtransverse colon, consistent with
Cannon's point. This represents a physiologic sphincter with focal
narrowing of the colon lumen…

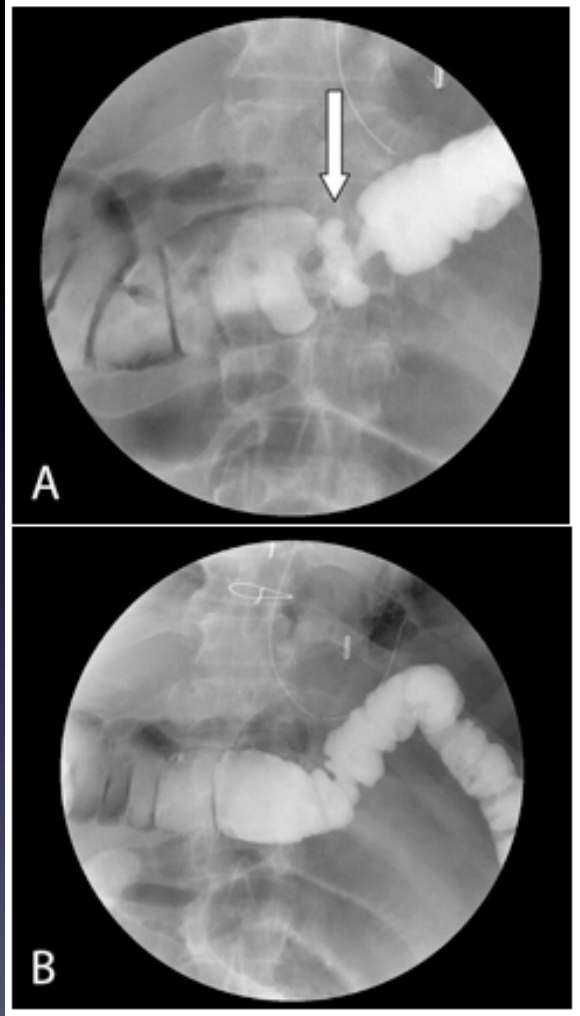
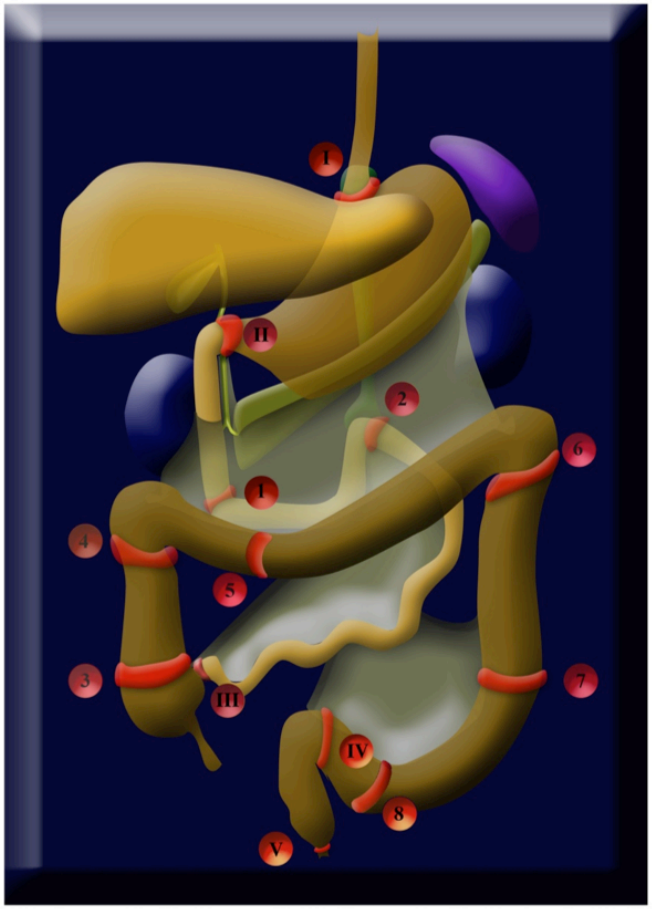


Figure 2. Water-soluble contrast enema shows a focal area of narrowing (white arrow) in the transverse colon with minimal passage of contrast into the proximal colon. (A) reveals an annular narrowing. After a period of time and increased contrast administration, the narrowing opened to a nearly normal caliber (B).

Corrections of the sphincters

Begin from the end (sigmoid)



Tube digestif: sphincters

physiologiques et anatomiques

I. Cardia
II. Pylore
III. Sphincter de Bauhin
IV. Angle sigmoïde distal
V. Anus

1. Angle D2-D3
2. Angle duodéno-jéjunal
3. Caecum
4. Angle colique droit
5. Sphincter transverse
6. Angle colique gauche
7. Angle sigmoïde proximal
8. Angle sigmoïde médian

End