UNIVERSITY OF LEEDS

Exploring Anatomy: the Human Abdomen

An advanced look at the disposition of viscera transcript

Welcome to this video for exploring anatomy, the human abdomen. This video is going to outline the disposition of the abdominal viscera.

So let's start off by drawing out the approximate location of the diaphragm. The diaphragm separates the thoracic cavity above from the abdominal cavity below. And here, we've got the right dome of the diaphragm.

Over here, we've got the right side of the abdomen. And over here, we have the left dome of the abdomen. So here, we got the left side of the abdomen.

We're drawn a small, little aperture in here. And that's where we'll begin with the gastrointestinal tract.

So passing through the diaphragm at approximately the level of the 10th thoracic vertebra, we have the oesophagus passing through the oesophageal hiatus. So here's the oesophagus And the oesophagus is then continuous with the stomach. So we can draw out the fundus of the stomach. We've got the greater curvature. And then it narrows down into the pyloric canal. So here, we can draw out the stomach.

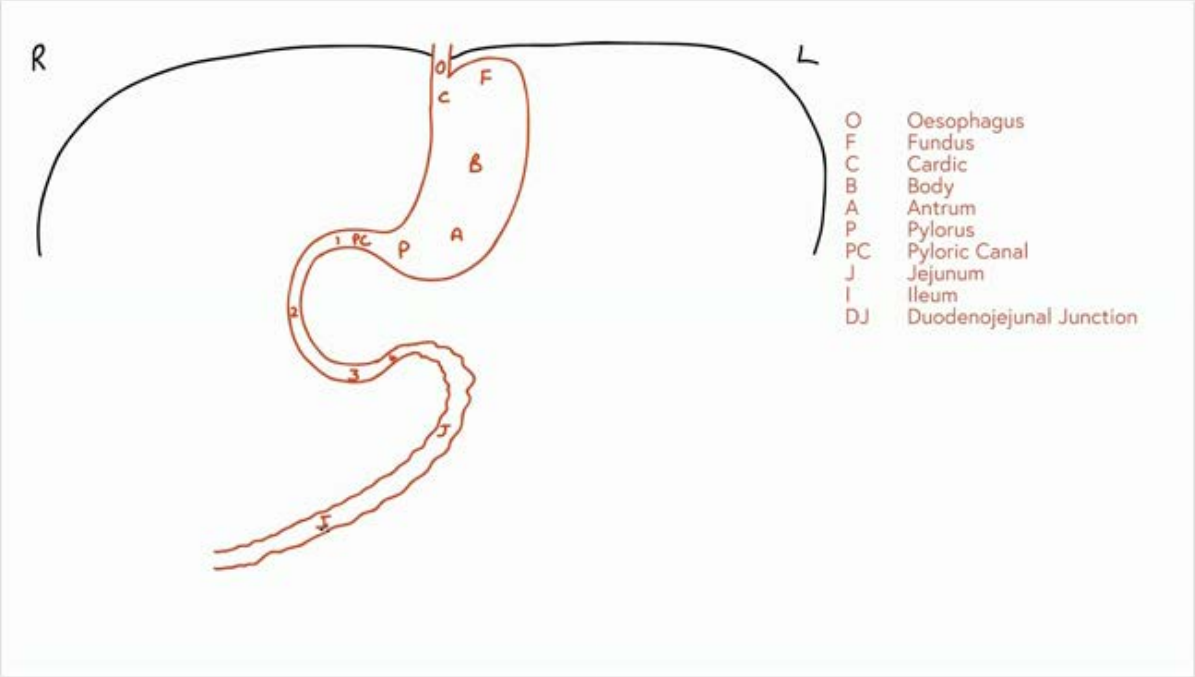
And we can recognise the fundus that lies above the oesophageal-gastric junction. Here we got the cardiac region of the stomach. Here we've got the body. We've got the antrum. We've got the pylorus. And here we've got the pyloric canal.

The pyloric canal is going to be continuous with the first part of the small intestines. The first part of the small intestine is duodenum. This is a retro-peritoneal C-shaped tube that runs around the head of the pancreas, which we'll draw in moment. And we've got four parts of the duodenum.

We've got a superior portion. We've got a descending second portion. We've got a horizontal third portion. And then we have a slightly ascending fourth portion. And this just runs to the left of the third lumbar vertebra.

The fourth part of the duodenum is continuous with the jejunum. The jejunum being the second part of the small intestine. And the jejunum then runs towards the right iliac fossa, where it gradually becomes the ileum. And the ileum is then continuous with the beginnings of the large intestine at the caecum.

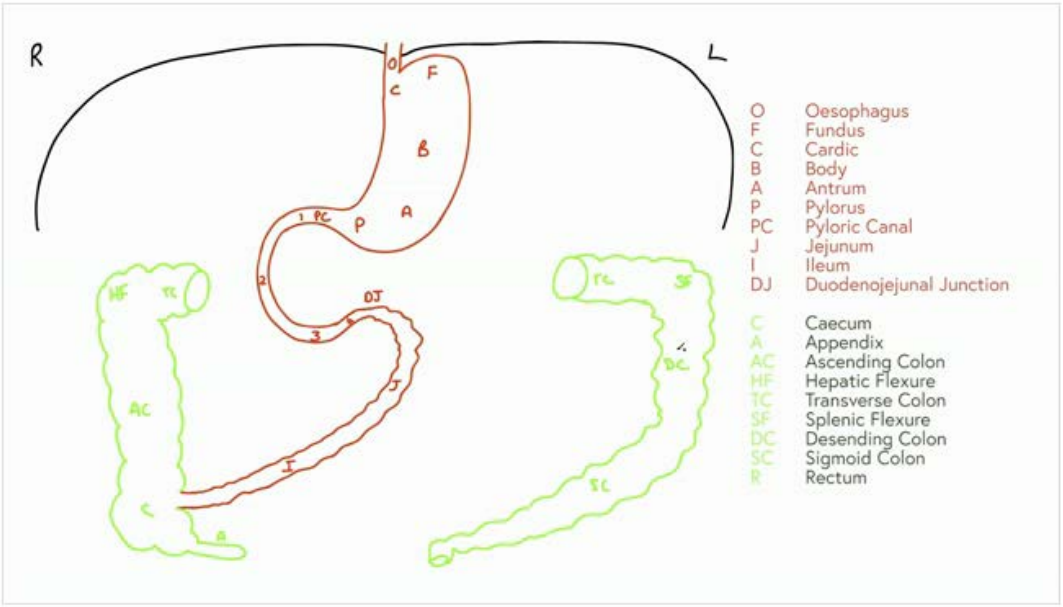
So here we've got the jejunum and we've got the ileum There's no demarcation between the jejunum and the ileum. There's just those characteristic differences that you should be aware of.



There's a junction between the duodenum and the jejunum. And that is the duodenojejunal junction. And that's supported by a slip of muscle. And there's the ligaments of Treitz. And that helps to open up the jejunum, allowing food to pass through. We'll come back to how the jejunum limb is suspended by mesentery later on.

So here we can see the ileum. And the ileum is going to run into the caecum. And the caecum is a dilated saccule-shaped pouch of the large intestine. So here, we can see the caecum. So here we've got the ileocaecal junction, where the ileum joins the caecum. And projecting away from the caecum, we have this finger-like projection, which is the appendix.

If we then go up from the caecum, if we travel superiorly towards where the liver will be-- and we'll draw the liver in this space in a moment-- then we have the ascending colon. And the ascending colon then turns left and becomes the transverse colon. So here we can see the ascending colon, the various haustra, those pouches. And then here, that's what's known as the hepatic flexure. The ascending colon turns to the left and becomes the transverse colon. I've sectioned the transverse colon here because if we drew it intact, then it would obscure the rest of the image.



We can then pick up the other side of the transverse colon over on its left-hand side. And we carry on with the transverse colon. And then the transverse colon becomes the descending colon at the splenic flexure. So here, we've got the splenic flexure where the transverse colon becomes the descending colon.

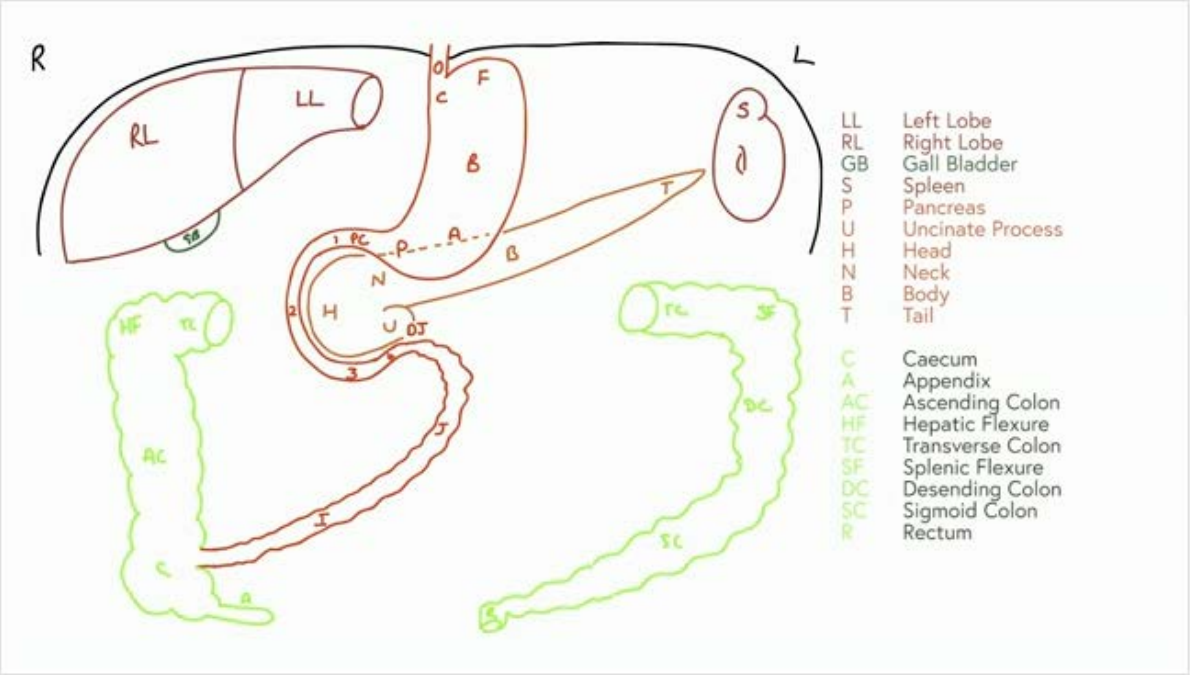
The descending colon is then going to form the sigmoid colon and the sigmoid colon that runs down into the pelvis. So here, we can see the sigmoid colon. And then the sigmoid colon is going to give rise to the rectum. And the rectum then becomes the anus. And that passes through the pelvis.

So here we can see the entire length of the gastrointestinal tract, from the oesphagus, through the stomach, duodenum, duodenojejunal junction, the jejunum, the ileum. And then we've got the large intestines, the caecum, ascending colon, transverse colon, descending colon, sigmoid colon. And then we have the rectum down here.

So now let's draw in a few important accessory organs. And up in this righthand region, in the right hypochondrium, we have the liver. And we can draw out the liver here. So here, we can see the liver. I won't draw it all out. I won't draw the left tip of the left lobe as that would obscure the stomach. Here we have the left lobe of the liver separated by the sagittal fissure on the anterior diaphragmatic surface. And here's the right lobe.

We could also see, just creeping on the underside of the liver, we've got the gallbladder. So here we can see the gallbladder here. And now, we can see why this turn of the ascending colon to the transverse colon is known as the hepatic flexure. So, the right lobe of the liver, the left lobe of the liver. And here we've got the gallbladder.

If we now go over to the left hypocondronium, we can see we've got another organ. And this organ is the spleen. And the spleen is in contact with a final organ I want to draw in, which is the pancreas.



And here we can draw the pancreas. So we can have the uncinate process of the pancreas and then we can have the head. The head fills the concavity of the duodenum. And then it passes posterior to the stomach. So I'll draw it by these dotted lines. So then it runs towards the hilum of the spleen.

So here we can draw that leaf-shaped pancreas. We've got the uncinate process. We've got the head. We can draw the neck.

Here, we've got the body. And then here we've got the tail, the tail of the pancreas passing towards the hilum of the spleen. And we can see the hilum of the spleen just here, where the blood vessels pass in and leave the spleen.

So now, lets draw a series of mesenteries, omenta, and various peritoneal ligaments that we can see on this diagram. They're connecting various pieces of organs to one another or connecting organs to the body wall.

So let's start off with the mesentery. Now, the mesentery is a double layer of peritoneum that's reflected from the posterior abdominal wall. And it passes towards the small intestines, specifically the jejunum and the ileum, and wraps around them, so suspending the jejunum and the ileum within the peritoneal cavity.

The root of the mesentery extends from the duodenojejunal junction to the ileocecal junction. And we can see this blue line is indicating the root of the mesentery. And then it just passes towards the jejunum and the ileum. So here, we can see the mesentery passing towards the jejunum and ileum.

Running through the mesentery are going to be branches of the superior mesenteric artery. And this is where those arcades and straight arteries are formed that go on to supply the jejunum and the ileum. So here we have the mesentery. So we have the mesentery.

If we then look at some other mesentery, we can see that the transverse colon and the sigmoid colon are two pieces of the colon that have a mesentery. The other portions of the large intestines do not. So we could just draw out a small section of the transverse mesocolon here.

And the root of the transverse mesocolon actually runs alongside the anterior surface of the pancreas. So, I won't draw that in here. But we can appreciate that we have a transverse mesocolon that's suspending the transverse colon.

We also have sigmoid mesocolon. And that is suspending the sigmoid colon. And obviously because these organs have a mesentery, they become highly mobile. So the jejunum here and the ileum are mobile because they're suspended by the mesentery. And the transverse colon and the sigmoid colon are mobile because they have the transverse mesocolon and they have the sigmoid mesocolon suspending them.

Now if we go up towards the stomach, then we need to draw some important layers of peritoneum that are reflected from the stomach. And these are called omenta. We have a greater omentum. And we have a lesser omentum.

The greater omentum is that apron-like layer of peritoneum that drapes down from the greater curvature of the stomach and covers the small intestines. Now, again, I won't draw all of that out or it's going to obscure the diagram. But we can draw out some parts of it.

Now, the greater omentum can be split into three peritoneal liagments. This is a remnant of the dorsal mesentery. And it has connections that run from the stomach to the diaphragm. So here we can see part of that greater omentum that's running from the stomach to the diaphragm. And this is the gastrophrenic ligament of the greater omentum.

We also have a layer that passes towards the spleen. And this is known as the gastrosplenic ligament, which we can draw in here. So all of these layers of peritoneum are continuous. And here we can have the gastrosplenic ligament coming from the greater curvature of the stomach.

And then we have the gastrocolic ligament. The gastrocolic ligament is the main part of the greater omentum. And this gastrocolic ligament runs from the greater curvature of the stomach. It runs all the way down, in front of the small intestine. And then it curves back on itself to run over the

superior surface of the transvese colon and then blends with the layers of the transverse mesocolon, as it passes towards the posterior abdominal wall. And this is the gastrocolic ligament.

So gastrophrenic, gastrosplenic, and gastrocolic ligaments form the greater omentum. The spleen is therefore suspended within the abdominal cavity by the gastrosplenic ligament and also by a ligament that runs from the spleen to the posterior abdominal wall. And we can see that this ligament is known as the lienorenal ligament. It's running from the hilum of the spleen towards the posterior abdominal wall, the lienorenal, sometimes called the splenorenal.

It contains the splenic blood vessels, the splenic artery and the splenic vein. And it also contains the tail of the pancreas, which is why the tail of the pancreas runs into the hilum of the spleen.

So the spleen is suspended from the gastrosplenic ligament from the stomach and then anchored to the posterior abdominal wall, in line with the kidney, which is where we get those renal parts of the lienorenal ligament. And this lienorenal ligament suspends the tail of the pancreas.

Although the pancreas is retroperitoneal, its tail is actually covered by peritoneum So there's interperitoneal parts of it.

If the spleen was to enlarge, called splenomegaly, then it would actually enlarge diagonally across the abdomen. It wouldn't descend down this lefhand side. And that's because of a ligament that extends from the transverse colon at the splenic flexure to the diaphragm.

And here, we can draw the phrenicocolic ligament, a ligament that's running from the splenic flexure of the colon to the diaphragm. So the phrenicocolic ligament prevents the spleen from descending inferiorly.

So we've looked at the greater omentum. Now, let's turn to the lesser omentum. The lesser omentum is a remnant of the ventral mesentery. And remember ventral mesentery passed from level of the stomach in the proximal part of the duodenum to the anterior abdominal wall. It had the liver developed within it.

And we still have a remnant of that ventral mesentery. We have a double layer of peritoneum that's passing from the liver towards the duodenum and the stomach, the lesser curvature of the stomach specifically. And this is known as the lesser omentum.

So here, we can draw out the lesser omentum passing from the liver towards the proximal part of the duodenum and the lesser curvature of the stomach. This is the lesser omentum. We can be a bit more specific with the lesser omentum, just like we were with greater omentum. And we can divide it into two portions.

The part that's running from the liver to the stomach, so this portion here, running from the liver to the stomach, this can be known as the hepatogastric ligament. Running from the liver to the stomach, the hepatogastric ligament. The part of the lesser omentum that's running from the liver to the duodenum can be known as the hepatoduodenal ligament.

And this hepatoduodenal ligament just here forms the free edge of the lesser omentum. And this free edge is thickened because within it runs the portal triad. The portal triad containing the bile duct, the hepatic portal vein, and the hepatic artery. So here, we have the hepatoduodenal ligament, part of the lesser omentum, running from the liver to the duodenum.

And the hepatoduodenal ligament is important as it marks the free edge of lesser omentum. The free edge forming because the ventral mesentery didn't extend down the entire length of the gastrointestinal tract, like the dorsal mesentery did. It stopped at the level of proximal duodenum. And that means that there's a foramen here-- there's a space that is the epiploic foramen, which will

allow fluid or puss to pass from the greater sac, which is lying anterior to the stomach, to the lesser sac, which is posterior to the stomach.

So a finger can be passed from the greater sac, posterior to the portal triad, posterior therefore to the hepatoduodenal ligament, and enter into the lesser sac. And this is the epiploic foramen.

The ventral mesentery, as I said, ran from the stomach and the proximal parts of the duodenum to the anterior abdominal wall. And the liver developed within it. So we can still see a remnant of that ventral mesentery passing from the liver to the anterior abdominal wall. And this is known as the falciform ligament.

So, it's coming from this sagittal fissure on the diaphragmatic surface of the liver. And we can see here we've got the falciform ligament, a double layer of peritoneum that is running from the anterior abdominal wall to the liver. These two layers of peritoneum will then split and cover the right lobe and the left lobe.

And what happens when they get to the superior surface of the liver is they're reflected and they run towards the diaphragm. And this forms one of the liver's coronary ligaments. And this is known as your anterior coronary ligament.

So, the layer of peritoneum that's sweeping over the lobes of the liver is reflected from the liver's surface through the diaphragm. And this is known as the anterior coronary ligament.

We have a posterior coronary ligament where peritoneum on the posterior surface of the liver is reflected onto the diaphragm. And the space between those two coronary ligaments is known as the bare area. It's where the liver isn't covered by peritoneum.

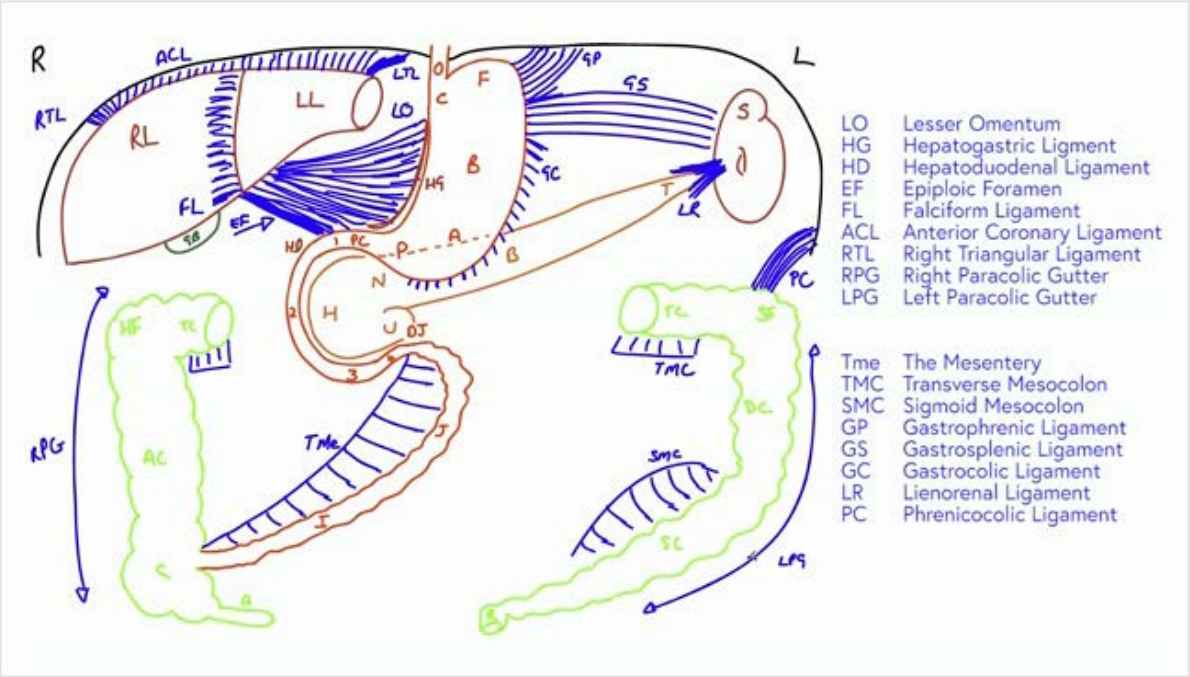
So here, we have the anterior coronary ligament. It forms thickenings at its most left extreme and its far right extreme. And these are known as the right triangular ligament and the left triangular ligament. So here, we can see the coronary ligament and the triangular ligament.

If we just return to the falciform ligament once again, that I mentioned that the lesser omentum has a thickening free edge. And so the falciform ligament also has a thickened free edge. And this contains the ligament arteries. This is the fibrosed umbilical vein, which was taking oxygen into the blood from the placenta from the mother into the foetus.

So just before we finish, I just want to mention how fluid can pass throughout the abdominal cavity. And we need to draw in what are known as paracolic gutters.

So here, we have the right paracolic gutter-- right paracolic gutter. And that's running lateral to the ascending colon. And here, we have the left paracolic gutter. And that's running lateral to the descending colon-- the left paracolic gutter.

These allow free fluid or puss to pass around the abdomen. Free fluid in this right paracolic gutter can pass from the infracolic region down into the hepatorenal recess between the liver and the kidney. So it can pass in this direction. And the left paracolic gutter can allow free fluid and pus to pass down lateral to the descending colon and into the pelvis. It can't pass superiorly because of the phrenicocolic ligament.



[end of transcript]