

ROTATION OF THE INTESTINE.

Normal rotation takes place around the superior mesenteric artery (SMA) as the axis. It is described by referring to 2 ends of the alimentary canal, the proximal duodenojejunal loop and the distal cecocolic loop, and is usually divided into 3 stages.

In stage 13, 32 days, the midgut begins to extend into the umbilical coelom and forms the umbilical loop, whereby initially from the apex only a wide connection to the umbilical vesicle exists. In the further development, this junction becomes constricted to become the omphalomesenteric duct. Mostly it is later obliterated, but can also partially remain as a MECKEL's diverticulum. In the beginning, stage 13, 31 days, the umbilical loop is positioned sagittally.

Only when the umbilical loop lengthens and grows into the umbilical coelom does it experience a rotation of 90 degrees in a clockwise direction as seen from the embryo. The cranial pedicle comes to lie to the right and the caudal to the left (Stage 14, 33 days). The umbilical loop now has a horizontal position. Through the cranio-caudal growth gradient, the cranial pedicle forms first through lengthening of several of loops in the umbilical coelom.

As development proceeds the intestinal loop turns further around its own axis. In stage 18, 44 days, the extension of the intestinal loop into the umbilical coelom has reached its maximum. This physiologic navel hernia remains in existence up to the 9th week of pregnancy. (OMPHALOCELE HERNIA).

At first the loops of the small intestine returns into the abdominal cavity and come to lie in the half left surrounded by the horizontal and descending part of the colon that never left the abdominal cavity. The repositioning of the physiologic umbilical hernia is facilitated by the righting of the embryo's body.

In stage 20, 49 days. After the reintegration of the intestinal loops into the abdominal cavity from the physiologic umbilical hernia, the derivatives of the originally caudal pedicle occupies the upper and ventral part of the abdominal cavity. At the end of the embryonic period this part migrates downwards into the iliac fossa, whereby an additional rotation occurs. The whole rotation of the intestines thus amounts to approximately 270 degrees. As a consequence, the mesenterium also turns with it and in its insertion it crosses over the inferior part of the duodenum. (stage 23, 56 days) As a rule the cecum grows caudally and comes to lie in the right iliac fossa. Through rotation of the whole small intestine of more than 270 degrees the mesenterium also rotates thereby and moves off from the posterior wall over the inferior part of the duodenum to the small intestine.