

**'Keep your head cool, the feet warm & fine,
and don't overstuff the intestine'.**

Herman Boerhaave (1720)



7. INTESTINUM

7.10. OSTEOPATHY INTESTINUM

Biomechanics (Mobility) Intestinum

Small bowel mobility is linked to breathing and abdominal hypertension / hypotension. The fascia are anti-gravitationally directed to the liver (Glenard's compartments).

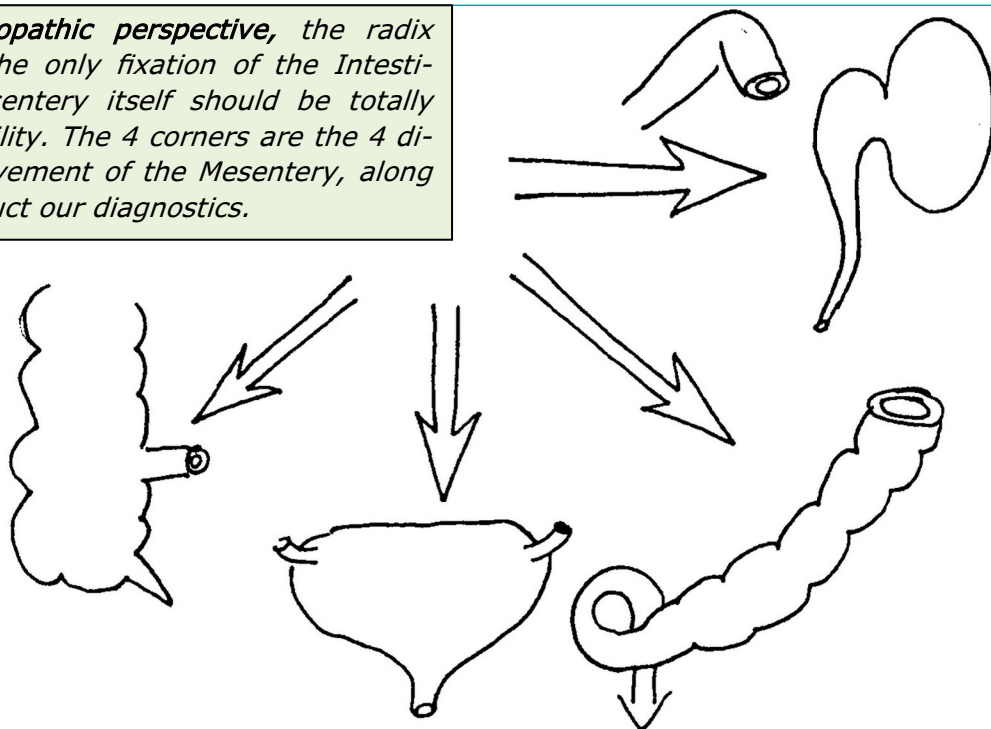
This fascial system has four main directions, to the four corners of the small intestine package:

- Renal zone
- Sigmoidal zone
- Vesical zone
- Caecal zone

The mobility of these four zones is directly related to the organs that determine the stability of the small intestine, respectively:

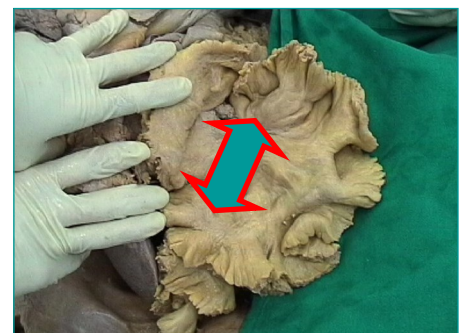
- Left kidney and FDJ (vascular angle of Treitz),
- Sigmoid (3th compartment of Glenard),
- Vesico Urinaria (Urethra, Vagina, Cervix, Ureter) and Rectum.
- Caecum, with ICV, Appendix, etc.

From an osteopathic perspective, the radix Mesentery is the only fixation of the Intestinum. The Mesentery itself should be totally free in its mobility. The 4 corners are the 4 directions of movement of the Mesentery, along which we conduct our diagnostics.



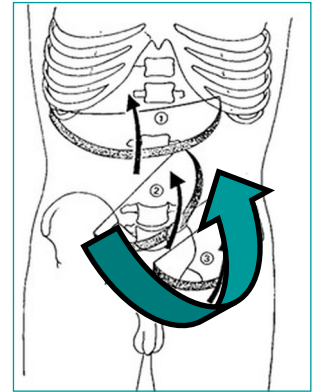
The radix Mesentery is the fixation site for the small intestine and yet also an exchange site. Regarding movements:

- the radix fixates the intestinal mobility,
- the radix integrates the intestinal Vitality (motility).



Vitality (Motility) Intestinum

The Vitality (motility) of the Intestines is the inherent (cellular) movement of the intestine presented in the complexity of the organ. It forms the BBRF (Basic-Body-Rhythmic-Flow) and follows the embryonic rotations, because the fascia (Mesenterium) are oriented in the collagen structure through this development. Embryologically, a 90° rotation counterclockwise (CCW) takes place during herniation and a 180° rotation counterclockwise (CCW) occurs upon return. The Vitality (motility) is thus related to a 270° rotation counterclockwise, in which the resultant is directed anti-gravitationally towards the liver. The Vitality (motility) of the Intestinum is a total movement with the A. Mesenterica Superior as the axis. From ventral perspective, the Intestinum undergoes a CCW rotation.



Remark: The Vitality (motility) can be represented by placing your own righthand on your small intestine and then making a radial abduction (moving the thumb cranially towards the processus Xyphoideus). Note that the total small intestine package (6 meters) can make this movement all, when:

- The angles and loops are free in their mobility.
- The total intestinal package is free towards the posterior wall (Toldt, PPP).

Autonomy (Motricity) Intestinum

The autonomic motricity (ENS) of the Intestinum consists of:

- SWA: Slow Wave Activity (activation with food), average transit takes 3 - 4 hours.
- MMC: Migrating Motor Complex (fasting pattern), arrives in 90 minutes at the ICV.

Nota Bene: both vitality and autonomy both require the free mobility of the Intestinum. Free mobility is therefore the first condition for healthy function.

Intermezzo SWA & MMC:

A Slow-Wave Activity (SWA) is a rhythmic electrophysiological event in the gastrointestinal tract. The normal conduction of slow waves is one of the main regulators of gastrointestinal motility (peristalsis). Slow waves are generated and propagated by a class of pacemaker cells called Cajal's interstitial cells, which also act as intermediators between nerves and smooth muscle cells. Slow waves generated in interstitial cells of Cajal spread to the surrounding smooth muscle cells and control motility. In the Gaster, the frequency is approximately 3 cycles per minute in humans. Intestinal slow waves amount to about 12 cycles per minute in the Duodenum and decrease in frequency to the Colon.

A Migrating Motor Complex (MMC), also known as migrating myoelectric complex, is a pattern of electrical activity observed in the TGI in a regular cycle during fasting. These motor complexes cause peristaltic waves, which facilitate the transport of indigestible substances such as fibers through the Intestinum to the Colon. MMC activity varies widely between individuals and within an individual when measured on different days. The MMC occurs every 90-230 minutes during the interdigestive phase (between meals) and is responsible for the rumbling in the abdomen, which you sometimes hear when you are hungry. It also serves to transport bacteria from the Intestinum to the Colon and to inhibit the migration of intestinal bacteria to the Ileum terminalis; an impairment of the MMC usually results in bacterial overgrowth in the Intestinum.

Source: Huizinga, J. D.; Lammers, W. J. E. P. (2008). "Gut peristaltisch is governed by a multitude of cooperating mechanisms". AJP: Gastrointestinal and Liver Physiology.

Osteopathic Dysfunctions Intestinum

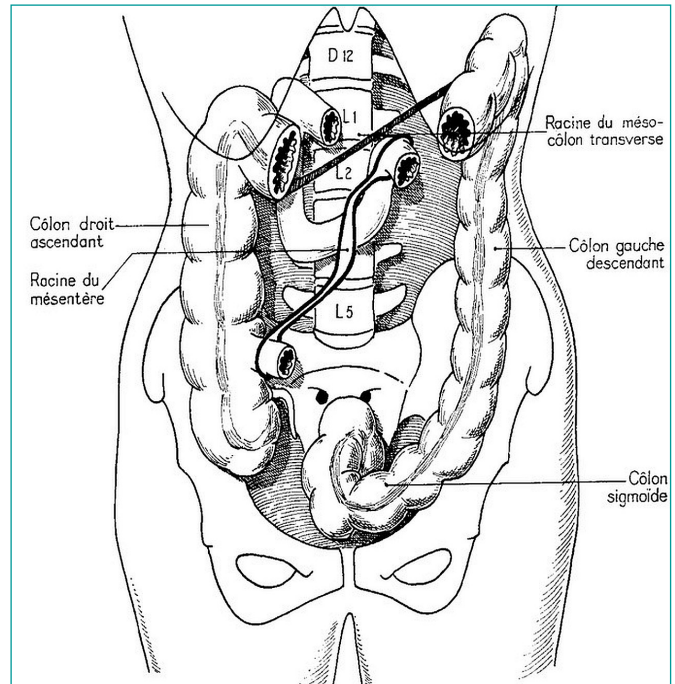
The dysfunctions of the small intestine are strongly related to the abdominal hypertension or hypotension. Evaluation of these phenomena is thus of primary importance in the diagnosis and interpretation of osteopathic dysfunctions (see chapter 3 visceral concept).

1. Radix Mesenterium

The radix forms a kind of autostrada for:

- Immune system (mass reflex)
- Lymphatic system (cisterna Chyli)
- Venous system (V. Portae)
- Arterial system (A. Mesenterica Superior).

The radix can be fixed in its origin (PPP) to the underlying (retroperitoneal) structures, such as the Aorta, the Inferior Vena Cava, the spine and the renal fasciae. As a result, the integration of all movements becomes disrupted (Mobility, Vitality and Autonomy). In addition, the intestine can no longer discharge its force vectors, the result of its movements, to the PPP and the structures behind it, especially the spine. In turn, the spine will resist these force vectors through muscular action (low back pain).



From an osteopathic perspective, an Intestinum seeks its support in the underlying structures (PPP and retroperitoneal). Subsequently, the muscular part of the spine will assist this support with increased muscular tone (hypertonus).

Source: Perlemutter, L., Prof. Walligora, J. Cahiers d'anatomie, Masson, Paris, 1987.

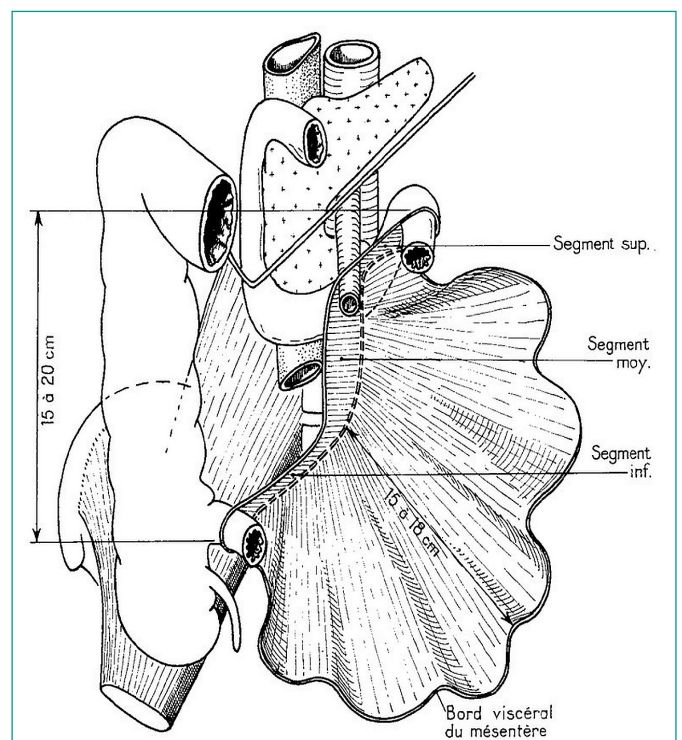
2. Mesenterium

Double layered peritoneal layer, provides information for:

- mobility (a fascia that supports Mobility, Vitality and Autonomy)
- immunity (B and T lymphocytes, Folliculi Lymphatici Aggregatii)
- metabolism (absorption depends on motility)
- acid-base balance.

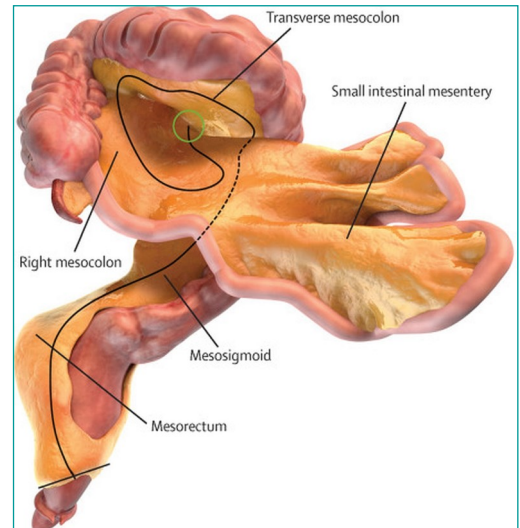
The Mesentery forms a layered structure, which in itself must be and remain mobile in its layers. This allows the small intestine to perform its normal function.

As a result of intolerances, allergies, infections, operations, gravity, immobility, etc., the sheets can stick together.



Intermezzo Mesenterium:
The Mesentery was discovered as a 'new organ' by some Irish scientists in 2017 and published in the 'Lancet Gastroenterology Hepatology'. In fact, Leonardo da Vinci described this as an independent organ as early as 1508, but now it is 'official', although we already knew that osteopathically.

From an osteopathic perspective, the immunity starts in the Intestinum (FLA with FLOra), following the radix Mesenterium (caudal right ICV, up to cranial left FDJ). From an osteopathic perspective, perpendicular to the mobility of the compartments of Glenard (caudal left, Sigmoid, up to cranial right, Hepar).



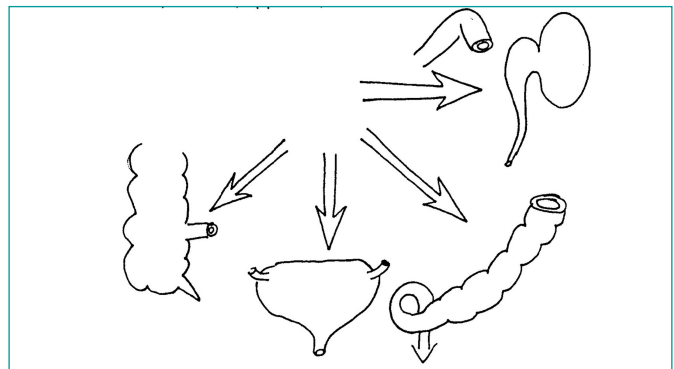
Fifth law of visceral: Immunology is an equilibrium (free mobility)

3. Four zones

The fascial system of the small intestine has four main directions:

- Renal zone (proximal Jejunum)
- Sigmoidal zone (distal Jejunum)
- Vesical zone (proximal Ileum)
- Caecal zone (distal Ileum)

The 4 zones form the 'trunks' for mobility for every quarter of the small intestine, so for 1.5 meters. Reduced mobility of one or more of the zones, affects the function of that part of the intestine.

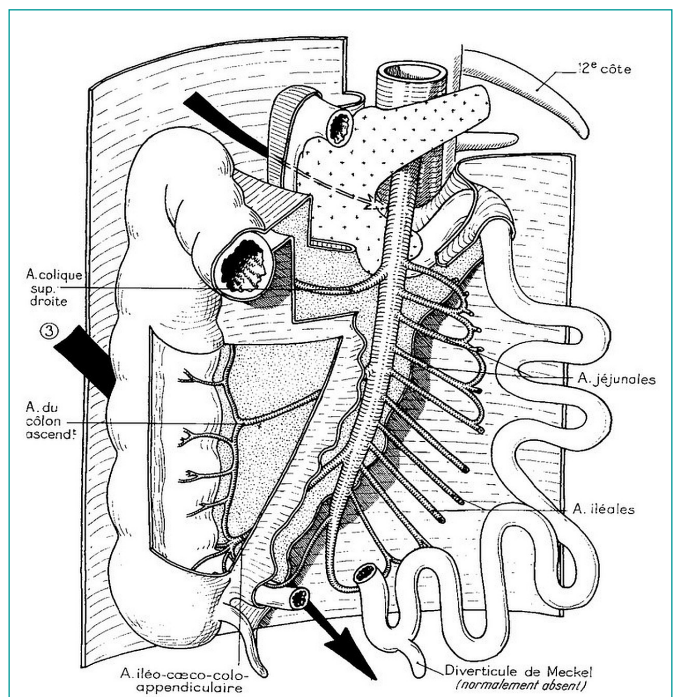


4. Sixteen loops

Each zone of the Mesenterium (main direction and trunk) is divided into 4 loops. The loops are formed by the separate branches of the A. Mesenterica Superior, the 8 Aa. Jejunalis and the 8 Aa. Ilealis. The mobility of each intestinal loop is necessary for:

- neurovegetative balance (lack of mobility; lack of information for Meisner, Auerbach)
- biochemical balance (for example chyle ves-sels)
- electrophysiological balance
- vascularisation.

The 16 main loops (arterial branches) must be free in mobility, in order for that part of the intestine, that is 40 cm., to function optimally.



5. Excavatio Pelvinale (Pelvis minor)

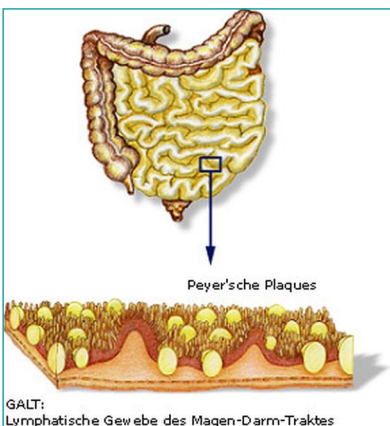
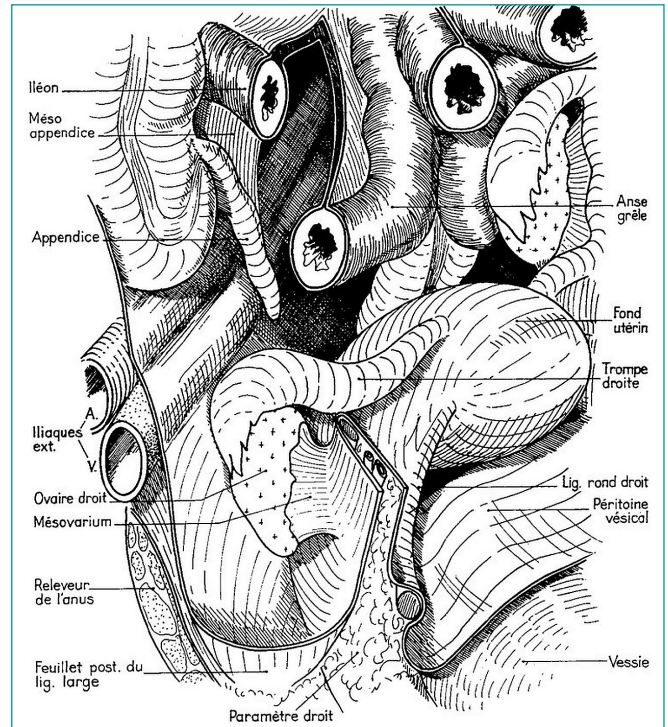
In particular, the eight vertical loops of the ileum have a very close relationship with the excavatio Recto-Uterina (Douglas) and the excavatio Utero-Vesicalis (male: Recto-Vesicalis).

Complications:

- Prolapse Ileum in an excavatio.
- Bladder problems from Ileum (cystitis)
- Uterus retroflexion as a result of Gastro-intestinal pressure.

The gliding surface for the Intestine (Ileum) and Pelvic organs is revered to as PPI (Peritoneum Parietal Inferior).

See further chapter 12 Vesico Urinaria and chapter 17 Pelvis Minor.

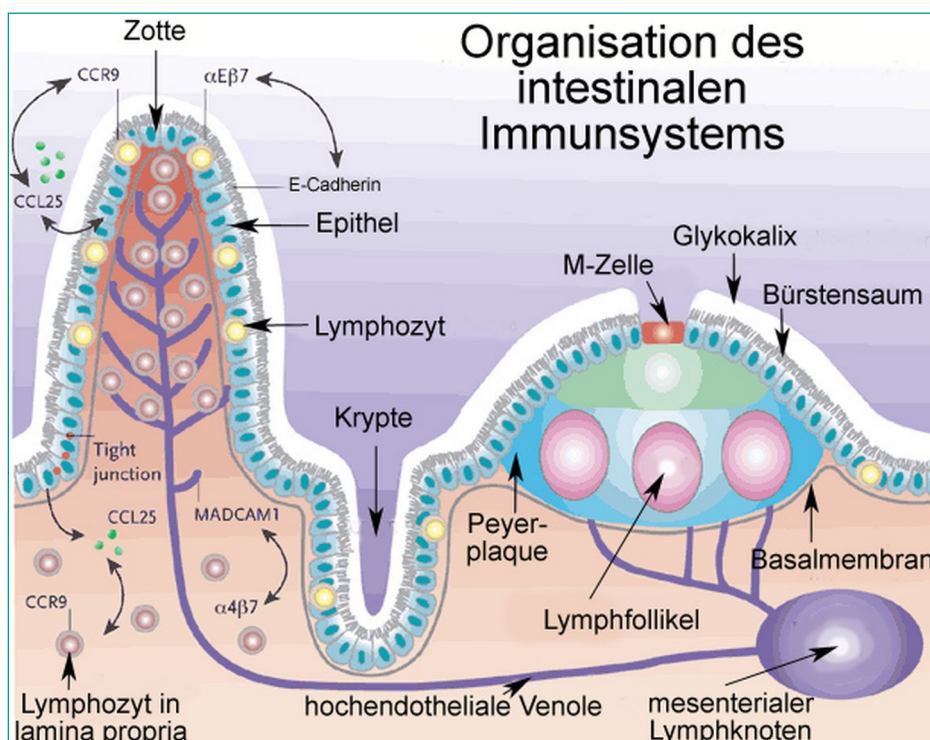


6. Immunity

The Folliculi Lymphatici Aggregatii (including the Peyer plaques) are closely related to the peritoneum, the Omentum major and the intestinal flora.

Inflammatory processes can be easily transferred to subperitoneal tissues.

Immunity of the Intestinal consists of B lymphocytes, T lymphocytes and Prostaglandins.



7.11. DIAGNOSTICS INTESTINUM

7.11.1. Anamnesis & Safety Intestinum

- Stool: diarrhea, constipation;
- Acidic air in diarrhea indicates carbohydrate fermentation;
- Greyish-white, foul-smelling deletion in thrush and pancreatic disease; then the stool is fatty deposits;
- Putty-colored elation also in closing icterus (no bile);
- Dark, black stools indicate bleeding, constipation, drug use;
- Mixture of blood and mucus: colitis, dysentery, tumor;
- Pure blood: hemorrhoids, rectal carcinoma;
- Alternating constipation and diarrhea in chronic intestinal constriction or bile production, with strong rumbling in the abdomen;
- Constant painful urge for defecation: inflammation;
- Peritonitis: more or less severe pain, increasing distention of the abdomen (meteorism and ascites);
- Lower right pain: Caecum problem, appendicitis;
- Lower left pain: Sigmoid, diverticulitis, colon carcinoma.



Intestinal complaints are often felt in the lower back

From an osteopathic perspective, we use the anamnesis to detect details and to identify red flags (exclusion diagnostics), not actually to treat.

An anamnesis or a conventional diagnosis do not give rise to an osteopathic therapeutic choice. This is only determined by osteopathic examination.

Subsequently, the patient often confuses small intestinal complaints with back problems or mistakes them for a dangerous process in the abdomen.

BRISTOL STOOL CHART

nutritionwithjudy

Normal stools should look like Type 3 or Type 4, Brown in color and Sink to the bottom

	Type 1 Separate hard lumps, like nuts (hard to pass)
	Type 2 Sausage-shaped, but lumpy
	Type 3 Sausage-shaped, but with cracks on surface
	Type 4 Sausage or snake like, smooth and soft
	Type 5 Soft blobs with clear-cut edges (easy to pass)
	Type 6 Fluffy pieces with ragged edges, mushy
	Type 7 Watery, no solid pieces (entirely liquid)



7.11.2. Reflexogenic Intestinum

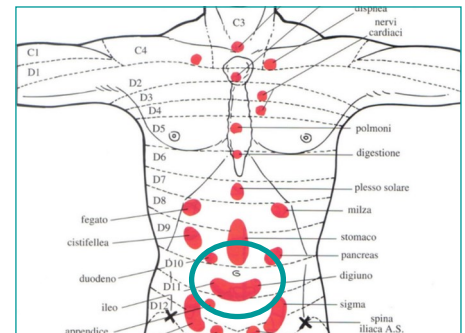
Reflexogenic features are indications of a possible dysfunction. To be used as confirmation of the diagnostics, or as a frame of reference for an effect of a therapy.

Nota Bene: Reflexogenic characteristics can also indicate an (old) compensation. So we cannot link diagnostics to it, but a possible support.

1. Jarricot

Connective tissue zones at the front of the abdomen that can occur with chronic intestinal disease. They do not constitute diagnostics, but may be a point of attention or reference for therapy.

- Duodenum: Dermatome T₉ right of the Umbilicus.
- Jejunum: Dermatome T₉ arcuate around Umbilicus left 2cm.
- Ileum: Dermatome T₁₀, arcuate around Umbilicus left 2cm.
- Posterior: paravertebral zone L₁ - L₂ right: Duodenum.
- paravertebral zone L₂ left: Intestinum.



2. Vertebral

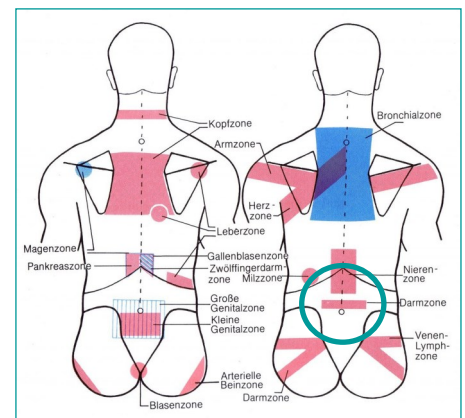
There are certain vertebrae that can be related to the intestine, because the innervation (Orthosympathic) of these vertebrae proceeds to the intestine. From an osteopathic perspective, we pay little attention to this, but blocked vertebrae can maintain an intestinal disorder.

T₇ - Duodenum.

T₁₁ en T₁₂ - Jejunum and Ileum.

3. Connective tissue

- 5-8 cm wide band that is on both sides of the middle 1/3 Sacrum towards lateral / caudal.
- Zone just above the Sacrum, between both ilea.



4. Applied Kinesiology

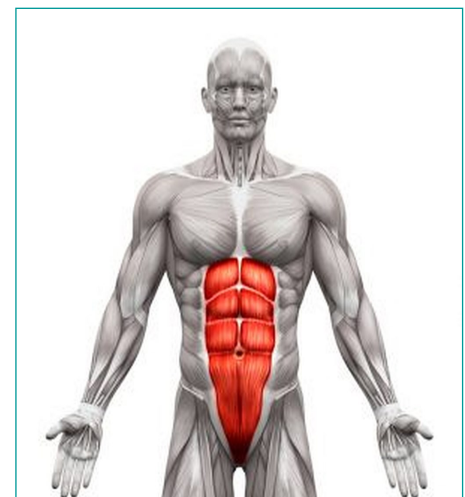
From applied kinesiology, certain muscles are known that (reflexively) become weaker in a chronic condition. For the small intestine, these are:

Intestinum: Main muscle - M. Quadriceps Femoris.
Assistent muscle - M. Rectus Abdominis.

Colon: Main muscle - M. Tensor Fascia Lata.
Assistent muscles - M. Biceps Femoris.
- M. Quadratus Lumborum.

These muscles may therefore be weakened as a result of a chronic intestinal disorder. They may need to be reinforced in therapy, in this case to prevent problems in particular.

On the other hand, chronic muscle problems in these muscles are a possible indication of underlying intestinal problems.



7.11.3. Palpation Intestinum

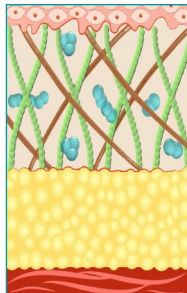
Information by palpation is limited at the Intestinum by:

- The large place in the abdominal cavity.
- The extreme mobility.
- The constant change of volume.

Nota Bene: The small intestine itself, as an annular tube, can hardly be felt. Due to the extreme mobility, the intestines move already at the first touch. The Mesentery, on the other hand, is easy to palpate.

7.11.3.1. General Intestinum

- Voluminous and sonorous: Ileum expanded due to gas (Fermentation, Carbohydrates, Fungi, etc.)
- Flat abdomen, lean, sub-dull (percussion): Ileum reduced.
- Aortic pulsations palpable, both above and below the umbilicus, indicates a narrowed small intestine at its loops and /or an Enteroptosis (NB. Aneurysm).

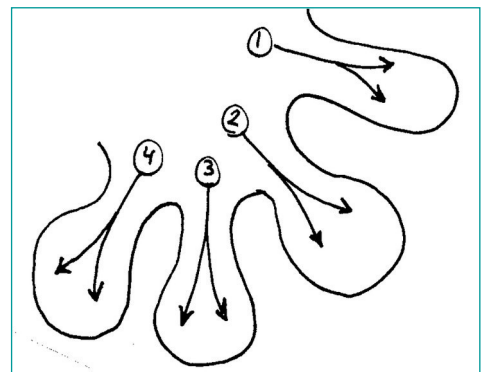


Intermezzo 60°:
 The angle of 60° of the fingers of the osteopath is due to the structure of the collagen fibres in the connective tissue of the Mesenterium.
 Without discussing the details of this.

7.11.3.2. Hand-Fan-test

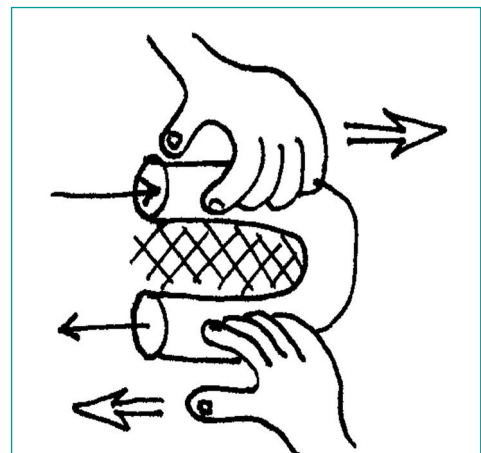
Follow the fanning out of the 4 zones, in the direction of:

- left kidney (renal zone) (1)
- sigmoid (sigmodal zone) (2)
- bladder (vesical zone) (3)
- ileocaecal (caecal zone) (4)



The mobility of the four corners depends on the mobility of the "radix" of the Mesenterium.

The osteopath gives an impulse during inspiration in the direction of these four corners.



7.11.3.3. Loops separately

- Test the 16 loops separately for fascial mobility.
- Take fixed point with the fingers 60° and move the rest.
- Compare the fascial mobility.

From an osteopathic perspective, we can therefore divide the diagnostics of the 6 meter Intestinum, in 4 Zones (1.5 meters) and in 4 Loops (40 cm). This gives us accurate diagnostics based on mobility. As mentioned:

- *Jejunum:* mainly absorption carbohydrates, proteins and fats and also the largest water absorption in the Renal and Sigmoidal zone.
- *Ileum:* more immune activity and absorption vitamins (for example vitamin B₁₂) & minerals and the entero-hepatic circulation in the Vesical and Caecal zone.

Remark: an important part of vitamins (B vitamins) and minerals in particular is still absorbed in the Colon. More than half of the Colon therefore belongs to the primitive midgut (absorption).

7.11.4. Tests Intestinum

7.11.4.1. Mobility-test mesenterial zones (Hand-Fan-test)

Patient: in supine position.

Osteopath: stands next to the patient.

Function test, to assess the mobility of the total Intestinum.

Implementation: the osteopath places the digits II-IV of both hands against each other (in a straight line !) and places it is about 1.5 cm away from the Umbilicus. There he quietly goes into the depths of the Abdomen, through the layers, to the level of the Mesenterium. On an inspiration, he gives an impulse in the direction of the 'zone' in which he works. Successively these are the Renal zone (photo 1), the Sigmoidal zone (photo 2), the Vesical zone (photo 3) and the Caecal zone (photo 4)

Assessment: The osteopath assesses the visco-elasticity of the Mesenterium at the relevant zone.



Remark:

It is important to arrive at the right depth after placing the fingers, before an impulse is given. Otherwise the osteopath is shifting the skin instead of testing the mobility of the Mesenterium.

Intermezzo zones & clock:

Imagine the belly as a clock, with the Umbilicus as the center and the Xyphoideus processus at 12:00. The 4 zones then become:

- 03.00: left kidney (Renal zone)
- 04.30: sigmoid (Sigmoidal zone)
- 06.00: bladder (Vesical zone)
- 07.30: ileocecal (Caecal zone)



7.11.4.2. Mobility-test intestinal loops

Patient: in supine position.

Osteopath: stands next to the patient.

Function test, to assess the mobility of the parts of the Intestinum.

Implementation: the osteopath places the digiti II-IV of both hands against each other (in a straight line !) and places this about 1.5 cm from each Zone and therefore 3 cm. away from the Umbilicus. There he quietly goes into the depths of the Abdomen, through the layers, to the level of the sliding surface between the loops. There he gives an impulse with both hands, such that they induce an opposite movement.

Assessment: the degree of mobility of the sliding surfaces between the individual loops.

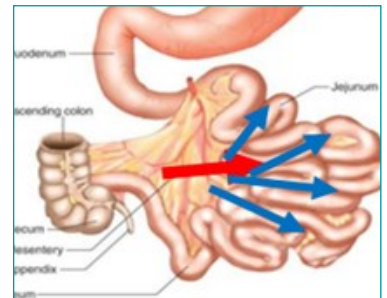


Remark:

1. The location of the sliding surfaces between the loops can be very diverse (see for example the different anatomical atlases). The placement of the fingers needs to be adjusted accordingly.
2. Although there is no small intestinal zone (Mesenteric fold) in the cranial direction, the intestinal loops are indeed in the supra-umbilical region, below the colon Transversum.

From an osteopathic perspective, the function of an intestinal loop (absorption & immunity) depends on the blood flow (A. Jejunalis / A. Ilealis and Lymphatic vessels) which in turn depend on the mobility of surrounding peritoneal structures (Mesenterium).

After a zone (red arrow) follows 4 loops (blue arrow). This is how we arrive at 4 zones and 16 loops on a mesenteric plane diagnostically.



7.11.4.3. Mobility-test radix Mesentericum

Patient: in supine position.

Osteopath: stands to the right or left of the patient at the height of the pelvis

Implementation: the osteopath places the right digits II and III on the level of the FDJ and the left digits II and III. at the level of the ICV.

Assessment: the osteopath assesses visco-elasticity of the radix Mesentericum.

Reference test,



From an osteopathic perspective the radix is a relative fixed part, but should guarantee the flow of the arteries, vein and lymph.

7.11.4.4. Mobility-test gliding surface Intestinum-PPP



Patient: in supine position.

Osteopath: located next to the patient.

Implementation: the osteopath includes the Intestinal package with both hands, such that he can assess the increases mobility at the level of this bursa Mesenterium (sliding surface). He does this by making a calm, empathetic, kneading movement, moving the tissue between his hands towards him and back again.

Assessment: degree of mobility.

Function-test

Remark: On both sides of the radix (inferior photo 1, superior photo 2) the mobility of the sliding surface is tested.

From an osteopathic perspective the Bursa Mesenterium forms the largest sliding surface of the human body. The term does not exist in anatomy, but is for us a good name for the functionality of this system.

In fact, they are the sliding surfaces of the Intestinum on Toldt's fascia, superior (Mesocolon ascendens) and inferior (Mesocolon descendens). See also chapter 13 Peritoneum.

