



OSTEOPATHY AND THE DIGESTIVE SYSTEM

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Osteopathy and the digestive system

The digestive system, also known as the alimentary canal or gastrointestinal tract, starts up at the mouth and then continues the esophagus, stomach, small intestines, large intestine, and the anus—the primary function of the system in digestion, absorption, excretion, and protection. The series of organs making up this tubular system carry out specific roles to be able to achieve these functions, starting with mechanical digestion of food occurring in the mouth through chewing and then in the stomach through muscular contractions, chemical digestion using enzymes, assimilation of nutrients, and lastly, fecal formation and excretion through the anus.

Our body a single unit of 11 organ systems, with each performing specific functions, which control or affect the other system. The 11 organ systems include the following divisions as follows: integumentary, muscular, skeletal, nervous, circulatory, lymphatic or immune, respiratory, endocrine, urinary or excretory, reproductive, and digestive. These systems have to work together in harmony to allow the body to function correctly.

Gut health is essential for the overall wellbeing of a person as it determines their nutritional status, which controls how the body systems function. Achieving nutrition is through the substances we ingest through our mouths. While this input occurs through the mouth, its usage and passage through the body depend on how well the digestive system functions.

Issues with gut function are of significant concern in conditions such as dyspepsia, irritable bowel syndrome, constipation, and many more.

Manual osteopathy has shown to help with chronic digestive issues leading to the restoration of a pain-free life for patients.

What is Osteopathy?

Osteopathy is a hands-on, holistic, drug-free, non-invasive manual therapy that aims to improve health across all body systems using several different techniques.

Osteopathy originated from the study of the Cherokee and Shawnee body works and healing arts practice that is still in practice in Native America. They combine the use of herbs, spirituality, musculoskeletal manipulation techniques, and many other techniques for healing its tribal people. Only a few areas across American still practice this. Most of the theories obtained from studying this practice are currently categorized and taught in different professions, such as naturopathy, chiropractic, acupuncture, and more.

Dr. Andrew Taylor Still, the well-known founder of osteopathy, introduced some of the musculoskeletal manipulation techniques during the civil war in the late 19th century to help heal people, when the practice of orthodox medicine during that time did not appear to save people. He promoted the practice of thinking of the body as a whole.

Today osteopathy is practiced by manual osteopaths and medical doctors who have studied osteopathic medicine. Medical doctors specialize in osteopathy, allowing them to practice regular medicine by being licensed to prescribe medication and providing a diagnosis in most

American States and other parts of the world. Manual osteopaths retreat to using the more hand-on approach of healing without the use of prescribed medications or surgery.

There are four main principles of osteopathy based on philosophy as follows:

1. The body is a single unit composed of body, mind, and spirit.
2. The body itself is capable of regulating, healing, and maintaining health.
3. There is a reciprocal interrelationship between structure and function.
4. Treatment is constructed on the bases of the understanding of the above principles.

Techniques used in Osteopathy

There are several techniques used in osteopathy which include

1. Articular mobilization

In this technique, the joint is taken passively through its complete range of motion in a slow and controlled manner. This technique is shown to release soft tissue tension, restore range of motion, and help reduce inflammation. It also reduces nerve compression and increases fluid movement within the joint, which reduces pain.

2. Muscle energy techniques

In this technique, the physician positions the joint or muscle at the point of initial restriction followed asks the patient to contract his muscle to resist a direction of movement for 3-5 seconds. They then release the contraction and relax for 1-2 seconds, and the joint is then taken to a new restrictive barrier without exceeding the physiologic barrier. This process is repeated 3 – 5 times for better results.

This technique is used to improve joint range of motion, lengthening a hypertonic muscle, and strengthening weak muscles. It also improves circulation.

3. Cranial osteopathy

This form of manipulation follows the primary respiratory mechanism (PRM), which deals with the fundamental physiology of the interchange of fluids through the internal tissues of the central nervous system.

Cranial bones have subtle movement along the bevels due to tensions in the dura mater, which attach to the cranial bone. The cranial bones are set into a harmonized movement through osteopathic manipulation with the movement of the sphenoid bone.

4. Visceral osteopathy

Visceral organs have motility due to their fascial attachments and ligamental attachments due to respiration. Vasculature, nerves, and ducts from exocrine glands such as the liver, pancreas, and gall bladder pass through these ligaments.

Visceral osteopathy releases any ligamentous or fascial area of tension, which improves blood flow, lymphatic drainage, and nerve conduction. It restores the motility of the organs.

Other techniques may include soft tissue therapy, facilitated positional release, balanced ligamentous tension strain, counterstrain techniques, and myofascial release techniques.

Dysfunction of the digestive system and Osteopathy

Starting at the oral cavity, digestion of food occurs through the process of mastication. Mastication is essential as food particles need to be small enough for enzymes to be able to carry out the chemical digestion of the food using enzymes. Movement of the tongue, proper occlusion of the teeth, and a functional temporomandibular joint (TMJ) are necessary for this process.

Restriction in the movements of the TMJ could be due to weakness or spasms in 1 or more muscles of mastication. These muscles get innervation through branches of the mandibular division of the trigeminal nerve. Releasing any lesions that may be of note through the course of the mandibular nerves is essential to ensure proper firing of impulses from the brain. This nerve originates from the mesencephalic nucleus situated in the brainstem close to the 4th ventricle, passing through the trigeminal ganglion and exiting the cranium through the foramen Ovale into the infratemporal fossa. Trigeminal neuralgia is one condition that can be of note to portray weakness in the muscle of mastication. The release of the dural folds containing the cavernous sinus and restoration of the CSF flow can lead to better functioning of this pathway using cranial osteopathic techniques, other techniques targeting the muscles in the infratemporal fossa will be beneficial for the mandibular nerve as it passes through here.

TMJ joint capsule lesion restoration using articular joint mobilization and masticatory muscle strengthening using muscle energy techniques can be of great benefit to restore TMJ function. Exercises the patients can do on their own will also be necessary to provide for the strengthening of these muscles. These techniques improve blood circulations to these areas as well.

Saliva, the viscous fluid released by the salivary glands, is necessary as it aids in moistening the mouth, functions as a lubricant for ease of swallowing, and a solvent for chemicals in food for the sensation of taste. It also contains the enzyme amylase, which initiates the digestion of complex carbohydrates. The production of saliva is regulated through the autonomic nervous system, with parasympathetic innervation of the parotid gland through the glossopharyngeal nerve and submandibular and sublingual gland through the facial nerve. Restoration of the rhythmic movement of the temporal bones through assessment of the primary respiratory movement (PRM) is beneficial.

Mobilizing and releasing the hyoid bone may also be necessary to help lengthen and reduce the tonicity of attached muscles between which pass the branches of the glossopharyngeal nerve. Mobilization will also lengthen the muscles of the tongue, which are attached to the hyoid.

Sympathetic innervation of the glands comes from the cervical sympathetic chain with preganglionic fibers originating from the upper thoracic segments. The restoration of the PRM between the sacrum and cranium can release any dural tension through the entire spinal cord. Articular joint mobilization techniques also help reduce any nerve compression through the thoracic and cervical regions. Soft tissue therapy can be beneficial to increase blood flow to the area and release muscle tension.

Myofascial release techniques over the parotid gland and neck can help release the nerves and improve blood circulation as well.

Deglutition, the process of swallowing is a reflex action initiated voluntarily through the oral cavity and then controlled by the autonomic nervous system through the oropharynx and entry into the esophagus through the glossopharyngeal and vagus nerves and other cranial nerves. Both nerves exit the cranium piercing the dura at the jugular foramen. The dural release is a necessary part of treatment for this process.

Food enters the esophagus, which runs the length in the thoracic cavity from the pharynx to the stomach piercing through the diaphragm. The esophagus has anatomic areas of constriction through its path, which are where it crosses the cricopharyngeal muscle, aortic arch, left bronchus, and where it pierces the diaphragm. Rib cage release and diaphragm release techniques with cervical mobilization due to phrenic nerve origin are beneficial for the release of these constrictions by the improved functional movement of the ribcage and thoracic organs; this also increases the thoracic cavity space during inhalation. Respiratory mechanisms play a role in the movement of the food through the esophagus and the motility of visceral organs.

The tubular portion of the rest of the digestive system has muscular layers called the muscularis externa, which contain bundles of circular and longitudinal muscles that contract and relax to allow the bolus of food to move along the canal. This process is called peristalsis, which is controlled by the autonomic nervous system. When a bolus of food passes in the intestine, it causes a stretch reflex, which causes the release of serotonin and other excitatory and inhibitory chemicals that activate and inhibit the Meissner's plexus. The Basic electrical rhythm (BER) for peristalsis is initiated by the pacemaker cells called the interstitial cells of Cajal (ICC), which have smooth muscle-like features and branched processes that synapse with intestinal smooth muscles. The Meissner plexus is part of the enteric nervous system, a branch of the autonomic nervous system that functions in the digestive system.

The autonomic nervous system also controls the enzymatic secretions from the exocrine glands, gall bladder, liver, pancreas, and gastric glands, which secrete digestive juices containing enzymes that are essential for chemical digestion. As mentioned above, articular mobilization and dural release techniques have shown benefit in restoring autonomic function.

Biliary dyskinesia, a disorder of the gall bladder and sphincter of Oddi is one such condition that may prevent bile and pancreatic juices from entering the duodenum. Mobilization of the thoracic spine and visceral osteopathy to restore natural homeostasis can be beneficial.

Gastroesophageal reflux disease or GERD affects about 20% of the Western adult population due to the impaired lower esophageal sphincter, hiatal hernia, abnormal esophageal clearance, or esophagitis. Referred pain from this could be to this can be felt at the neck or back.

Diaphragmatic release, stretching of the esophagus through visceral osteopathy, and cervical mobilization have shown benefit in reducing symptoms. Cervical mobilization due to the origin of the phrenic nerve from C3-C5 is necessary as well. Techniques targeting the autonomic innervation of the stomach, duodenum, pancreas, gall bladder, and liver, which include branches from the vagal trunk, coeliac plexus, and the mesenteric plexus can also be beneficial.

Techniques include articular mobilization, muscle energy techniques for the back, visceral osteopathy, and craniosacral therapy.

Irritable bowel syndrome with a prevalence of 10-15% and functional dyspepsia and gastroparesis are a few other conditions that are due to the dysfunctional motility of the visceral organs.

Constipation prevalent in 20% of the general population, affecting the elderly more than the younger population, is dependent on the function of pelvic floor muscles and the colonic transit of food. Pain caused by constipation can be referred to the back. Articular mobilization of the pelvis and spine with visceral mobilization of the colon and MET for pelvic muscles are beneficial treatments. Exercises to strengthen the pelvic floor muscles are also necessary for long term improvement.

Fecal incontinence, the inability to control bowel movements can be caused by weakness in pelvic muscles, nerve damage or compression, chronic constipation, or diarrhea, to name a few. Release of nerve compression through the articular mobilization of the lumbar and sacral vertebra can be useful with the release of the fascia between the pelvic organs. Muscles of the pelvis can be strengthened through exercise using biofeedback therapy protocols.

Assimilation is the process of nutrient absorption and usage. Absorption occurs through the single-cell epithelial lining of the villi and the surrounding capillaries; good blood circulation is crucial for this, and all osteopathic techniques have slight effects on the improvement of circulation. Blood carries these nutrients to cells that metabolize these nutrients according to the body's need.

Protection from harmful pathogens starts from the tonsillar ring at the back of the mouth. Tonsils are a component of the lymphatic system that plays a role in immunity. Lymphatic system function benefits from all the different techniques identified above from fascial release, muscle energy techniques, mobilization, and cranial osteopathy.

Long term improvement may only be achieved by addressing other factors such as diet and lifestyle:

- Sedentary lifestyle - Regular exercise, which studies show improves circulation, metabolism, strengthens muscles and improves posture, which in return can improve gut function.
- Stress - Reducing stress, which has an impact on the autonomic nervous system, is crucial; breathing exercises and meditation may be practical when practiced regularly.
- Diet - A diet rich in fresh fruits and vegetables, healthy sources of fats and proteins are necessary. Having balanced meals containing approximately 25% fiber can help regulate how long food takes through the gut and increases effective micronutrient extraction from the meals. Following a Mediterranean diet may be beneficial for the long term.
- Water intake of at least 2 liters a day requires moisture for ease of movement through the gut. It also helps in the formation of normal feces.
- Supplements to address deficiencies may be of assistance as well.
- Circadian rhythm – following the light and dark cycles of the days created by the rotation of the earth around the sun, an environmental factor, cause all systems to follow a regulatory pattern, which is critical for homeostasis. Many factors in today's lifestyle

have caused disruption to this rhythm, such as sleeping patterns, meal timings, excessive light exposure, and more.

Conclusion

Chronic GI conditions such as constipation, irritable bowel syndrome, gastroesophageal reflux disease, or fecal incontinence can be addressed adequately through the use of osteopathic manipulation techniques.

Assessment of areas restriction is crucial to identify the root cause of the problem. Treatment based on these assessment findings is sure to be effective in bringing the body back to normal functioning.

Osteopathic techniques require to be combined with lifestyle and dietary advice for treatment to be able to address the condition effectively.

References

1. Cheng LK, O'Grady G, Du P, Egbuji JU, Windsor JA, Pullan AJ. Gastrointestinal system. *Wiley Interdiscip Rev Syst Biol Med*. 2010;2(1):65-79. doi:10.1002/wsbm.19
2. "What Is an Organ System? - Definition & Pictures." Study.com, 5 December 2014, study.com/academy/lesson/what-is-an-organ-system-definition-pictures-quiz.html
3. <https://kripalu.org/resources/native-american-bodywork-practices>
4. Gevitz N. (1988) Andrew Taylor Still and the Social Origins of Osteopathy. In: Cooter R. (eds) *Studies in the History of Alternative Medicine*. St Antony's/Macmillan Series. Palgrave Macmillan, London
5. **Excerpted from *A Journal of Contemporary Shamanism*, Vol. 8, #1, Spring-Summer 2015; *Polarity Therapy Workbook*, by John Beaulieu: 2016 edition.**
www.catany.com/traditional-american-indian-bodywork-origin-osteopathy-polarity-craniosacral-therapy/
6. <https://www.catany.com/what-is-chokebodywork/>
7. <https://www.aacom.org/become-a-doctor/about-osteopathic-medicine/history-of-osteopathic-medicine>
8. <http://www.kcumb.edu/about-kcu/why-kcu/what-is-osteopathic-medicine/osteopathic-principles>
9. Ferreira CLP, Sforza C, Rusconi FME, Castelo PM, Bommarito S. Masticatory behaviour and chewing difficulties in young adults with temporomandibular disorders. *J Oral Rehabil*. 2019;46(6):533-540. doi:10.1111/joor.12779
10. Janjua RM, Al-Mefty O, Densler DW, Shields CB. Dural relationships of Meckel cave and lateral wall of the cavernous sinus. *Neurosurg Focus*. 2008;25(6):E2. doi:10.3171/FOC.2008.25.12.E2
11. Proctor GB, Carpenter GH. Regulation of salivary gland function by autonomic nerves. *Auton Neurosci*. 2007;133(1):3-18. doi:10.1016/j.autneu.2006.10.006
12. Rechberger V, Biberschick M, Porthun J. Effectiveness of an osteopathic treatment on the autonomic nervous system: a systematic review of the literature. *Eur J Med Res*. 2019;24(1):36. Published 2019 Oct 25. doi:10.1186/s40001-019-0394-5
13. Piagkou M, Demesticha T, Skandalakis P, Johnson EO. Functional anatomy of the mandibular nerve: consequences of nerve injury and entrapment. *Clin Anat*. 2011;24(2):143-150. doi:10.1002/ca.21089
14. Guillaud, Albin & Darbois, Nelly & Monvoisin, Richard & Pinsault, Nicolas. (2018). Reliability of diagnosis and clinical efficacy of visceral osteopathy: A systematic review. *BMC Complementary and Alternative Medicine*. 18. 10.1186/s12906-018-2098-8.
15. Evidence based Complementary And Alternative Medicine; Volume 2018 ;Article ID 4929271 <https://doi.org/10.1155/2018/4929271>
16. Antunes C, Curtis SA. Gastroesophageal Reflux Disease. [Updated 2020 May 25]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK441938/>
17. Eguaras N, Rodríguez-López ES, Lopez-Dicastillo O, Franco-Sierra MÁ, Ricard F, Oliva-Pascual-Vaca Á. Effects of Osteopathic Visceral Treatment in Patients with Gastroesophageal Reflux: A Randomized Controlled Trial. *J Clin Med*. 2019;8(10):1738. Published 2019 Oct 19. doi:10.3390/jcm8101738

18. Patel N, Shackelford K. Irritable Bowel Syndrome. [Updated 2020 Jan 3]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK534810/>
19. Müller A, Franke H, Resch KL, Fryer G. Effectiveness of osteopathic manipulative therapy for managing symptoms of irritable bowel syndrome: a systematic review. *J Am Osteopath Assoc*. 2014;114(6):470-479. doi:10.7556/jaoa.2014.098
20. Attali TV, Bouchoucha M, Benamouzig R. Treatment of refractory irritable bowel syndrome with visceral osteopathy: short-term and long-term results of a randomized trial. *J Dig Dis*. 2013;14(12):654-661. doi:10.1111/1751-2980.12098
21. Vazquez Roque M, Bouras EP. Epidemiology and management of chronic constipation in elderly patients. *Clin Interv Aging*. 2015;10:919-930. Published 2015 Jun 2. doi:10.2147/CIA.S54304
22. The Journal of the American Osteopathic Association, February 2014, Vol. 114, 129-133. doi:<https://doi.org/10.7556/jaoa.2014.027>
23. Chen JD, Lin Z, Pan J, McCallum RW. Abnormal gastric myoelectrical activity and delayed gastric emptying in patients with symptoms suggestive of gastroparesis. *Dig Dis Sci*. 1996;41(8):1538-1545. doi:10.1007/BF02087897
24. Patel KS, Thavamani A. Physiology, Peristalsis. [Updated 2020 Mar 29]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK556137/>
25. Campbell SM, Winkelmann RR, Walkowski S. Osteopathic manipulative treatment: novel application to dermatological disease. *J Clin Aesthet Dermatol*. 2012;5(10):24-32.
26. Cheng LK, O'Grady G, Du P, Egbuji JU, Windsor JA, Pullan AJ. Gastrointestinal system. *Wiley Interdiscip Rev Syst Biol Med*. 2010;2(1):65-79. doi:10.1002/wsbm.19
27. Codoñer-Franch P, Gombert M. Circadian rhythms in the pathogenesis of gastrointestinal diseases. *World J Gastroenterol*. 2018;24(38):4297-4303. doi:10.3748/wjg.v24.i38.4297