The Autonomic Nervous System in Osteopathic Therapy

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INTRODUCTION

The field of medicine has swung from the general practitioner to the specialist and is now going back to the general practitioner—the one who usually has the first opportunity to study the patient as a unit. The doctor of tomorrow will be the man who studies, observes, analyzes, and correlates his findings to the body in its entirety. The osteopathic physician will be that man if he will devote himself to this task. Even at the present time he is highly regarded as a person who sees the patient as a whole.

It is surprising to learn that the greatest clinical teachers, including Andrew Taylor Still, were without modern knowledge of the scientific basis of disease. But these great clinical teachers were keen observers and were students of anatomy and physiology. Osteopathic physicians should be proud of the fact that they are well versed in anatomy and physiology because the future practice of medicine depends upon this knowledge.

According to Potterget,1 the status of every branch of science, every profession, every business rests upon a mass of supposedly established and accepted facts. Whether or not these facts are true, they rule the branch of science, the profession, or the business with which they are concerned and progress can be made only as increased knowledge displaces error or as these “facts” are changed to meet new conditions. Dr. Still gave us important facts and startling observations, but I am certain he would never have proposed for us to stop thinking and searching for the truth. The so-called “consensus of opinion” leads us to conservatism and dulls original thought and investigation.

Owing to the magnitude of the subject of the autonomic nervous system in osteopathic therapy, it is not possible to cover it thoroughly in a short paper. Therefore, I shall limit the discussion to three main topics: I shall try to give you, first, a picture of the part played by the sympathetic and parasympathetic systems, or the autonomies; second, a review of the anatomy of these structures; and finally, my conclusions as to osteopathic technique which will make use of these nervous systems.

With these points in mind your osteopathic manipulative treatment will never be classified as general. In my opinion many of the fine results obtained by the osteopathic physician can be credited to the recognition of the autonomic nervous system. If we understand this delicate mechanism clearly, our therapy will be specific and will bring about certain results desired.

PART I

Let us take up first the action of the autonomic nervous system and its effect on the normal human body.

Cannon,2 who made an extensive study of the autonomies, has shown that the balance of the nervous control is maintained, for the most part, by the sympathetics. He goes further and states that the balance is controlled by a sort of thermostat located in the hypothalamic nuclei at the base of the brain. This center is known as the generator or dynamo for the reactions of the parasympathetic nervous system. It controls body temperature by means of vasoconstriction and vasodilatation, and reflexes of somatic origin, such as shivering and panting. It further controls or regulates water metabolism and urinary function.

One of the most difficult tasks in practice is to convince patients, after a thorough examination, that their trouble is functional and that their symptoms are not a result of organic disease. The most common functional disorders are in the digestive tract and many times they bring on disturbance of normal heart function. Most of the patients having these disorders are very intelligent individuals who are subject to emotional strain and develop an anxiety neurosis. We find them of the “nervous type,” unable to relax their mental or their skeletal structures.

It is most difficult to treat these patients from the mental and structural viewpoint if they have been told that their trouble is due to colitis, low or high blood pressure, increased or subnormal metabolic rate. We, as osteopathic physicians, can give these patients relief. We must gain their confidence, make a logical diagnosis, and treat them intelligently, always remembering that the brain, through the parasympathetic nervous system’s functioning overtime, may be causing the distress.

The importance of the sympathetic and parasympathetic systems should not be overlooked by our profession. It is important to remember that every organ and tissue of the body is supplied by the autonomies. We in the osteopathic profession believe the saying that “the rule of the artery is supreme.”
The autonomic nervous system exercises control over the blood vessels and, by the action of vasocostriction and vasodilators, influences the minute motor body structure.

Physiologists tell us that the cells of man depend almost wholly upon nerves for their nutrition and their power of action. Failure to feed nerve tissue in a few of the less important structures does not prove that there is no nerve supply to that part. Any tissue which acts must have some means of nerve control.

The hypothalamus is important to the osteopathic profession in explaining to us the reactions of the parasympathetics. We can understand the patient with a so-called essential hypertension, spastic colon, insomnia, jitteriness, and many functional conditions which are real to him.

A patient who is suffering is not so much concerned regarding the pathological condition present as he is regarding the symptoms—those he may cause him much harm. We must train ourselves to treat the patient as well as the disease.

PART II

The sympathetic system has its origin from all of the thoracic and from the first to third lumbar segments of the cord. The parasympathetic system arises from two widely separated portions of the nervous system—the midbrain and medulla at one end and the first to third sacral segments of the cord at the other end.

The Sympathetic System.—This system innervates every organ and all tissue of the human organism. Briefly, it supplies all blood vessels and, by its twofold action of vasocostriction and dilatation, acts on or influences all body tissues. It supplies many structures which apparently have no parasympathetics, such as the urogenital apparatus. It activates structures which the parasympathetics inhibit, for example, the heart and the sphincters of the bowel and bladder. It provides inhibitory nerves which counteract the parasympathetics as in structures of the head and gastrointestinal system.

Sensory fibers accompany the motor fibers in the sympathetics. These sensory fibers transmit impulses to the corresponding area of the cord. These impulses may be referred to neurons which in turn may influence other structures, causing symptoms of distress.

These sympathetic reflexes (especially of visceral origin) are of three kinds: motor, sensory, and trophic. The reflexes of visceral origin are typical examples.

Motor: It is agreed that the visceral motor reflex is the only real sympathetic reflex in muscular tissue of the skeleton. Skeletal muscles contract when a stimulus is carried over the sensory fibers of the sympathetics due to a motor response.

Should the bombardment of sensory impulses from the large bowel be of sufficient duration and intensity, the motor response in skeletal musculature would produce chronic contraction, the end result being degeneration of muscle structure and limitation of normal spinal motion. Nerve cells which are subjected to constant harmful stimuli eventually are impaired in function. Osteopathic lesions are not only maintained by this abnormal physiology, but they are most difficult to correct. A vicious cycle results and further retrogression of physiologic bowel action is augmented by continued immobility of vertebral segments. This immobility very definitely interferes with sympathetic action of inhibition, which equalizes parasympathetic activation of the bowel.

Sensory: The sensory nerve response from the large intestine does not influence the motor response to the organ directly. Rather, the sensory action is distributed to spinal musculature, producing contraction and degeneration, resulting in disturbed function of the sympathetic nerves which supply the gut.

Pain is closely associated with most visceral sensory impulses. It is interesting to note the findings of Mackenzie according to Crile. A few of them are: First, that the deeper tissues of the external body wall are less sensitive to pain than the skin. Second, that the viscera are innervated to some extent and produce pain in the external body wall, such as pinching and heat.

These findings agree with the osteopathic findings of pain exhibited at the seat of vertebral lesions, whereas pathological changes may be developing in the bowel itself. Osteopathic manipulative treatment may break up this vicious cycle and will go far in preventing further development of pathology.

Trophic: I have found no authorities who have determined that there are special trophic nerves. It is agreed that nutrition of tissues is dependent upon the sensory and motor nerves which innervate it. Proper nutrition is essential to the normal function of all body cells. Thus, trophic change is a perversion of nerve function with the end result being an inadequate supply of nutrition to the cells.

Nerve cells may be injured by mechanical stimuli which occur from osteopathic lesions. Nerve cells may not be harmed by a moderate number of these stimuli, but a continued stream of these harmful impulses will produce injury to the nerve cells. The tissues supplied by these cells will undergo a nutritional change.

The functional capacity is reduced in injured cells, owing to constant irritability. Since nutrition of these tissues is controlled by the nerves, both motor and sensory, it is easy to see why a prolonged injury results in degeneration.

To apply the osteopathic concept intelligently in regard to the treatment of human ailments, we must know what effect stimulation or irritation has on the sympathetic system. Pottenger lists among the effects of stimulation of sympathetics the following:

Lessened mucous secretion in nose and throat; lessened secretion in gastrointestinal tract, manifested by retarded digestion and hypochlorhydria; lessened motility in gastrointestinal tract with relaxation of intestinal musculature; increase in pulse rate; increase in oxygen content of blood, its being forced from liver; increase in body temperature, and sweating. This last is found in hyperactivity of both sympathetic and parasympathetic systems.

Parasympathetic System.—As the parasympathetic system has only two vulnerable points of attack, namely, the first, second, and third sacral nerves and the vagus, which lies in the carotid, from the osteopathic standpoint I shall not go into its action as thoroughly as the sympathetics. However, we should know the signs of excess parasympathetic activity 

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we can counteract the condition by means of sympathetic inhibition.

Parasympathetic stimulation produces some or most of the following symptoms: increased secretion of saliva, tears, and pancreatic; increased bronchial secretion; spasm of bronchi; hypotension and hypersedimentation of gastric glands depending on degree of stimulation; irritable bladder; and locomotion of organs and muscles.

It might be said that the parasympathetics provide the substance of man. They control digestion and elimination of fecal material, and respiration. Food is prepared for the entering up to the body. They are used by the individual. Already, the parasympathetics activate the sphincters of the bladder and gastrointestinal tract. The flow of digestive juices, such as intestinal, gastric, pancreatic, biliary, and salivary, are controlled by this system. It affects the general circulation of the blood by means of its regulatory action to the heart.

Rudolph

Osteopathic manipulative technique is applied to the basis of the action of the sympathetic nervous system. It is essential to remember that, generally speaking, the sympathetic system and the parasympathetic system act in opposition (with a few exceptions). These two systems give rise to osteopathic manipulative treatment. If the osteopath will keep these reactions in mind, his treatment will be more specific.

I wish to outline briefly the recommended treatment for a few common conditions which the general practitioner encounters in everyday practice.

1. Headache.—Chills, gastritis, and hypercholesterolemia definitely indicate the need for treatment of the sympathetic nervous system. This treatment should be directed to the areas from the fifth to ninth thoracic, the most important segments being the fifth, sixth, seventh, and eighth. By treating this area one helps muscular fatigue, decreases glandular secretions, and eliminates the presence of hydrochloric acid. (The physician readily comprehends the significance of this specific treatment).

In treating hypercholesteremia, parasympathetic stimulation by way of the vagus is definitely indicated, because the vagus possesses contraction of muscles, hypotension, and increased output of hydrochloric acid.

2. Gallbladder and Liver.—The liver, embryologically, is formed from the alimentary canal and the pericardium has the same innervation. Hence, in dealing with the gastrointestinal tract, the liver and gallbladder are involved. In treating cholecystitis, one and in the situation of the action being construction of the walls of the gallbladder. Very short treatment would be given to the vagus, but longer stimulation of the areas involving the fifth and ninth thoracic segments.

It is evident that a general osteopathic manipulative treatment would take the affective and specific for gallbladder and liver disturbances.

3. Head and Neck.—The visesenteric system of the head and neck is controlled through fibers which arise from the first thoracic and cervical segments. This is not due directly to the blood vessels, but they can be involved in the treatment. The carotid artery to all vessels in the head and neck. By treating and correcting lesions from the first to fifth thoracic, we lessen the engorgement of veins and arteries, therefore reducing the danger of sinus infection and congestion of infection. This can explain the good results obtained by osteopathic physicians in treating colds.

4. Heart.—The sympathetic nerve supply to the heart originates from the first to the fifth thoracic. These fibers pass to ganglia, which in turn send fibers directly to the heart muscles. The general action of inhibition is reversed to the heart, the action being activation or acceleration. It has been found that by osteopathic manipulation therapy applied from the first to the fifth thoracic, the heart rate is increased without elevating blood pressure. The pressure may fail in many cases; however, we are told by physiologists that there are fibers which increase the force of each heartbeat. Decrease the time of systole, and step up the output of the ventricles. In my opinion, this is the reason why osteopathic manipulative treatment is helpful in managing the diseased heart.

5. Pulmonary Nerves.—The sympathetic nerves arise from the fifth thoracic to the third lumbar and are considered by most physicians to be the most important sensory plexus of the body. Due to the fact that some sensory fibers are sent to the superior, inferior, and anterior mesenteric, renal, ovarian, and sympathetic ganglia, osteopathic manipulative treatment of this area has a far-reaching effect. The blood vessels act as a reservoir for surplus blood, serve to control blood pressure, and exert an influence in all cases which involve circulatory disturbances. Arthritis is greatly benefited because all patients with arthritis have some circulatory involvement.

6. Large Intestines.—In treating bowel conditions, it is important from an osteopathic standpoint to keep in mind that every visceral receives its sympathetic sympathetic fibers from certain segments of the cord and sends back its adventitious function to definite segments of the cord. The gastric and the thoracic bowel is caused by an imbalance of sympathetic and parasympathetic section. Muscular contractions in the bowel are inhibited by stimulation of the parasympathetics and the increased activity of secretory glands is augmented by this stimulation. Intestinal strain, cramp, and fatigue is definitely stimulated the action of the parasympathetic system, producing spasm, diarrhea, and severe pain. Colicky pains are recognized among the most common symptoms from increased vagus stimulation. When parasympathetic and sympathetic systems are equalized or are in unison, normal function results. A direct control over the symptoms is available through osteopathic manipulative therapy. Doctors of osteopathy and chiropractic can readily construct parasympathetic activity by increasing sympathetic inhibition. This specific correction of all osteopathic lesions from the fifth thoracic to the third lumbar will do much to control a spasmodic bowel.

Complementary

I wish to emphasize again the importance of sympathetic and parasympathetic sections. (1) In general, the sympathetic fibers and parasympathetic fibers act together. (2) The main exception to this general rule is found in the heart. Here the sympathetic activates through the stimulation of fibers while the parasympathetic inhibits by way of the vagus. (3) All blood vessels are supplied by the sympathetic and parasympathetic fibers which can combat disease and maintain physiological equilibrium.

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I firmly believe that most of the splendid results from osteopathic manipulative treatment are obtained through action of the autonomic nervous system. It is my opinion that a more thorough understanding of its two great component systems would lead to a more scientific application of osteopathic technic and better and more constant results.

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REFERENCES