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 Potteridge,† 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 technic 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 action 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 1

Let us take up first the action of the autonomic nervous system and its effect on the normal human body. Cannon,‡ 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 vasconstriction 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 "driving 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 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 over time, 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 vasomotor and vasodilator fibers, influences the minute blood system.

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 act 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 so-called essential hypertension, spastic colon, insomnia, jitteriness, and many functional conditions which are very real to him.

From a practical standpoint, the examination of a patient on 2 successive days should yield approximately the same result. Should one find the pulse rate, metabolism, and blood pressure the same on both examinations, he knows that the patient has a balanced autonomic system. Abnormal findings one day and normal the next would indicate an unstable autonomic nervous system.

A patient who is suffering is not so concerned regarding the pathological condition present as he is regarding the symptoms— which 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 nerve 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 vasoconstriction 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 provokes the inhibitory nerves which counteracts the parasympathetics 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 sympathetic to a motor nerve.

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 long continued 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 system.

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 insensitive to stimuli which 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 glycogen 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 so thoroughly as the sympathetics. However, we should know the signs of excess parasympathetic activity &
we can counteract the condition by means of sympathetic inhibition.

Parasympathetic stimulation produces some or most of the following symptoms: increased secretion of mucus, snot, and phlegm; increased bronchial secretion; moistness of the mouth; hyperemia and hypersecretion of the gastric glands depending on the degree of stimulation; a fluids bladder; and incontinence of urine and feces.

It might be said that the autonomic nerves provide the sustenance of man. They control digestion and excretion, effects of food material, and respiration. Food is prepared for the body's use by the autonomic nerves. The autonomic nerves activate the autonomic system of the body and assist in the function of the body.

The autonomic nervous system is divided into sympathetic and parasympathetic systems. The sympathetic system is responsible for the fight-or-flight response, while the parasympathetic system is responsible for the rest-and-digest response. The sympathetic system is associated with physical activity, whereas the parasympathetic system is associated with relaxation.

The sympathetic nervous system is responsible for the release of adrenaline and noradrenaline. These hormones activate the body's response to stress, such as an increase in heart rate and blood pressure, and can also affect the release of other hormones, such as cortisol.

The parasympathetic nervous system is responsible for the production of digestive enzymes, the release of insulin, and the regulation of smooth muscle in the body. It is often referred to as the "rest and digest" system because it is responsible for processes that occur when the body is not under stress, such as digestion and the regulation of body functions.

The sympathetic nervous system is innervated by the sympahtetic ganglia, which are located along the spinal cord and in the thoracic cavity. The parasympathetic nervous system is innervated by the vagus nerve, which travels through the neck and into the body.

The sympathetic nervous system is important for maintaining homeostasis in the body. It is responsible for the release of hormones that help to regulate blood pressure and heart rate, and it helps to maintain the body's temperature.

The parasympathetic nervous system is responsible for the production of digestive enzymes, which help to break down food into smaller molecules that can be absorbed by the body. It also helps to regulate the body's blood pressure and heart rate. The parasympathetic nervous system is important for the proper functioning of the heart and blood vessels.

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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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Editor's note

The pages appearing in this “Special reprints” section have been electronically scanned from the original journals in which they appeared. Consequently, the scanning process at a density to enhance readability has picked up such artifacts as “bleed-through” type from reverse pages and other “blemishes” that existed in the original paper on which the text was printed. Even the yellowing of the original pages has caused some darkening of the margins. JAOA regrets these anomalies and hopes that readers will overlook them and concentrate on the content of these works published in the osteopathic medical profession’s early history.

For interest sake, concluding pages of articles may contain “newsy” items of the original date.

Gilbert E. D’Alonzo, DO, October 2000

JAOA to continue special reprints series

In 2001, JAOA will be continuing this series of special reprints from past issues to commemorate 100 years of continuous publication, beginning in September 1901, as the osteopathic medical profession’s archival journal. The JAOA editors and staff hope that the articles selected will provide practitioners, osteopathic physicians-in-training, and students greater understanding and a firmer foundation in the history and evolution of the philosophy and practice of osteopathic medicine.

The topics to be represented by the articles selected by Associate Editor Michael M. Patterson, DO, and Albert F. Kelso, PhD, for this series will include:

■ Principles of osteopathy—transition years
■ Research—beginning the modern era
■ Functional thinking in osteopathic medicine
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■ The California issue
■ Osteopathy in other areas
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