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## The Emerging Concept of the Osteopathic Lesion\*

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### INTRODUCTION

The survival, growth, achievements, and increasing effectiveness of osteopathy are eloquent testimony to the soundness of the principles upon which it was founded. The attainments of the osteopathic profession have been possible only because the profession is founded upon the solid rock of basic truth. Its continued growth and prestige indicate that those truths continue to be correctly applied and soundly developed.

The time has come, however, when increasing attention must be given to the theoretical reserves upon which continued technical advance is predicated. For many reasons these reserves have been consumed far more rapidly than they have been replenished. In osteopathy, as in all technological aspects of modern life, large backlogs of fundamental information must be maintained and enlarged if continued practical advances are to be assured. They are, indeed, the springs from which the advances flow.<sup>1</sup>

In osteopathy these reserves consist of our understanding of the basic biological processes and mechanisms associated with the phenomenon designated as the osteopathic lesion. Today this understanding is not, or at least until a very few years ago was not, a great deal larger than in Still's day. Although knowledge of the mechanical aspects of the lesion (the "cause") and of its clinical manifestations (the "effect") has greatly advanced, there has been no parallel advance in our knowledge of the processes intervening between these two aspects of the problem.

These processes are the problems before us today. Given a lesion—so well known to osteopathic physicians through their trained fingers and through x-rays—how does it produce its effects? Through what mechanisms and channels does it impair the defensive, reparative, and homeostatic functions of the body? How does it predispose to disease? How does it upset physiological equilibria? What processes does it initiate? The very future of osteopathy, as a distinct and advanced system of practice, is directly related to the accuracy and thoroughness with which these questions can be answered in the next few years.

It is my purpose in this paper to present our current theories regarding these central aspects of the

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osteopathic lesion. Then I wish to draw some of the practical implications of these emerging concepts. Paradoxically, I shall present our current theories by dealing to a large extent with other matters. It is possible to do this because those other matters are so intimately, and sometimes inseparably, related to the osteopathic lesion. The discovery of these relations is as important as the discovery of the new facts about the lesion itself because, with the establishment of each such relation, a whole body of knowledge, ready-made and usually still growing, is automatically incorporated into the osteopathic concept. With every such incorporation our concepts, in which clinical and professional advances have their origin, are deepened and widened.

The history of science—physical, biological, or medical—records again and again the collapse of fences separating scientific and technical fields. As a result of certain fundamental discoveries entire fields of scientific pursuit, whole schools of thought, and major concepts begin to develop and attract disciples. These fields may develop independently and remain separate, one from the other, and apparently unrelated, for many years. However, as the knowledge and understanding within each field accumulates, through experience and research, it becomes apparent in many cases that the walls which separate these fields have very little substance; in fact, they exist only in the minds of men, and not in nature itself. Each field begins to draw from, and give to the other, new and additional meaning. Finally they merge.

Nowhere is this better illustrated than in the fields of immediate interest to the osteopathic profession. I have selected for discussion only three major fields which, from our perspective, appear to have much basic and distinctive substance in common. Each has yielded a major body of concepts, a school of thought or a school of practice. Each originated independently, at different periods and in three different countries, separated by thousands of miles, and under very different circumstances. Today they are adjoining fields and the fences between them are crumbling. They have in common the following general concepts:

1. The body is a unit; all parts function in the context of the entire organism.
2. Disease is a reaction of the organism as a whole. Abnormal structure or function in one part

exerts abnormal influence on other parts and, therefore, on the total body economy.

3. The organism has the inherent capacity to defend itself, to repair itself, and to resist serious upsets in equilibria.

4. The nervous system plays a dominant organizing role in the disease processes.

5. There is a somatic component to every disease which is not only a manifestation of the disease, but an important contributing factor.

6. Appropriate treatment of the somatic component has important therapeutic value in that it leads to improvement in the other components.

The concepts I refer to are: (1) the osteopathic, (2) the concept of referred pain and associated phenomena, and (3) the concept of disease developed by A. D. Speransky and his colleagues in Leningrad. These concepts have not only had very different origins, but very different courses of development.

The osteopathic concept soon led to the development of a most effective therapeutic weapon which became, and for more than 60 years has been the basis for a new and expanding school of practice. From the beginning, this weapon—osteopathic manipulative therapy—was so revolutionary and so effective that the major concern of its designers, developers, and practitioners was with: (1) Learning how to use it most effectively, (2) winning the right to use it, (3) determining its effects on the various ills to which man is heir, and (4) reproducing the weapon, winning recruits, putting the weapon in their hands and teaching them how best to use it.

Possessed of such a weapon, but with few other material resources, and preoccupied with those struggles in the face of opposition, it is understandable that the founders, the disciples, and the earlier practitioners of this school found it impossible to engage in the more leisurely pursuits of investigating experimentally the fundamental basis for the effectiveness of their therapeutic weapon.

The founders of the other two schools did not, however, strike upon new therapeutic measures in the early development of the concepts. They and their disciples, therefore, devoted themselves to seeking the mechanisms whereby pathological processes are initiated, and the channels whereby pathology of one part affects others. These investigations have led to extensive research programs which are now conducted throughout the world and which have won much support and many recruits.

These research programs have made available a great wealth of information, which has led to some sound theory. This, in turn, like all good theory, is today leading to good practice. New and promising forms of therapy are emerging from the work of these schools. It is to be expected that these forms of therapy, experimental though they may be today, but based as they are on rapidly expanding bodies of fundamental knowledge, will rapidly develop and increase in applicability and effectiveness. As I hope to demonstrate, both of these fields of investigation are actually concerned with certain fundamental aspects of the osteopathic lesion, though they may not be recognized as such.

In preparing this lecture, I have found it convenient to review the work of these two fields—referred pain and the work of the Speransky school—before summarizing the emerging concept of the osteopathic lesion, since that concept is emerging, not only from osteopathic research and experience, but from their

integration with contributions of these two schools in particular.

#### REFERRED PAIN AND ASSOCIATED PHENOMENA

This field of investigation had its most important beginnings in England in the work of Sturge,<sup>2</sup> Ross,<sup>3</sup> Head,<sup>4</sup> Mackenzie,<sup>5</sup> and others in the early 80's and 90's. More recently important contributions have been made by Sir Thomas Lewis and his co-workers,<sup>6</sup> also in Britain, and by a number of laboratories and medical institutions in this country. These workers were primarily concerned with the somatic manifestations of visceral disease, especially the somatic pain, and with related phenomena.

Even very superficial study in the field of referred pain reveals the close resemblance of this syndrome to the osteopathic lesion. Mackenzie,<sup>7</sup> for instance, many years ago spoke of the triad of somatic manifestations of visceral pathology: (1) referred pain, (2) hyperalgesia, and (3) motor phenomena.

1. *Referred Pain*.—In many cases, the pain of visceral disease is felt not in the organ itself, but is referred to the soma, that is, skin, muscles, etc. Very often these somatic structures do not overlie the area of disease and may be remote from it. It was soon demonstrated, however, that the zone of reference bears a segmental relationship to the area of origin; both are innervated from the same segments of the spinal cord. The pain is said to be referred to the corresponding dermatome and myotome. Many examples are familiar to the physician: The pain of angina pectoris, originating in the myocardium and referred to the chest wall, the back, shoulder, and medial surface of the arm; renal colic, which produces intense pain in the lower back and groin; irritation of the diaphragm which is referred to the base of the neck and shoulder tip.

2. *Hyperalgesia*.—Tenderness is also found in somatic structures segmentally related to the pathological viscus:

a. Cutaneous tenderness—the over-sensitivity to pinching and to friction in the dermatomes related to the sick viscus;

b. Muscular tenderness and exaggerated sensitivity of the muscles to deep pressure; and

c. Tender spinous processes. Interestingly enough to osteopathic physicians, Mackenzie<sup>7</sup> placed great diagnostic significance on the tender spinous processes. He demonstrated, for instance, that diseases of the heart were commonly associated with tender spines T1 to T4; stomach, with T4 to T8; liver, with T8 to T11; rectum and uterus, L5 to S2.

3. *Motor Phenomena*.—Mackenzie described the spasm, sustained contraction, and rigidity in muscles segmentally related to the pathological organ. He included under motor phenomena the autonomic changes in the zone of reference although they properly belong in a fourth category.

What is the basis for the "referred pain complex"? Much of the final answer is certain to be found in the spinal cord (Fig. 1). There is obvious interchange of excitation among all the types of neurons which meet or have their origin in a given segment of the spinal cord: The dorsal root (afferent) fibers conveying centripetal impulses from all the tissues, somatic and visceral; the various efferent or motor neurons, including those which have their cell bodies in the anterior horn and which regulate activity of the skeletal musculature, and those originating in the intermediolateral column which regulate visceral

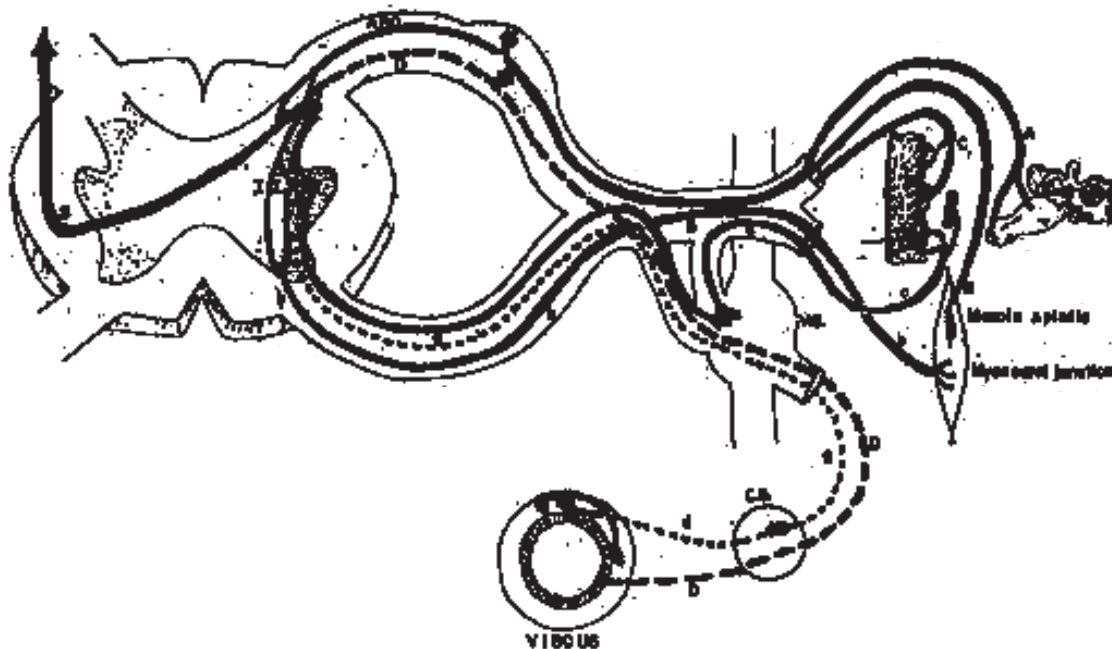


Fig. 1.—Diagrammatic representation of segmental reflex pathways among somatic and visceral afferents and efferents.  
**Afferents (Dorsal root neurons):**  
 A—From spinous process, joints  
 B—From stretch and tension receptors (proprioceptors) in muscles and tendons  
 C—From touch, pressure and pain endings in skin  
 D—From viscera  
**Afferents:**  
 ABC—Somatic efferents  
 b—motorones to skeletal muscle

e—sympathetic postganglionic neurons to blood vessels of skin and muscle; to sweat glands and pilomotor muscles of skin  
 f—sympathetic postganglionic neurons to visceral smooth muscle, blood vessels and glands  
 S—Spinothalamic fibers  
 I—Interneurons  
 L—Lateral horn cells (sympathetic pre-ganglionic neurons)  
 V.G.—Ventral ganglion  
 C.G.—Collateral ganglion

activity (motor and secretory), sweat gland activity, vasomotion, etc. The spinothalamic fibers which convey sensation of pain to the higher centers are also obviously involved in the complex. Although the spinothalamic fibers can be excited by impulses transmitted by the afferent fibers from the viscera, nevertheless the cerebral cortex projects or "refers" these sensations to somatic structures whose afferent fibers enter the same dorsal root. (See the paper by Drucker for a review of the mechanism.)

On the basis of these observations Mackenzie developed the hypothesis of the "irritable focus." This hypothesis stated, in essence, that irritation from the viscera, conveyed by the afferent fibers, renders many of the nerve cells in the same segment hyperirritable. As a result, tissues and organs innervated from that segment are affected by the visceral pathology. The "irritable focus" hypothesis has since been modified and restated in accordance with more modern concepts of facilitation.<sup>9</sup>

More recently Lewis and his colleague, J. H. Sigren,<sup>10</sup> showed that the phenomenon of pain reference was not peculiar to visceral irritation, since similar and even identical patterns ("triads") could be evoked by irritation of deep-lying somatic structures. They found that injection of 0.1 to 0.3 cc. of 6 per cent sodium chloride solution into certain ligaments, tendons, and muscles, could produce intense pain in relatively large and often remote areas of the

corresponding dermatome and myotome. The pain reference was accompanied by the other components of the classical triad, namely cutaneous and muscular hyperalgesia and muscular rigidity.

Even more striking was the demonstration that such localized irritation of the interspinous ligaments or spinal extensor muscles in certain segments, reproduced with remarkable precision the pain patterns and other somatic phenomena which are associated with visceral pathology.<sup>11</sup> This was true to such an extent that patients who had experienced the real disease could not distinguish between the experimentally produced and the naturally occurring syndromes. For instance, the injection of the eighth cervical interspinous ligament with the hypertonic saline solution produced a perfect facsimile of an anginal attack, not only with respect to pain distribution (including the subcostal pain and the radiation down the ulnar surface of the arm), but also the hyperalgesic areas, the muscular rigidity, and the sense of compression of the chest. Injection of the first lumbar interspinous ligament produced the typical pain distribution of renal colic (lower back, lower abdomen, groin, and scrotum), rigidity of abdominal and spinal muscles, hyperalgesia, and often a marked cremasteric reflex on the corresponding side. (In our own laboratory, we have not only confirmed these observations, but have demonstrated certain associated autonomic changes.)

Furthermore, these workers<sup>10</sup> and others<sup>12</sup> demonstrated that experimental trauma to certain visceral

organs produced recordable contractions of skeletal muscles in corresponding segments. These contractions could be almost perfectly reproduced (with respect to location, amplitude, and time characteristics) by irritation of certain somatic structures in the same segment. (Studies on the converse, namely the influence of somatic irritations on visceral function, are in progress in our laboratories.)

It may be concluded from these observations that not only does irritation or pathology in one tissue or organ stir up abnormal activity of other tissues in the corresponding segments, but that the complex—the pattern of the overall response to the primary pathology—is organized by the spinal cord. The character of the pattern is determined by the segment or segments which are involved, and not by the tissue which is first irritated (somatic or visceral) nor by the nature of the irritation.

It was early recognized by workers in this field that the secondarily irritated structures, that is, those tissues in the zone of reference, may themselves, as a result of this pathological influence, become secondary sources of irritation—leading to the establishment of a vicious cycle. This recognition has formed the basis for certain important therapeutic measures which have begun to emerge from this work. Given such a pattern, including visceral pathology and the reference phenomena, then why not eliminate the irritation contributed by the most accessible part of the complex—the somatic component? The potentialities of this approach were indicated 20 years ago by Weiss and Davis<sup>18</sup> who showed that at least the pain, due to visceral pathology, could be relieved by local anesthetization of the skin areas to which the pain is referred. It is of special interest that the relief from pain often outlasted the expected duration of the local anesthesia by considerable periods of time.

Other work (reviewed by Wolff and Hardy<sup>14</sup> and Wolff and Wolf<sup>15</sup>) has demonstrated that the sustained muscular contractions or spasms which are part of the referred pain patterns, may themselves comprise sources of irritation. Local infiltration of the rigid muscles, identified by palpation, relaxed those muscles, relieved the pain, and often produced improvement in the associated autonomic disturbances.

This general approach has been receiving especially significant development in the hands of Travell and her colleagues at Cornell University Medical College. They were able to produce complete and immediate relief from cardiac pain due to myocardial infarct by infiltrating appropriate trigger areas with dilute procaine hydrochloride.<sup>16,17</sup> These were intensely hyperesthetic areas located in the myofascial structures of the reference zone (usually in the pectoralis major, pectoralis minor, or serratus anterior). When sufficiently near the surface the trigger areas could also be effectively blocked by spraying the overlying skin with ethyl chloride. Relief from pain was not only immediate, but lasting. Relief was obtained for periods of months and even years. It is of interest that when similar trigger areas, in patients with skeletal muscle disorders without organic disease, are irritated, as by needling, referred pain occurs "which is indistinguishable in distribution and quality from the substernal and radiating pain of coronary insufficiency."<sup>17</sup>

Of interest to those familiar with the osteopathic concept and the current theories of the osteopathic lesion are the explanations of these observations proposed by these workers. Thus Travell and Rinzier<sup>16</sup> say, "The most reasonable explanation is that the

initial insult, whether to visceral or somatic structures, sets in motion a chain of events perpetuated by a vicious cycle of nerve impulses which have no further dependence on afferent impulses from the heart and which are probably transmitted to and from the soma by virtue of sustained facilitation of the noxious impulses by the closed self-reexciting chains of internuncial neurons in the central nervous system." Apparently, even brief interruption of this self-sustaining cycle of nerve impulses at any point in the chain may be effective in permanently abolishing it.

In explanation of the lasting effect of this brief interruption by local somatic block therapy they offer the possibility that the "somatic trigger mechanisms contribute to the perpetuation of the primary source of pain," that is, the coronary insufficiency. In support of this hypothesis they refer to the evidence obtained by Lindgren<sup>18</sup> that local anesthetization of the precordial structures produced improvement in the coronary circulation. Although the authors are careful not to make therapeutic claims unsupported by their observations, they point out that the relief of pain due to myocardial infarction may itself, have true therapeutic effect since there is evidence that pain may induce reflex spasm of collateral coronaries.

Autonomic changes in the zone of reference are well established, but it has only recently begun to be appreciated that the blood vessels supplying the brain and spinal cord<sup>19,20</sup> may also be included in the zone of reference. Travell and Bigelow<sup>20</sup> have recently shown, for instance, that phenomena of hysteria may be mediated by afferent impulses from trigger areas in skeletal muscles. Whether these zones are activated by psychogenic stress or (experimental) trauma, the same clinical patterns are produced. The patterns are often bizarre, and may be not only spatially, but also segmentally remote from the somatic trigger area. Infiltration of the appropriate and specific somatic structures dramatically relieved disorders of vision, respiration, motor power, and cutaneous sensation (e. g., glove-and-stocking paresthesias). The concept is advanced that "high intensity stimuli from somatic trigger areas reflexly produce prolonged vasoconstriction with partial ischemia in localized areas of the brain, spinal cord, or peripheral nerve structures." The authors point out that, in these patterns, raising the threshold of excitability at the synapse in the central nervous system directly, by general anesthesia, hypnosis or psychotherapy, may be expected to accomplish the same result as blocking the source of noxious impulses at the somatic trigger area.

No attempt has been made in this section to review this field, but rather to present a few outstanding examples and to establish several important concepts. (For more comprehensive reviews see references 8, 14, and 15.) These may be summarized as follows:

1. There is extensive interchange, through the spinal cord, among the various structures, visceral and somatic, blood vessels, glands, smooth muscle, skeletal muscle, skin, etc., which draw their innervation from the same segment.

2. Pathology or irritation of one of these structures may lead to the establishment of a pattern of changes in all the others. The pattern is determined more by the part of the nervous system affected than by the irritated structure or the nature of the irritation.

3. As a result of these associated pathological processes new sources of irritation may be produced, which lead to the establishment of an autogenetic vicious cycle of nervous impulses.

4. Interruption of this cycle for even a brief period may permanently prevent, or greatly delay its re-establishment, permitting the reparative processes (e. g., in the viscera) to proceed under more favorable circumstances.

5. Highly localized areas in skeletal muscle or myofascial structures frequently become important sources of afferent impulses in these complexes, reinforcing or facilitating the primary irritation, or even becoming independent of it. Inactivation of the somatic component of the pattern associated with visceral pathology, may disrupt the pattern and break the vicious cycle.

6. This has therapeutic import, not only because the somatic component is accessible and easily localized, but also because it may be the most important factor in sustaining the (primary) pathology.

7. The patterns are not exclusively segmental, in view of the involvement of the vasculature of the central nervous system. Vasospasm in the brain, spinal tracts, or nerves may produce secondary effects quite remote segmentally from the locus of primary irritation.

#### THE WORK OF THE LEHIGH LABORATORIES

Without going into the elaborate detail which the work of Speransky<sup>22</sup> and his coworkers deserves, let us summarize the main conclusions to which their intensive laboratory and clinical observations have led them.

1. The nervous system not only participates in every disease but plays a dominant role in organizing the pathological processes and their various manifestations.

2. Sustained irritation, inflammation, or pathology of muscles, skin, bone, viscera, or nervous structures initiates processes in the nervous system which may lead to certain functional and organic changes designated as "neurodystrophy." Once initiated, the processes in the nervous system do not require the continued action of the irritant, and the neurodystrophy may persist long after the primary pathology has ceased.

3. The neurodystrophy expresses itself through pathological and trophic changes in the various organs of the tissues, first, usually, in the segments related to the primary pathology, and later in other segments. The entire body may thus be affected.

4. The nature of the process, and its final extension, are independent of the nature of the irritation—chemical, physical or biological. The biological agents—the toxins, bacteria, viruses, etc.—act fundamentally in the same way as the chemical and physical irritants; they merely initiate the process, which then becomes independent of the primary pathology.

5. This role of the nervous system appears to be based upon much slower processes than nerve impulses—trophic processes. (Speransky emphasized repeatedly that his approach is distinguished by its different utilization of the time factor.) These trophic actions of the nervous system may well have their site in the movement of substances along the axon (as well as impulses), as indicated by the recent observations of Weiler<sup>23</sup> and Schmitt.<sup>24</sup>

6. As a result of the primary lesion, lasting and conceptually demonstrable, effects on the nervous

system may be produced which may remain latent for long periods of time. The signs of the original irritation may long have disappeared before the first signs of the disease appear.

A recent dramatic illustration of changes in the cord which persisted after the healing of the original lesion appeared in a report by Frankstein.<sup>25</sup> The foot pads of cats were injected with turpentine, producing pain and inflammation, and the typical limping and limb-withdrawal pattern. After some time the irritation disappeared, no signs of the inflammation were detectable and the animal no longer limped or "favored" the paw. At this time the cat was decerebrated, and it was found that the postures assumed by the animal were similar to those produced when a decerebrate animal receives intense stimulation upon the foot corresponding to that which had had the lesion, namely, flexion of the affected leg and exposed-extension. In other words, reflex signs of the original irritation reappeared, although that irritation had apparently vanished. Frankstein concluded that the initial irritation had set up some altered state within the spinal cord; this altered state persisted for some time after the precipitating lesion had subsided, but was masked by action of the higher centers. Removal of the forebrain permitted the pattern associated with the altered state to re-emerge. Frankstein implied, also, that such states in the nervous system, originally established by irritative processes, predispose to disease, though they may be masked for some time. Those segments are, so to speak, the vulnerable segments of the nervous system which may serve as foci of disease processes under certain circumstances.

This concept bears a distinct resemblance to that originally developed by Mackenzie, the concept of the lingering of the area of "irritation" beyond the duration of the initial stimulation. It will be recalled that Mackenzie also believed that once established, the irritable focus remained for a variable period of time after the initial source of irritation had been removed, and continued to influence the activity of structures innervated by that segment for some time. Similarly, an osteopathic lesion may exist for years without producing symptoms.

7. The effect of a given irritation, that is, the disease pattern it evokes, if any, depends largely on the condition of the "substratum," the patient and his nervous system, rather than upon the irritation itself. The "substratum" varies from individual to individual, and within the individual from time to time according to circumstances, environmental influences, etc. The disease—and the therapy—must be considered in the context of the patient as a whole.

8. These concepts are today providing the basis for therapy. Attention is focused, not on the offending organism, irritant, or primary lesion, but rather on the nervous system, and more specifically on those parts (e.g., spinal segments) which in each case organize the disease process. In essence, the object of therapy is to alter the balance of nervous factors in such a manner as to provide optimal circumstances for the operation of the normal reparative and defensive processes of the body.<sup>2</sup>

These principles were illustrated in a large series of cases of lobar pneumonia.<sup>26-28</sup> Speransky and his coworkers had previously demonstrated in experi-

<sup>22</sup> It is of interest that many years ago Mackenzie showed that lesions of the brain or spinal cord associated with visceral disease could be produced in the exposed viscera of nerve innervation. Such a relation is observed in osteopathy with the osteopathic as it is described in later sections.

<sup>23</sup> It is of interest that Speransky<sup>22</sup> notes that upon having obtained a favorable therapeutic effect, the osteopathic procedure should not be repeated or repeated often, since another less favorable balance might result. Consequently, osteopathy will counteract the tendency to self-heal. (Ibid., p. 2, and later, p. 3.)

mental animals that intense stimulation of sensory nerve endings in muscle and skin, in areas innervated from the medulla oblongata and upper segments of the cord, or direct mechanical and chemical stimulation of these parts of the nervous system, could produce profound pulmonary changes, very similar to pneumonia. These changes in the lung may develop within a few minutes. "Treatment must therefore be directed not only at the diseased lung but also at the associated nervous disturbance. . . . This suggested that treatment of pneumonia in men be directed at the nerve segments involved. . . . The above experiments showed that the nerve regions involved were connected with the cervical-thoracic segment of the spinal cord and the adjacent medulla oblongata. The anterior branches of this segment, except those supplying the head, neck and extremities, supply the organs of the chest and mediastinum specifically involved in pneumonia. But the posterior branches of these nerves are distributed in the long muscles and skin of the spine and neck. Thus by anesthetizing these posterior branches which have no direct connection with the lungs we shall affect through other axons specific nerve segments of the lung."<sup>26</sup>

In several hundred cases of lobar pneumonia in soldiers during the Finnish campaign and during World War II remarkable results were obtained by injecting 60 to 70 cc. of 0.5 per cent novocain intradermally into a diamond-shaped area extending sagittally from C3 to T4 and covering the medial halves of the scapulae. The treatment, when given early, is usually followed by a drop of temperature by crisis to normal within 18 to 24 hours; in some cases a drop by lysis occurs within 48 hours. Resolution of the pneumonic consolidation begins as the temperature drops and the general condition improves. Convalescence is short and uneventful. The treatment is non-specific since beneficial results were obtained also in acute or chronic catarrhal pneumonia, and the type of pneumococci responsible for the disease did not influence the effectiveness of the treatment. "Laboratory and clinical data support the belief that the therapeutic result is affected more by the site of the application than by the drug."<sup>27</sup>

#### THE OSTEOPATHIC CONCEPT

The basic principles of the practice of osteopathy need not, of course, be reviewed in detail for an osteopathic audience. We shall state them briefly, paraphrasing them somewhat, with the foregoing in mind, and review the basic processes through which these principles operate as they have been revealed by recent researches in osteopathic and other institutions.

1. A. T. Still fully recognized, and for the first time incorporated into a *system* of practice, the capacity of the human organism to resist and defend itself against noxious influences, to resist or compensate for alterations in equilibria, and to repair itself.

2. He fully recognized and incorporated into practice, the unity of the body as expressed in the fact that abnormal structure or function in one part exerts abnormal influence on other parts.

3. The human organism, presumably because of its incomplete adaptation to the erect stance, is highly subject to anatomic and functional derangements of

joints and their supports, especially the vertebral, pelvic, and other weight-bearing articulations.

4. These "errors" in weight-bearing unfavorably affect the structure and function of neighboring and distant parts of the body, thus initiating and contributing to pathological influences and processes. This complex of the articular disturbance and its associated phenomena has been designated as the *osteopathic lesion*.

5. The spinal lesion is associated with: (a) Tenderness or hyperesthesia of the paravertebral tissues and those overlying the vertebrae (skin, muscle, connective tissue); (b) muscular changes—rigidity, sustained contraction (or contracture), ropiness, and lowered motor reflex thresholds; (c) autonomic changes, as reflected in textural changes of the supraspinous tissues, vasomotor changes, alterations in visceral and other autonomic functions; and (d) pain, which, when it occurs, is of the "deep" variety; it is rather diffuse and may be radiating or "referred."<sup>28</sup>

6. The lesion may be detected and evaluated through its associated phenomena.

7. The osteopathic lesion is conceived as a most important—and frequent—etiological, predisposing, exacerbating, and sustaining factor in disease, through the establishment and maintenance of a vicious cycle of irritative, inflammatory, and other pathological processes which impair the defensive and reparative capacities of the human organism.

8. It may be present for varying periods of time without the production of symptoms.

9. The lesion may be corrected or improved through the application of appropriate manipulative technic. A highly effective system of osteopathic manipulative therapy has been developed whereby lesions of many kinds and locations may be corrected.

10. Correction of the lesion interrupts the vicious cycle and is followed by regression, amelioration, or abolition of the related pathological processes. Elimination of the lesion provides more favorable circumstances for the operation of the defensive, reparative, and homeostatic<sup>27</sup> mechanisms of the body.

11. Recent researches conducted at the Kirksville laboratories support the conclusion that the patterns of local and distant effects of the articular disturbance and associated phenomena—the osteopathic lesion complex—are mediated and organized by the central nervous system; the lesion expresses itself primarily *through* those parts of the nervous system with which it is associated. Correction of the lesion provides a more favorable balance of nervous factors.

Since these researches and the concepts which emerge from them have been recently reviewed<sup>28</sup> they will only be briefly summarized and supplemented by the advances that have been made since the publication of the review. I shall try to present our concepts dynamically rather than in the chronological order in which they have developed. (The reader may find it helpful to refer frequently to Figure 1.)

The disturbance of an articulation exerts its influence directly through the soft tissues which surround and support it. There is no known mechanism whereby the positional relationships of two bones or two vertebrae can be "registered" except through those tissues. Further, we have the frequent clinical observation that an osteopathic lesion need not have associated with it a gross articular displacement. At

<sup>26</sup>When this work was recently reviewed before the seminar on the osteopathic lesion at Kirksville, several members of the clinical staff remarked upon how similar was the course of the disease following this therapy to that (in their experience) following osteopathic treatment of lobar pneumonia.

<sup>28</sup>The similarity between this complex and the classical referred pain pattern is obvious.

any path, as a result, for instance, of an intervertebral lesion (whether it be described as a subluxation, a flexion, extension, or rotation lesion) the (paravertebral) muscles, tendons, and ligaments on at least one side of that articulation are subjected to, and maintained at, excessive tension. This causes the proprioceptors (and organs in muscle and tendon sensitive to changes in length and tension) to fire increased numbers of impulses into the corresponding segment of the spinal cord, via the dorsal root fibers with which they are connected. The frequency of the impulses fired by these receptors is in proportion to the degree of stretch (severity of the lesion?); and since these receptors are relatively nonadapting, the barrage is maintained as long as the tension is maintained.

The stretch or myotatic reflexes are self-regulatory and self-exciting. That is, because the dorsal root fibers (afferents) bearing impulses from the proprioceptors synapse directly<sup>20</sup> with the anterior horn cells which conduct impulses to the self-same muscle segments,<sup>21</sup> the stretched muscles are further stimulated to produce still more tension. This may be an important factor in the maintenance of the articular derangement once it is established.

Because of the synaptic connections of the dorsal root fibers, directly and through internuncial neurons, this nervous stimulation affects, potentially or actually, the excitability of all neurons which have their origins (cell bodies) in the corresponding segment of the spinal cord. These include not only the anterior horn cells,<sup>20,21,22</sup> but also the cells of the intermediolateral column,<sup>23</sup> which are the preganglionic neurons of the sympathetic nervous system. They include also the neurons coursing in the spinal tracts. This is certainly true of the spinotubular fibers which conduct impulses to the brain for the registration of pain, and there is evidence<sup>24</sup> that it applies to other tracts terminating in suprasegmental structures.

As a result of the sustained barrage of impulses, these neurons, in the segment of the cord associated with the lesion, are rendered and maintained hyperexcitable to all impulses which reach them regardless of their source—impulses from other segments of the cord, from the higher centers, including the cerebral cortex, from the skin, etc. (The inhibitory aspects of the lesion have not yet received experimental investigation.) The segment of the lesion is said to be a facilitated segment of the cord,<sup>25</sup> one in which "the barriers have been lowered."<sup>26</sup> The afferent (motor) neurons in these segments may be said to be maintained "on edge" (in a state of subliminal excitation), and easily triggered into activity by relatively few additional impulses from any source.

Since the neurons which have their origin in the segment of lesion, as in all segments of the spinal cord, represent final common paths, the activity of these neurons (and the structures they innervate) will be determined by the balance of inhibitory and excitatory impulses which reach them. Given a sufficient background of nervous activity, such as that descending from the cerebral cortex, its influence will be magnified and channeled through the facilitated segments, that is, the segments of lesion. As a result, the efferent neurons (and intraspinal neurons) having their cell bodies in these segments will discharge abnormally intense streams of impulses into the tissues

which they supply, which will therefore be maintained in altered states of activity. The segmental changes may include alterations in contractile states, in blood flow through various structures and organs,<sup>27</sup> in visceral motility, in rate and quality of secretion, etc.

If maintained for sufficient periods of time, these altered states of activity inevitably lead to pathological processes in the affected structures which, in turn, become secondary sources of afferent irritation. Another vicious cycle is set in motion, in which each structure reflexly, through the corresponding segments of the cord, irritates the other components. Continuation of these processes leads to profound structural and functional derangements of those tissues—trophic changes—which no longer depend upon nerve impulses for their maintenance. As was shown by Denlow and Elmscott<sup>28</sup> and confirmed many times since,<sup>29</sup> the paravertebral muscles in the segments of lesion remain rigid and apparently shortened, and under tension, in the complete absence of action potentials, that is, without stimulation from the anterior horn cells. By definition this is a state of contracture—a reversible loss of the ability to relax on the part of the contractile elements. (It will be recalled that Mackenzie found similar states of skeletal muscle associated with visceral referred pain.) These muscles are hyperesthetic and unquestionably continue to be a source of irritation to the cord.<sup>30</sup>

It is important to recognize that trophic, cellular and functional changes, due to prolonged irritation and operation of the vicious cycle, may extend also to the central nervous system itself. Cole<sup>31</sup> has obtained evidence that microscopically demonstrable changes in the cord are associated with the experimental lesion; these bear a distinct resemblance to the changes described by Weckers in Speransky's laboratory and by others. These pathological changes may comprise an enduring "irritable focus" in its literal sense and may be an important factor in the chronic lesion. Furthermore, as indicated in an earlier section, localized partial ischemia may be produced in the nervous system by peripheral irritations. Kogelberg<sup>32</sup> and Lehmann<sup>33</sup> have shown that impaired circulation through neural elements may render them not only hyperexcitable but spontaneously active, in which state they may themselves serve as "trigger zones."

Although the above presentation of the concept of the neural basis of the osteopathic lesion has been concerned with the segmental mechanisms and manifestations, although the primary focus is within the segment of lesion, and although the pattern of pathological processes associated with the lesion is especially conspicuous in the tissues segmentally related to the lesion, the importance of the extrasegmental and supra-segmental effects is not to be minimized, and is demonstrated in daily osteopathic practice. They, too, may be organized by the nervous system in at least two ways which have already been mentioned: (a) through the system of internuncial neurons and spinal tracts and (b) by the production of localized vaso-spasm and partial ischemia in the nervous system. The lesion apparently may irritate ascending neurons which terminate in various parts of the brain. Through descending tracts and cranial nerves such as the vagus, these may in turn alter the function of tissues segmentally remote from the primary lesion. This concept has been invoked by Cole<sup>31</sup> to account for the "widespread"

<sup>20</sup> It is thought by some that the spinal cells (especially in the thoracic region) receive the majority of the impulses from their proprioceptors. This may account for the grounds or "traps" as sometimes termed in specific locations with lesions.

<sup>27</sup> It is thought that even the altered circulation induced by the lesion in various organs and tissues, and upon which still placed as usual emphasis (the rate of the artery), is secondary to changes in the nervous system.

spread effects which he claims for the experimental lesion in the rabbit. Its similarity to the spread of neurodystrophies, in Speransky's view, is suggestive. Similarly, according to the views of Travell and Bigelow,<sup>19</sup> partial ischemia in parts of the brain stem, due to lesions in the cervical segments, could also produce far-flung effects. The evidence for the operation of these mechanisms in the osteopathic lesion is, however, still presumptive.

According to the above concepts, the basis for the effectiveness of osteopathic therapy lies in silencing the somatic component of the complex, by abolishing the contracture, spasm, or sustained contraction (and ischemia) of the skeletal muscles in the lesioned segment. Lasting effects are obtained by correcting the mechanical or articular disturbance which imposed the stress.

It is not a vital question, affecting the validity of these concepts, as to which part of the complex comes first. The mode of operation of the somatic component (the osteopathic lesion) is fundamentally the same whether the muscular and articular disturbance was the primary, precipitating factor in the complex, or whether it is secondary to irritations which arise elsewhere in the segment, e.g., in the viscera. Once established it plays a major role, or even the most important role, in the subsequent development of the pathological pattern. This is amply supported not only by clinical osteopathic experience (the secondary "reflex" lesion), but it is now a well accepted fact that the sustained muscular contractions in the classic visceral referred pain pattern become an important contributor to the vicious cycle; it has also been demonstrated by Wolff and his coworkers for headaches of various kinds and origins.<sup>24</sup> The important thing is that the somatic component, whether primary or secondary, is accessible and responsive to treatment, and that appropriate treatment of this component, by establishing a more favorable balance of neural factors, benefits all the structures associated in the pattern—and therefore the entire body.

#### THE TREND TO A UNITARY CONCEPT OF DISEASE

Three major fields of medical thought, which have had very different origins and different courses of development, have been briefly reviewed and shown to have a great deal that is fundamental in common. All three schools have, implicitly or explicitly, accepted certain basic principles or generalizations at which they have arrived through very different experiences and processes of reasoning. They appear to be concerned with very similar, if not identical, phenomena, although each may conceive of them differently.

All three schools agree that the somatic component of the disease pattern, of which the most conspicuous features are the sustained muscular contraction (rigidity, spasm, contracture), the sensory changes (pain, hyperesthesia) and vasomotor changes, is not only a sign or symptom of disease, but a major contributing factor to the disease, and that it may be a primary etiological factor.

All have therefore directed therapeutic attention to this component because of its accessibility and responsiveness to treatment, and because of the demonstration that improvement in this component results in improvement in the others, through interruption or retardation of a vicious cycle of impulses (or trophic influences) coursing through the central nervous system. The treatment of this component is

the very core of the osteopathic system of practice, while to the others it is at best experimental or ancillary to other forms of therapy.

It is important to point out that still a fourth major field of practice, which is daily becoming a larger and more important part of the healing arts and sciences, is intimately bound, by mechanism, to the three reviewed above. Its distinctive feature, too, is the emphasis on the nervous system, especially the cerebrum, as the organizer of, and even as a primary etiological factor in, disease. Reference is made, of course, to psychosomatic medicine. Representatives of all three of the schools previously reviewed have placed emphasis on the higher centers, especially the cerebral cortex, in the role of inhibiting, exciting, exaggerating, masking, reinforcing, or initiating the disease patterns mediated by the lower levels. Travell and Bigelow,<sup>19</sup> Theobald<sup>27</sup> and others have done it for the referred pain school; Frankstein<sup>24</sup> has demonstrated the influence of the cerebrum on the phenomenon designated as neurodystrophy by Speransky and his followers. Korr<sup>28</sup> has ascribed to the osteopathic lesion (chronic segmental facilitation) a localizing, channelizing, and predisposing influence in the bodily expression of mental or emotional imbalance. It is not surprising that this is being so widely recognized. After all, the nervous system exerts its influence on the body structures through the efferent neurons which are final common paths receiving and funneling impulses from a host of sources in the body, not the least of which is the cerebral cortex.

In all these schools there appears to be a demphasis of the specificity between the etiological agent on the one hand and the manifestations of the disease on the other. We see an approach to a unitary concept in which disease is conceived, not as the effect of this agent or that upon this organ or that, but rather as *the reaction of the organism as a whole to noxious influences*.<sup>38</sup> It is being increasingly recognized, and especially in the above four fields, that the organism can respond in only a limited number of patterns to noxious influences.<sup>39</sup> The pattern—the character of the disease—is determined by the patient, and not by the offending or invading agent; the nervous system certainly has a key role in the organization of the patterns. These schools, then, might be said to be characterized by their emphasis on the similarities among diseases rather than on their differences. "There are no illnesses; there are only ill people."

#### POSSIBILITIES IN THE FUTURE OF THE OSTEOPATHIC CONCEPT

There are many important implications in the above "story" for the osteopathic profession. The present writer is hardly the person to draw the lesson for the profession, but it might be well to point out some important facts and make some predictions supported by the foregoing and by recent scientific and medical advances.

It is clear that the basic concepts upon which osteopathy is based and which have been dealt with so successfully for more than a half-century are receiving increasing investigative attention and increasing therapeutic emphasis from other major schools of medical thought and practice. Workers in these other schools have arrived at these basic concepts by patient, intensive, and extensive exploration of basic mechanism. They have arrived at these concepts through very different experiences and processes of



thought than has the osteopathic profession, and, indeed, still think of them and apply them in a very different context.

The osteopathic profession has earned its place in history and society, however, through having developed, and effectively and skillfully applied, a system of diagnosis and therapeutics based on the role of the somatic structures in disease. It has demonstrated, although it is not yet recognized by the other schools, that the somatic component can be most directly and effectively influenced and controlled by adjustment of the vertebral and paravertebral structures—i.e., by recognition and correction of the osteopathic lesion. One illustration will suffice. The somatic trigger areas which Linzler and Travell<sup>11</sup> have found in the muscles of the thoracic cage, in association with certain cases of coronary insufficiency and muscular disorders, are apparently identical with, and certainly similar to, those commonly associated with the rib lesions familiar to the osteopathic physician. Adjustment of the articulation of the rib-head on the vertebra is followed by disappearance of intensely hyperesthetic spots in the serratus and pectoral muscles and relief from pain. It is important to recall, also, that rib lesions in the upper segments often produce pain patterns and other subjective phenomena typical of angina pectoris. Immediate, complete, and lasting relief is obtained upon correction of the lesion.

That system of diagnosis and therapy and the content of the lesson distinguish osteopathy from all other schools, and they are possessed by no other school. Adjustive manipulative therapy, as the heart of his practice, distinguishes the osteopathic physician from all others. We must be quick to recognize, however, in the light of the foregoing, that workers in other schools of practice are placing increasing importance, with respect to disease, upon the processes which are associated with or initiated by the osteopathic lesion, and are making serious and effective attempts to base therapy on the interruption of those processes.

Although it is impossible to make accurate predictions one can say with a high degree of certainty that continued investigations by these workers must inevitably lead to the development of new and better forms of therapy. Although it is possible that they will "discover" the osteopathic lesion itself and the direct schools for its treatment, it is much more probable, in view of the present direction of their work, that they will circumvent the lesion by learning how more effectively to deal with the processes it sets up. As a result of our own researches we are presented with promising approaches to the development of new forms of osteopathic therapy in which the lesion is averted simply by preventing its effect on the body. The rapidity with which these approaches are pursued will be determined to a large extent by the resources which are made available.

It can also be stated with a high degree of certainty that the stage has been set by history and scientific advances, for the emergence, in the near future, of an osteopathic concept, in one form or another, as the dominant system of practice. We believe this to be true regardless of what further the osteopathic profession does about the development of the osteopathic lesion in preparation for this historic role.

In what way is history making a place for osteopathy as the dominant system of practice? From its birth osteopathy was faced with powerful competition from the concept of the "foreign agent" in disease. Pasteur's discoveries almost coincided with those

of Still. The bacteriological concept of disease—the concept that disease was "caused" by this organism or that—was sweeping the world (as were the diseases) while Still and his few followers were patiently and heroically struggling for recognition of the osteopathic concept. This was taking place at a time (the third and fourth quarters of the last century) when medical science was practically nonexistent in this country, and when, although great strides were being made in Europe (Pasteur, Virchow, Ehrlich, Metchnikoff, Mueller, Bernard), not one result of real scientific investigation had yet been successfully applied to therapy,<sup>12</sup> at a time when the infectious and contagious diseases were the major health problem, and when the average life was cut very short by diseases "caused" by invading agents.

Today, as a result of the tremendous advances in our knowledge of the infectious agents and their modes of transmission, in immunology, preventive medicine, chemotherapy, in the social control of disease, in sanitation, etc., the infectious diseases are no longer the major health problem of the world. In the past 40 years we have seen them, one by one, succumb to these advances, until today the biggest killers among these diseases have been all but eradicated. A continuous decline in incidence of all infectious diseases may be reliably expected. This decline is strikingly illustrated in the leading causes of death. In 1900, tuberculosis, pneumonia and the acute intestinal diseases, enteritis and typhoid fever, were way out front. Pneumococcus pneumonia today is a vanishing disease; typhoid fever is virtually eradicated; tuberculosis seems destined for a similar fate.<sup>13</sup> Today the main killers are the chronic degenerative diseases, which claim their victims largely from the older segments of the population.

As a result of these advances there has been a great increase in the average life expectancy. Persons in the middle and late years comprise a much larger segment of the population than at the time of the founding of osteopathy. In the last 40 years the proportion of people over 60 years of age has doubled. It is now 10 per cent and is expected to double in the next generation. From 1933 to 1946 alone the average age at death increased from 58.2 to 64.2.

However, although the percentage of people over 60 has increased, the average man at 60 has the same life expectancy as had a man of 60 in 1900—about 14 years. In other words, lives saved from infectious diseases are still being lost at an age not far from the traditional ones of the past.<sup>14</sup> They are being lost to the chronic degenerative diseases, the diseases of maturity and senescence, the functional disorders. Large segments of mature and older persons live highly restricted, unproductive existences, burdened with discomfort and disability, resulting from these diseases. As Dr. Leonard A. Scheele stated upon his induction as Surgeon General,<sup>15</sup> "We find ourselves faced . . . with an enormous personal and national burden of disease in the adult population, the most productive element of our society. It is possible that we shall not be able clearly to define healthy maturity until we learn more about the chronic degenerative diseases and until we attempt to apply to the entire population our knowledge of these diseases. . . . We have barely started to explore . . . the major causes of death and ill-health among adults." (Italics supplied.)

Although chronic and degenerative disorders are spoken of as diseases of maturity or of middle and late life, it is not adequately appreciated that often they

have their beginnings in youth and childhood. Early life and childhood are themselves too frequently victimized by the chronic diseases and disabling functional disorders. *These* diseases are today the biggest killers, the biggest cripplers, and among our most pressing social problems.

Today the osteopathic concept is the only one sufficiently broad and sufficiently unitary in its outlook, upon which a *system* of practice can be based, that is capable of encompassing all these diseases. Today osteopathy is the only system of practice which has preventive potentialities with respect to these diseases. Medical practice as yet has no key, no clear-cut, and certainly no *systematic* approach to the prevention of these disorders. Treatment is still largely palliative, symptomatic, or substitutional. A few illustrations will suffice. In the treatment of diabetes mellitus, in which such great advances have been made since the discovery and isolation of insulin, the disease itself—the pancreatic deficiency—is taken for granted. The prevention of this deficiency, or even the elimination of the basis for the deficiency, has received no practical therapeutic attention. Without minimizing the importance and the magnitude of the advances made in the recent past through research, unfortunately no more than this can be said of the other chronic degenerative diseases and functional disorders:

What can be positively said about the *prevention* of heart disease, coronary thrombosis, hypertension and peripheral vascular diseases, the skin diseases, the arthritides, kidney diseases, rheumatism, peptic ulcer, and the host of endocrine disturbances? Can it yet be said that medical science, in the *treatment* of these diseases, has gone more than a step beyond the palliation of the signs and symptoms, or beyond the treatment of the terminal step in the disease processes? In fact, the terminal process is usually referred to as the cause of the disease. The endocrine diseases are "caused" by under- or overactivity of this gland or that; they are accordingly treated. But what combination of factors led to the over- or underactivity? To ascribe them to "autonomic imbalance" or to the under- or overactivity of another gland is merely to beg the question.

The success of osteopathy in the treatment of many of these diseases and the promise of osteopathy in their prevention, lie in the following three factors:

1. The identification of a major predisposing and primary etiological factor in disorders affecting all parts of the body;
2. Its detectability in even very early stages; and
3. Its amenability to correction *before* it does irreparable damage. All three, in other words, mean the recognition and appropriate treatment of the osteopathic lesion.

A great deal, however, remains to be learned before osteopathy is adequately prepared for its role as the preventive medicine of tomorrow.

1. The effectiveness of osteopathic therapy in preventing and alleviating disorders of all kinds needs to be precisely evaluated on a mass scale. This requires reliable comparisons of segments of the population receiving osteopathic therapy with those not, as to incidence of the various diseases, mortality, duration of the illness, convalescence, etc. Statistics on the control segment of the population are already amply available. It is difficult to conceive of a more informative—and more convincing—survey of the therapeutic and preventive merits of osteopathy than the comparison of two large groups of children—one of which is under

osteopathic management, the other not—and following their medical records into adulthood. The osteopathic profession has simply not tested adequately, with sufficient persistence, with adequate controls, with objective enough methods, with careful enough recording, and in sufficient numbers, the value of osteopathy in a large number of baffling conditions—especially those dealt with in the various specialties which have developed since Still's day. It is sometimes too easy to resort to convenient symptomatic treatment.

2. Osteopathic concepts and technics have to be developed to the point where they can be applied effectively to *entire populations*, in the same way that the preventive medicine of today protects millions at a time against infectious diseases.

3. A great deal more needs to be learned about the factors leading to the development of the lesion—the structural, postural, congenital, environmental, inheritable, occupational, age, activity, and other factors. What again, in this regard, could be more informative than studies on large numbers of children in different age groups for the incidence of lesions of various kinds, in relation to those various factors? This would make possible education of masses of people on the *prevention of the lesion*.

4. We need reliable, easily applied methods of detection of the lesion which may be utilized by the lay population that they may benefit from early correction.

5. We need to learn a great deal more about the lesion itself and the processes which it initiates and sustains. Without question, the time, labor, and skill required for the correction of each lesion set a certain limit upon the mass applicability of present-day osteopathic therapy, although today that labor and skill are the basis for the very success of osteopathy, and of its distinction from other forms of therapy. On the basis of our present knowledge it is entirely conceivable that a higher, more general, less laborious form of osteopathy may be achieved by preventing or interrupting the effects of lesions, by preventing or abolishing the processes that lesions initiate—wherever the lesions may be and whenever they occur. This possibility has already been referred to, and it is important to recall that the processes associated with the lesion are receiving widespread attention in nonosteopathic institutions.

It would appear from the foregoing that to consider that the osteopathic concept is the same today as it was at the time of its inception is a serious mistake. Any endeavor to *keep* it the same is even a worse mistake. This does not imply departure from the fundamental Stillian principles, but rather their extension, explanation, and elaboration, as recent advances in genetics and cytology have done for the Darwinian principles. The concept itself has been greatly enriched and developed, and its forms of application, its range of effectiveness have been widened. But most important, the osteopathic concept is different today for the simple reason that it has new roles to play with respect to the national health, and it operates in a very different context—social, political, scientific, economic—from that in Still's day. A living, working concept—and the osteopathic concept is certainly that—could not remain the same while the scene around it is transformed. A new and more important place in the world scene for the osteopathic concept has been, and continues to be, prepared. The concept and the technics must continue to evolve, to fill that place, fit in with the scene, and operate in the new context. But

they must evolve at an accelerated pace because the scene is changing rapidly.

CONCLUSIONS

In summary, then, from this perspective, the following appear to be the major tasks before the profession today:

A. So to practice osteopathy as to leave no question, leastwise in the mind of the patient, as to what is distinctive about osteopathy as a system of practice and wherein lie its merits. In view of the clinically and experimentally demonstrated role of the osteopathic lesion as a predisposing and etiological factor, the question is seriously raised whether any osteopathic physician has the moral right to withhold the only therapy which today can correct it. One can certainly question the wisdom or motivation of any osteopathic physician who casts aside the powerful and preventive weapon which he alone possesses for palliative and symptomatic therapies simply because they are more convenient or easier to apply. One can certainly question the integrity of any osteopathic physician who casts the weapon aside to conceal his distinction from other physicians.

B. The profession must establish a research program of such magnitude and productiveness as befits the historic importance of the osteopathic concept. This is required to provide the information and the new techniques which will prepare osteopathy for its role as the central theme in the healing and prevention of tomorrow on a mass scale. We need data, and still more data.

C. The osteopathic colleges must become among the best institutions in the world for the training of physicians—physicians who will be prepared to meet the growing challenge; physicians who, through their training in scientific osteopathy, will provide the steady stream of needed information and data; physicians who will seek and know how to apply scientific advances to the health of mankind; physicians who will know how to teach others to do likewise. Our colleges must be staffed by the best physicians and the best scientists who must be given the means with which to do their best work. The facilities must be sufficiently large that no member is so burdened with pedagogical or clinical duties that he cannot contribute, through research, to the knowledge in his field.

The third is unquestionably the most important of the three tasks, because the fulfillment of the other two, as well as those concerned with organization, legislation and public relations, will flow from the fulfillment of this one. The osteopathic profession has reached a stage of development where its progress from now on will be limited by, and in direct proportion to, the progress and welfare of its training and research programs.

These tasks, it would appear, are the order of the day for the osteopathic profession.

It is important to remember that the scientific world and mankind in general are neutral in the struggle of the osteopathic profession against its opponents; they are even indifferent to the question of its survival and continued growth as a distinct and separate profession. They are not neutral, however, in the question of truth versus untruth, especially as it affects the life and welfare of humanity. The things that will make possible the continued and rapid development of osteopathy to its fullest potential are the very things, at the same time, will lead to its universal acceptance as a superior—and indispensable—form of

practice. We refer again to data, solid, incontrovertible fact which permits no alternative conclusion; not opinions, no quotations, not the isolated dramatic case, not even faith, but "the scientific substance in which faith can be intrinsic."<sup>12</sup>

History and society have presented the osteopathic profession with a great challenge and a great opportunity—the development of osteopathy to its fullest man-serving potential. Because of its illustrious half-century of successful application of the osteopathic concept, this profession has been best equipped by history to meet this challenge. Whether—and how—the profession meets the challenge will determine the future of the osteopathic profession, but not the survival of the osteopathic concept; that seems determined. Good ideas never die; society eventually makes places of honor for them. If this profession does not take that historic opportunity and meet that challenge, then others certainly will. To paraphrase an aphorism of Sir William Osler's: In science credit goes to the man (or the profession) who convinces the world, not to the one to whom the idea first occurs. The history of the osteopathic profession shows that once a challenge has been recognized—invariably that challenge has been met—and with honor.

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REFERENCES

1. Korv, J. M.: Research program for the osteopathic profession. *J. Am. Osteop. A.* 47:528-571, March 1942.
2. Stanger, W. A.: Phenomena of angular periodic and their limiting case theory of counter-irritation. *Brain* 14:228-215, 1902-4.
3. Egan, J. I.: On the regional distribution of sensory functions. *Brain* 12:112-121, 1887-9.
4. Hald, H.: The mechanism of sensation with special reference to the pain of visceral disease. *Uppsala* 32:1-22, 1892; or 37:123-150, 1894.
5. Woodcock, J.: Some points bearing on the connection of sensory disorders and visceral disease. *Brain* 12:211-224, 1889.
6. Lewis, T.: *Pain*. The Macmillan Co., New York, 1942.
7. Minkowski, J.: Symptoms and their interpretation. Ed. 2. Paul B. Hoenes, New York, 1912, p. 304 E. (Also later editions.)
8. Drucker, D. E.: Inferior pain and the osteopathic lesion. *J. Am. Osteop. A.* 47:623-626, Aug. 1942.
9. Hines, J. C., and Phillips, E. A.: Observations upon the sympathetic nervous system. *J. Neurophysiol.* 5:173-181, March 1942.
10. Lewis, T., and Kolliker, J. H.: Observations relating to referred pain, chloretone-cocaine reflexes and other associated phenomena. *Clin. Sci.* 4:47-57, June 1945.
11. Kolliker, J. H.: Histologic anatomy visceral pain. *Clin. Sci.* 4:508-510, Oct. 1945.
12. Davenport, C. H. N., and Mellorby, H. A.: Reflexes elicited by visceral stimulation in man: spinal reflexes. *J. Physiol.* 145:100-104, July 15, 1946.
13. Wells, B., and Davis, D.: Equilibrium of afferent impulses from skin in modulation of visceral pain: skin irritation as inhibitory sympathetic nervous. *Am. J. M. Sc.* 176:1317-1326, Oct. 1928.
14. Wells, H. G., and Harty, J. D.: On nature of pain. *Physiol. Rev.* 37:187-206, April 1947.

15. Wolff, H. G., and Wolf, S.: Pain. Charles C. Thomas, Springfield, Ill., 1948.
16. Travell, J., and Rinzler, S. H.: Relief of cardiac pain by local block of somatic trigger areas. *Proc. Soc. Exper. Biol. & Med.* 63:480-482, Nov. 1946.
17. Rinzler, S. H., and Travell, J.: Therapy directed at somatic component of cardiac pain. *Am. Heart J.* 35:248-251, March 1948.
18. Lindgren, I.: Cutaneous precordial anesthesia in angina pectoris and coronary occlusion; an experimental study. *Cardiologia* 11:207-213, 1946-7.
19. Travell, J., and Bigelow, N. H.: Role of somatic trigger areas in patterns of hysteria. *Psychosom. Med.* 9:353-363, Nov.-Dec. 1947.
20. Roberts, J. T.: Role of vasa nervorum especially in regard to "referred pain." *Fed. Proc.* 7:103, 1948.
21. Speransky, A. D.: Basis for theory of medicine. International Publishers, New York, 1944, p. 452 ff.
22. Weiss, P.: Site of cell growth. *Science* 106:511, Nov. 28, 1947.
23. Schmitt, O. H.: Measurement of electrical energy release, "impedance," and longitudinal transport in nerve by differential electrode techniques. *Fed. Proc.* 7:109, 1948.
24. Frankstein, S. I.: One unconsidered form of part played by nervous system in development of disease. *Science* 106:242, Sept. 12, 1947.
25. Speransky, A. D.: Experimental and clinical lobar pneumonia. *Am. Rev. Soviet Med.* 2:22-27, Oct. 1944.
26. Ginsburg, E. M.: Pathogenesis and treatment of lobar pneumonia. *Am. Rev. Soviet Med.* 2:28-36, Oct. 1944.
27. Deming, G.: Background for rational therapy. *Osteop. Med.* 1:28, Aug.; 65, Oct. 1943; 2:20, Jan. 1944.
28. Korr, I. M.: Neural basis of osteopathic lesion. *J. Am. Osteop. A.* 47:191-198, Dec. 1947.
29. Lloyd, D. P. C.: Conduction and synaptic transmission of reflex response to stretch in spinal cats. *J. Neurophysiol.* 6:317-326, July 1943.
30. Denslow, J. S., and Hassett, C. C.: Central excitatory state associated with postural abnormalities. *J. Neurophysiol.* 5:393-402, Sept. 1942.
31. Denslow, J. S.: An analysis of variability of spinal reflex thresholds. *J. Neurophysiol.* 7:207-215, July 1944.
32. Denslow, J. S.; Korr, I. M., and Krems, A. D.: Quantitative studies of chronic facilitation in human motoneuron pools. *Am. J. Physiol.* 105:229-238, Aug. 1947.
33. Korr, I. M., and Goldstein, M. J.: Dermatomal autonomic activity in relation to segmental motor reflex threshold. *Fed. Proc.* 7:67, 1948.
34. Cole, W. V.: Osteopathic lesion complex. *J. Am. Osteop. A.* 47:399-406, April 1948.
35. Kugelberg, E.: "Injury activity" and "trigger zones" in human nerves. *Brain* 69:310-324, Dec. 1946.
36. Lehmann, J. E.: Effect of asphyxia on mammalian A nerve fibers. *Am. J. Physiol.* 119:111-120, May 1937.
37. Theobald, G. W.: Some gynaecological aspects of referred pain. *J. Obst. & Gynaec., Brit. Emp.* 53:309-327, Aug. 1946.
38. Seguin, C. A.: Concept of disease. *Psychosom. Med.* 8:252-257, July-Aug. 1946.
39. Wolf, S.: Experimental research into psychosomatic phenomena in medicine. *Science* 107:637-639, June 18, 1948.
40. Lane, M. A.: A. T. Still, founder of osteopathy. *Journal Printing Co., Kirksville, Mo.*
41. Long, E. R.: Medical science and longer life. *Science* 107:305-307, March 26, 1948.
42. Statement by Dr. Leonard A. Scheele upon induction as Surgeon General, Public Health Service, Federal Security Agency, April 5, 1948. *J. Am. Osteop. A.* 47:472-474, May 1948.
43. Long, F. A.: A review of research; introduction. *Osteop. Med.* 1:57-64, Oct. 1943.



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