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Osteopathic manipulative treatment and the Spanish flu: a historical literature review

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Abstract

Context: The Spanish flu pandemic of 1918 was approached with a variety of management techniques available at that time, including osteopathic care in addition to standard medical care.

Objective: To analyze the osteopathic manipulative treatment (OMT) techniques used for the management of patients affected by the Spanish flu according to four themes: the principles and procedures used, frequency and length of OMT, reported side effects, and advice for patients.

Methods: A structured review of the literature was performed by hand searching texts at the Museum of Osteopathic Medicine International Center for Osteopathic History in Kirksville, Missouri, and online via PubMed (National Library of Medicine), ScienceDirect (Elsevier), and Google Scholar (Google, Inc.). The literature search was carried out between February and March 2020. Three keywords were selected from the medical subject headings database of the

National Library of Medicine: manipulation, osteopathic; influenza pandemic, 1918–1919; epidemics. Articles were then reviewed for relevance by screening for articles published between 1900 and 1940 that contained at least 1 of the following keywords in their title: Spanish influenza, flu, epidemic, grippe, pneumonia, or osteopathic management/treatment. All articles that provided information about OMT and advice met the inclusion criteria. Articles that did not report descriptions of manipulative intervention were excluded.

Results: Our search yielded 63 articles: 23 from the hand-search and 40 from the electronic search. No electronic source was selected for the review because none met inclusion criteria. A total of 16 articles from the hand-searched set met inclusion criteria and were analyzed according to the four main themes stated in the objective. The range of OMT approaches reported to be administered to patients with Spanish flu suggests that early osteopathic physicians treated patients with this disease using OMT in addition to offering advice on healthy lifestyle behaviors.

Conclusion: Conclusions from this study are limited by the historical and descriptive nature of the data gathered, which lacked the rigor of modern-day scientific studies. However, this review could lead to future research inquiries on the effectiveness of these approaches. Osteopathic physicians and osteopaths should embrace their historical osteopathic heritage by continuing the work of our predecessors and combining their hands-on experience and osteopathic principles with modern medical treatment and rigorous scientific standards.

Keywords: OMT; osteopathic manipulative treatment; pandemic; Spanish flu.

In the spring of 1918, near the end of World War I, a new disease – the Spanish Influenza (Spanish flu) – broke out and claimed millions of lives. The Spanish flu forever changed the global political and economic scenery, becoming one of the most devastating global health crises

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in recorded history.¹ In spite of the limited global travel and transportation facilities available at that time, the Spanish flu pandemic reached a simultaneous peak activity in multiple continents within a few months after its appearance.¹ Speculation still surrounds its origin, with possibilities including US military camps like one in Haskell County, Kansas, or the army camp and hospital in Étaples, France.^{2–4} Physiological symptoms generally lasted seven days and included chills, shivering, high fever, weakness, nausea, loss of appetite, pharyngitis, cough, and bloodshot eyes.⁵ After the initial onset of symptoms, some patients experienced a brief recovery to normal health followed by an aggressive recrudescence of disease, and, ultimately, death.⁵

The majority of fatal infections resulted from respiratory complications, similar to those caused by the 1889 “Asiatic flu” (or “Russian flu”), and were associated with an acute, aggressive bronchopneumonia (including epithelial and vascular necrosis, hemorrhage, edema, and bacterial-associated overinfection within the lungs) and a severe acute respiratory distress-like syndrome associated with severe facial cyanosis.⁶ Patients manifested a rapid disease progression, frequently leading to fatal multiorgan failure.^{7–9}

While other flu epidemics exhibited age-specific death patterns in the very young and the very old, the Spanish flu had a distinct peak of deaths in young adults between the ages of 20–40 years.⁷ Ultimately, the pandemic caused 500 million infections worldwide (roughly 1/3 of the world population at the time), resulted in an estimated 50 million deaths.¹⁰ and a had case-fatality rate greater than 2.5% (>25 times higher than any other previously reported pandemic).^{7,11} Published data shows that the mortality of the Spanish flu pandemic had vast regional differences (Africa: 2,175,000; Americas: 1,540,000; Asia: 26,000,000–36,000,000; Europe: 2,300,646; Oceania: 85,000).¹² Johnson and Mueller¹² suggested that areas such as coastal locations, urban centers, and places with higher levels of connection via communication and transport networks endured higher mortality rates vs. remote, rural, and isolated areas. In the United States, the death toll was 675,000.¹²

The following excerpt is from a letter written in 1918 by a physician at Camp Devens, a US military base near Boston, MA, to the Department of Epidemiology at the University of Michigan.^{13,14} The letter, signed by a man named Roy, provides an early description of the symptoms and disease progression of the Spanish flu.

These men start with what appears to be an ordinary attack of Influenza, and when brought to the Hospital they very rapidly

develop the most vicious type of Pneumonia that has ever been seen. Two hours after admission they have the Mahogany spots over the cheek bones, and a few hours later you can begin to see the cyanosis extending from their ears and spreading all over the face, until it is hard to distinguish the coloured men from the white. It is only a matter of a few hours then until death comes, and it is simply a struggle for air until they suffocate.¹⁴

The epidemic spread very quickly, in spite of the attempt to limit its dissemination by closing public spaces (e.g., schools, picture shows, and pool halls) and implementing the rules of social distancing (e.g., prohibiting more than three people in saloons at the same time in Big Timber, Montana).¹⁵ New hospitals were also built to cope with the increasing number of patients; however, the epidemic was so invasive that more restrictive measures were necessary to contain the spread.¹⁵

In Kirksville, Missouri, the American School of Osteopathy tried to limit the pandemic by urging all its alumni to assist patients with the Spanish flu; 2,445 osteopaths were recruited and treated 110,122 influenza patients.¹⁶ According to the data reported in articles published in the aftermath of the pandemic,^{17,18} patients treated by osteopathic physicians and osteopaths showed significantly lower morbidity and mortality rates compared with patients treated by physicians administering the standard medical care of that time.¹⁹

A 1919 article by Riley, which was reprinted by the *Journal of the American Osteopathic Association* in 2000,²⁰ also reported low rates of pneumonia in patients under the regular care of osteopathic physicians during the time of the Spanish epidemic. Hruby and Hoffman²¹ noted that, although no controlled studies or descriptive comparisons between the patients of osteopathic and allopathic physicians had been published (because of the lack of rigorous research methods and criteria available at that time), osteopathic physicians and osteopaths did seem to achieve a high success rate, and osteopathic manipulative treatment (OMT) likely played a major role in patients' recovery.

In 2020, more than a century later, the world is responding to a new pandemic, novel coronavirus disease 2019 (COVID-19). While the response to COVID-19 has used modern technological and scientific breakthroughs such as genomic studies, new antivirals, and possible vaccines, it has also relied on containment approaches that proved effective during the Spanish flu pandemic, like quarantine, rigorous hygiene standards, and social distancing along with new strategies based on multidisciplinary and personalized approaches to respiratory infections.²² The aim of this historical literature review is to examine which OMT techniques were administered to affected patients during the 1918 Spanish flu pandemic.

Methods

Using a design similar to a previous historical literature review by Liem and Ost,²³ our structured narrative review was performed by both manual and online searching undertaken on March 26, 2020. One researcher (J.H.) hand-searched historical osteopathic books, journals (e.g., *Journal of Osteopathy [1918–1937]*; *Journal of the American Osteopathic Association [starting 1901]*) and other references at the Museum of Osteopathic Medicine International Center for Osteopathic History in Kirksville, Missouri. Another researcher (F.B.) searched PubMed (National Library of Medicine), ScienceDirect (Elsevier), and Google Scholar (Google, Inc.) electronic databases using 3 keywords selected from the medical subject headings database of the National Library of Medicine: manipulation, osteopathic; influenza pandemic, 1918–1919; epidemics.

The screening strategy consisted of selecting historical articles that contained at least one of the following keywords in their title: Spanish influenza, flu, epidemic, grippe, pneumonia, or osteopathic management/treatment. The selection process was executed by three researchers (F.B., D.M., C.L.) via title screening, abstract screening, and full-text screening. Articles were selected by relevance to the proposed aims of this study, without methodological quality assessment. All articles that provided information about OMT and osteopathic physicians' advice for patients met the inclusion criteria. Articles that did not report descriptions of manipulative intervention were excluded. The information and available evidence was narratively synthesized in table format and categorized according to the prevalent body regions and systems addressed by OMT. Available evidence was structured according to the following themes: OMT principles and approaches, frequency and length of the OMT, reported side effects, and patient advice.

Results

Our search yielded 63 articles: 23 from the hand search and 40 from the electronic search. All the sources collected by the electronic search were excluded from the review because they did not meet inclusion criteria. A total of 16 met the inclusion criteria for this review.

OMT principles and approaches

OMT during the Spanish flu pandemic was based on the concept that osteopathic physicians and osteopaths

treated patients rather than the disease, with the main goal of preventing disease spread.^{24,25} OMT treatments were administered to release muscular blockages and adjust bony lesions,²⁶ and associated treatments were used to support the respiratory system and influence the circulatory and lymphatic systems.^{15,27–31} The osteopathic approach also aimed to influence autonomic nervous system^{28,30} and the activity of the endocrine and metabolic systems.^{15,27,–32}

The clinical reasoning behind OMT administration was focused on improving physiological functions to maximize the patient's health potential, considering the age, health status of the patient, and their predominating symptom group.^{29,33–38} Smith²⁴ reported that osteopathic physicians cared for 6,258 patients affected by epidemic pneumonia, with only 635 deaths. Patients who received OMT had a 0.25% mortality rate, which was lower than the mortality rate than those who did not receive OMT.²⁴

In 1918, Corrin³⁵ reported several hypotheses for a supposed rational administration of OMT. Peripheral pulse assessment and pulmonary auscultation were used to evaluate the need for treatment: "The urgent indications for treatment arise in the presence of a small creeping pulse with failing pulmonary second sound and any degree of cyanosis [...]".³⁵ The selection of OMT procedures was based on a diagnosis of dysfunction and a rational determination of the cause (diagnosis) rather than symptoms. The treatment aim was to favor the interdependent relationship between body regions and functions:

From the osteopathic standpoint, we believe we are able to find a fairly clear reason from cause to effect, and solution of what has been the puzzle to our writers and practitioners as well [...] The pain is entirely relieved and controlled by corrective treatment to the ribs in lesion, thus removing obstruction [...] Correction of all lesions from the Atlas to the clavicle will assure freedom of supply from pneumogastric and produce favourable results on the organs that suffer functional embarrassment [...] General elimination can be directly influenced by treatment at the 10th, 11th and 12th dorsal [...] Osteopathic treatment to the upper dorsal region eases up the heart action by reducing the blood pressure in the area of obstruction by restoring the normal lumen to the vessels, and in so doing relieves both the cardiac and pulmonary functions [...] it is necessary to remove all obstruction to the vasomotor innervation to the lung and bronchi, and all vessels entering into the supply and drainage of this region in order that blood and lymph that have been held static and undergone fermentation producing favourable culture media [...].³⁵

Table 1 lists OMT techniques that were used by osteopathic physicians during the Spanish flu pandemic and applied to the musculoskeletal systems, particularly the head, cervical, thoracic, lumbar, and limbs regions. Most of the

Table 1: Osteopathic approaches to musculoskeletal regions.

Region	Type of technique	Description of the technique (reported in one of the selected articles)	References (of all the articles where the technique is mentioned)
Head	N/A	<i>"Place the thumb upon one side, the index finger upon the other, of the root of the nose, and press gently, working the thumb and finger as deep as possible without pain, into the corner of the eyes, after which, pressing gently, move the thumb and finger up and down the nose, moving muscle and not permitting the skin to slip beneath the thumb and finger."</i> ³²	Starr, 1919 ¹⁵ Barber, 1906 ³²
Angle of mandible	N/A	N/A	Platt 1918 ²⁶ Platt, 1920 ³⁶
Suboccipital	Deep inhibition	<i>"Use the ends of the fingers and go deep into the suboccipital triangles. Turn the head far to one side and repeat."</i> ³⁷	Reid, 1918 ³⁷ Wood Howes, 1918 ³¹ Starr, 1919 ¹⁵
Scalene muscles	N/A	N/A	McConnell, 1918 ²⁷
Anterior cervical	Relaxation	<i>"Relaxation of the muscles of the anterior cervical region about the larynx and the sternal ends of the sterno-cleido-mastoid muscle to relieve coughing and assist in relieving congestion and inflammation of the bronchial tubes."</i> ¹⁵	Platt, 1918 ²⁶ Starr 1919 ¹⁵
Posterior cervical	Depp pressure; articulation	<i>"Inhibition of the posterior cervical areas to control fever are some necessary factors."</i> ³⁰	Fetzer et al., 1919 ³⁰ Reid, 1918 ³⁷ Platt, 1920 ³⁶ McCole, 1919 ²⁸ Wood Howes, 1918 ³¹ McConnell, 1917 ³⁴ Ward, 1937 ²⁹ Laughlin, Still & Bigsby, 1914 ³⁸
Upper dorsal	N/A	<i>"Springing the upper dorsal with the ends of my fingers intermittently for about 10 min and then with the patient on his back, slide the hands under and with the backs of the hands resting on the mattress, lift the spine with the fingers and keep them there until it is felt to give a way that only experience can teach. A general relaxation results – temperature, pulse and respiration gradually lower."</i> ³⁰	Fetzer et al., 1919 ³⁰ Reid, 1918 ³⁷ McCole, 1919 ²⁸
Dorsal	Depp pressure	N/A	Fetzer et al., 1919 ³⁰
Chest	Manipulation	N/A	Reid, 1918 ³⁷ Ward, 1937 ²⁹ Laughlin et al., ³⁸ Fetzer et al., 1919 ³⁰ McCole, 1919 ²⁸
Upper rib	Mobilization	<i>"With the fingers over the angles and a straight pull parallel with the shaft until the musculature relaxes will suffice."</i> ²⁷	Ward, 1937 ²⁹ Starr, 1919 ¹⁵
Lower rib	Mobilization	<i>"To lift the ribs, stand behind the patient while he lies on his side. Catch under the lower costal margin and pull up and out, while pushing forward with the other hand on the posterior ends of the ribs."</i> ³⁶	McConnell, 1918 ²⁷ Platt, 1920 ³⁶ Wood Howes, 1918 ³¹ Burns and Perry, 1920 Fetzer et al., 1919 ³⁰ Platt, 1920 ³⁶
Lumbar	Deep pressure; extension	<i>"Dig deep into the lumbar muscle on each side between the iliac crest and the spine."</i> ³⁷	Barber, 1906 ³² Laughlin et al., 1914 ³⁸
Lower lumbar	Deep pressure	N/A	Fetzer et al., 1919 ³⁰ Reid, 1918 ³⁷
Spinal muscle	Soft tissue relaxation	<i>"I find what really counts therapeutically, if carefully given, so far as soft tissue work is concerned, is relaxation of the deep and extensive contractions of the spinal musculature."</i> ³⁷	Fetzer et al., 1919 ³⁰ McConnell, 1918 ²⁷
Leg	Inhibition in the popliteal region	<i>"The muscles of the legs were relaxed, with inhibition in the popliteal space, also internal and external rotation to relieve general aching and where necessary the sciatic nerve was stretched to relieve pain along its course."</i> ³¹	Wood Howes 1918 ³¹ Laughlin et al., 1914 ³⁸
Sciatic nerve	Progressive inhibition of neuromuscular structures technique	<i>"Work directly over the sciatic should be done in these cases, with deep, hard pinching and kneading of the calves."</i> ³⁶	Fetzer et al., 1919 ³⁰ Reid, 1918 ³⁷ Wood Howes, 1918 ³¹ McConnell, 1917 ³⁴ Starr, 1919 ¹⁵
			Platt, 1920 ³⁶ Starr, 1919 ¹⁵

applied methods include articulation, soft tissue, and deep inhibition techniques. OMT techniques aimed to improve the functions of body systems are shown in Table 2.

Osteopaths and other health professionals confronted the Spanish flu and gave particular attention to the neonatal, pediatric, and pregnant population.³⁰ Fetzer et al.³⁰ reported treating by individualized approaches and specific

articulatory and inhibition techniques for the second, third, and fourth dorsal and lower ribs of pregnant patients with influenza to address visceral, vascular, and neural functions. These techniques were used to treat pregnant women with influenza and pneumonia to clear congestion of the diaphragm that, in turn, relieved congestion of the liver, stomach, and bowels.³⁰ In a pediatric patient population,

Table 2: Osteopathic systemic approaches.

System	Area	Description of the technique (reported in one of the selected articles)	References (of all the articles where the technique is mentioned)
Circulatory	Cardiovascular approach	<i>"This treatment for the heart is best given with the patient lying on the right side, leaning a little forward, with his left forearm against the chest, hand at neck or chin. Stand then at the patient's head and with the thumbs give all the region on the left side at the base of the neck and around the suprascapular notch thorough muscular adjustment for circulation and removal of contraction which disturb the heart's vitality. I consider this treatment for the heart debility of influenza and many other heart conditions, as well."²⁸</i>	McCole, 1919 ²⁸ Starr, 1919 ¹⁵ Fetzer et al., 1919 ³⁰
Respiratory	Lung vibration	<i>"[...]osteopathic treatment along the spinal cord, raising the ribs and chest, and vibration of the chest wall [...]."²⁸ The work was done to relax pectoral muscles, because of the importance of the nerve under the right pectoral muscle, frequently mentioned by the Old Doctor. This nerve center is stimulated by lifting the patient's arm and inserting the finger beneath the outer border of the muscle."¹⁵</i>	McCole, 1919 ²⁸ Wood Howes, 1918 ³¹ , Starr, 1919 ¹⁵ Fetzer et al., 1919 ³⁰ Barber, 1906 ³²
Neurologic	Inhibition of cervical and dorsal area; solar plexus; vegetative gland	<i>"Patient should be near edge of bed upon his side, then with your thighs against his knees, in order to flex lower spine place one arm under patient's neck; with patient supported in this manner your hands will be free to place over the different regions of spinous and transverse process. [...] relaxation of the deep spinal musculature is probably due to toxemia and acts as an inhibitory influence to the vasomotor nerves. [...] twice a day."²⁷</i> <i>"Place the hands upon the sides of the neck, the fingers almost meeting over the spine of the upper cervical; tip the head backward, pressing upon the vasomotor center 4/5 min, to reduce the fever."³²</i>	Fetzer et al., 1919 ³⁰ McConnell, 1918 ²⁷ McCole, 1919 ²⁸ Barber, 1906 ³²
Metabolic	Kidneys	<i>"Place your hands below the kidneys, not over them, and carefully elevate organs upward and outward. This not only influences kidney functioning but renders ureter more patulous."²⁷</i>	McCole, 1919 ²⁸ Ward, 1937 ²⁹ Fetzer, 1919 ³⁰ McConnell, 1918 ²⁷ Starr, 1919 ¹⁵
	Bowel	<i>"The intestines should be lifted at each corner of the abdomen, beginning at the sigmoid, going to the splenic and hepatic flexures, the cecum. This should be done with the patient on his back, and you will at the same time get into the spleen, gall bladder and solar plexus. It will do the patient good to work into the solar plexus enough to cause quite a little pain. Then turn him on his right side, and standing behind him, reach over and get under the cecum, lifting it to the midline, until you can feel the pulsating of the abdominal aorta. Keeping the colon up to this point, work your fingers along up and down the course of the aorta."³⁶ [...]The upright position for a few minutes causes the involuntary nervous system to react and tone up the vascular system, and is more favorable to a bowel action."³⁶</i>	McCole, 1919 ²⁸ Ward, 1937 ²⁹ Fetzer, 1919 ³⁰ McConnell, 1918 ²⁷ Starr, 1919 ¹⁵ Platt, 1920 ³⁶
Immune	Lymphatic approaches	<i>"Lymphatic pump (cervical and dorsal) is a specific osteopathic treatment to improve immune system responses. The obvious objective of treatment is directed to stimulate the reticuloendothelial system of the body to combat the infection early. The spleen, lymph nodes, liver and capillaries of the bone marrow are structures directly concerned in producing phagocytic cells. The antibody content of the blood is increased by the cellular output of the same organs and its germicidal action is stepped up to resist the invading organisms. [...] The lymphatic pump technique, which has become popular in the last few years is a procedure of definite value in the treatment of influenza."²⁹</i>	McConnell, 1918 ²⁷ McCole, 1919 ²⁸ Ward, 1937 ²⁹

McCole²⁸ reported using a vibration technique for children with influenza: “Children are often given vibration; holding their chests with my hands under their arms.” McCole reported that the practitioner’s fingertips were used to exert a vibration of the chest wall with the patient lying down in bed or sitting during the technique to address circulatory and respiratory functions.²⁸

Frequency and length of OMT

We found that varying frequencies and lengths of OMT were recommended for patients with influenza. Ward²⁹ suggested that the length and frequency of OMT should be decided according to the severity of each case and by patient response and tolerance. Two sources^{25,26} advised daily treatment, whereas five sources advised treatments twice per day if possible.^{25,27,28,30,37} In extreme cases, when the condition of the patient was serious, OMT was administered 3 to 4 times per day.^{25,27,30,33,38} Two sources^{27,30} reported that the length of OMT was 10–15 minutes for each patient. Patients who were severely ill were unable to tolerate long treatments, so a short duration with increased frequency was warranted.^{27,28,30} Fetzer et al.³⁰ wrote, “I give as vigorous a treatment as I think the patient will react to, favorably. I find that patients do not react as well to a heavy treatment as from light, thorough, frequent, and specific treatments.”

Reported side effects

Three articles^{26,27,30} reported that patients’ temperatures increased after receiving OMT. Platt²⁶ noted that patients who received a general spinal treatment of OMT experienced an aggravation of their general symptoms and a slight increase in temperature. He advised physicians to refrain from treating patients with OMT again until the aggravated symptoms subsided, which usually took about 24–48 hours. McConnell²⁷ noticed a rise in the patients’ temperatures after the received OMT focused on cervical lymphatics and attributed it to the excessive freeing of toxins in the system. Fetzer et al.³⁰ noted that “temperature did not usually rise after the first OMT at that time except where there was a relapse.”

Osteopathic physicians’ advice to the patient

A liquid diet was recommended until the patient’s temperature returned to normal;^{15,25,28,29,30,31,37} any kind of hot

drink was recommended – in particular, hot lemonade^{27,28,30,31} – as well as water to rehydrate the patient. Reid²⁵ and Platt²⁶ suggested that patients should drink 1 glass of water every hour.^{25,26} Until body temperature was normal and the patients were free of kidney, stomach, and bowel complications, osteopathic physicians recommended a diet consisting of unsweetened juice of any fruit; water of boiled spinach beef, mutton, or chicken broth; buttermilk; and milk with white of an egg no more than twice daily.¹⁵ After patients’ conditions improved and their temperature returned to baseline, the following diet was allowed: breakfast foods of all kinds with little sugar (honey was preferred) and plenty of cream; bacon; fresh fish; soft poached or boiled eggs; baked squash and potatoes; stewed vegetables; cooked fruits; tapioca pudding; oyster soup; and toasted wheat bread.¹⁵

Environmental recommendations included that patients should be placed in a warm but ventilated room.^{27,29,30,33} Laterally recumbent bed rest for patients was also suggested, because patients resting in a dorsal position tended to develop congestion on the dorsal surface of the lungs,¹⁵ topical hypoventilation, and ventilation/perfusion mismatch, which could lead to atelectasis and rapid progression to pneumonia.^{27–38}

Discussion

During the Spanish flu pandemic, osteopathic physicians combined OMT with the standard medical care of the day to treat patients with influenza. This review of the historical osteopathic literature was collected to analyze the OMT techniques and osteopathic approach used to treat patients affected by the Spanish flu. The data collection and analysis adopted a century ago are weak in terms of modern methodological and scientific standards. Consequently, the historical reports did not provide high-quality data. However, the global osteopathic community should embrace their historical heritage by continuing the work of their predecessors, with the responsibility of monitoring the safety and effectiveness of the osteopathic manipulative approach.

Smith’s article,²⁴ which was first published in 1919, reported that patients with influenza who received OMT had a lower mortality rate than those who did not receive OMT. However, this report of the lower mortality rate cannot be definitively attributed to OMT and the osteopathic approach because of the lack of rigorous research methods at that time. Sanderlin and Licciardone³⁹ highlighted the difficulty of establishing a valid causal relationship between the use of OMT and decreased mortality in the noncontrolled observational reports published

during the Spanish flu pandemic. The lower death rate from influenza and related complications in the patient population treated by osteopathic physicians could be affected by the reporting methods used to assess morbidity and mortality.⁴⁰

Indeed, since the characteristics of the cohort of osteopathically-treated patients are not known, it is not possible to assess whether a selection bias influenced the raw mortality index. Dery⁴¹ maintains that the osteopathic community should act responsibly by acknowledging the historical value and merit of old reports but avoid referring to them as scientific evidence. Therefore, the use of historical reports to substantiate any claim for effectiveness in the osteopathic treatment of influenza and pneumonia are speculative at best, and misleading at worst.⁴² However, we believe that the above-mentioned reports do have a historical value and could provide a working assumption; these historical accounts can be used to develop a theoretical basis for the administration of OMT rather than be quoted as evidence about its efficacy.

Many of the treatments used to manage the symptoms of Spanish flu were derived from practical evidence and experience.^{21,40} In 1920, following the teachings of A.T. Still, Frederic P. Millard, DO, and the experience of the osteopathic community in confronting the Spanish flu, C. Earl Miller, DO, developed what became known as the Miller thoracic pump technique.⁴³ Different approaches aimed to release the thoracic inlet (myofascial release), address the head (frontal and maxillary lifts) and neck region (soft tissue techniques), and release tensions in the thoracic region (pectoral traction and rib raising technique, diaphragm doming as well as muscle energy techniques). The described approaches were used to improve and maximize coordinated body functions (i.e., respiratory, circulatory, lymphatic, neurologic, metabolic, and behavioral).^{21,40} Further, a series of lymphatic approaches was also used during the Spanish flu pandemic, (e.g., the thoracic, hepatic, splenic, abdominal and pedal lymphatic pump, as well as the mandibular drainage).^{21,40}

Gentle OMT approaches applied to the chest cage improved ventilation (i.e., the respiratory system function) and minimized complications during the Spanish flu,²⁹ and these OMT approaches and techniques could be applied and expanded today to manage respiratory infections.^{21,40,44} Noll et al.⁴⁵ studied the efficacy of osteopathic manipulation as an adjunctive treatment for hospitalized patients with pneumonia, observing significant reductions in hospital length of stay (both in adults and the elderly), duration of intravenous antibiotics, and respiratory failure or death. Adjunctive OMT may also reduce in-hospital mortality rates in older adults with more severe pneumonia.⁴⁶

Not many research findings supported the immunotriggering role of OMT. A few preliminary, although promising, research studies (laboratory-based research and animal studies) on lymphatic pump techniques did show that positive immune response changes were induced by OMT,^{47–51} but the available evidence is too limited to underpin its application in clinical practice.^{39,41,52} Early osteopaths administered lymphatic techniques during the Spanish flu;^{27–29} however, these techniques as well as other osteopathic methods seem to be underused in current treatments to enhance the immune system.⁵³

Although there are well-designed studies that report OMT's effectiveness in the management of lower airway infections,⁴⁶ experts agree that more research, extensive planning, and organized responses to medical and public health are required before large-scale use of OMT is recommended during an influenza pandemic.⁵² The manuscripts analyzed in this review do not comply with recent methodological and scientific standards; however, they represent a springboard for more rigorous evidence-based studies.⁵³ Our hands-on skills and osteopathic principles should continue to guide us in managing the symptoms of respiratory infections and providing patients with relief, as the founders of osteopathic medicine did more than a century ago (Figure 1; Figure 2), but we are called to support these past experiences with an evidence-based method that combines

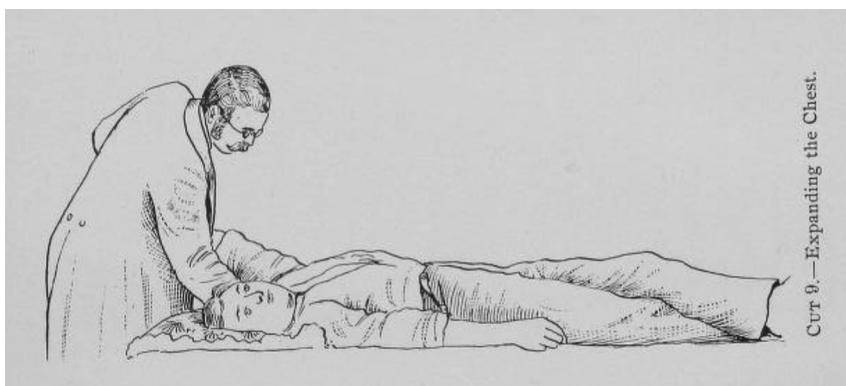


Figure 1: Patient receiving osteopathic manipulative treatment for expanding the chest, as found in Barber⁶⁸ at the Museum of Osteopathic Medicine (public domain).



Figure 2: Patient receiving osteopathic manipulative treatment for raising the false ribs, as found in Barber⁶⁹ at the Museum of Osteopathic Medicine (public domain).

the legacy of our predecessors with the needs of current scientific research.

Much of the advice usually given to patients during the Spanish flu pandemic is still reasonable and valid today: eating protein-rich foods (such as eggs, fish, lean meat, dairy products) and carbohydrates, as well as practicing good personal hygiene.^{54,55} An inhalant based on thymol, menthol, eucalyptol, pine oil, and camphor was often used, and modern research supports that some essential oils are effective for the treatment of the common cold, acting on respiratory bacteria and viruses, and have also been shown to inhibit the growth of drug-resistant microbial strains which are difficult to treat even with conventional antibiotics.^{56–63}

“Witch hazel,” or *Hamamelis virginiana*, displays an antiviral effect against influenza A virus, and it is being studied for developing and improving plant-based antivirals.⁶⁴ Homeopathy appeared to have been successful during the Spanish flu pandemic; of 26,795 cases of influenza treated by homeopathic physicians, there was a reported mortality of 1.05%, while the average mortality of patients treated with conventional medicine was 30%. There are several testimonials by the physicians who treated Spanish flu; the main homeopathic treatments were *Gelsemium*, *Belladonna*, *Bryonia*, and *Echinacea*.⁶⁵ Chiropractic treatment was also used during the outbreak and seemed to have had positive effects, Rhodes⁶⁶ reported, “In Davenport, Iowa, 50 doctors treated 4,953 cases, with 274 deaths. In the same city, 150 chiropractors, including students and faculty of the Palmer School of Chiropractic, treated 1,635 cases with a single death.” These treatments can be considered as valuable alternatives, especially if the toxicity of the drugs prescribed by

the allopathic medicine of the time is considered.⁶⁷ It was noted that taking high doses of quinine could lead to the death of patients.⁶⁷

Our review was limited because hand-screening articles and books took place at a single location and was solely limited to historical literature, which is usually poorly represented in online repositories. However, these efforts were complemented by a structured electronic database review, with the goal of finding more recent work that may have been eligible for inclusion.

Conclusion

Conclusions from this study are limited by the historical and descriptive nature of the data gathered, which lacked the rigor of modern-day scientific studies. However, this review could lead to future research inquiries about the effectiveness of these approaches. Therefore, we should embrace our historical heritage by continuing the work of our predecessors, although our hands-on experience and osteopathic principles should be applied in conjunction with up-to-date medical treatment and rigorous scientific standards, also bearing in mind the importance of preventing respiratory infections.

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