

Corona Virus

Is There A Missing Link To Treatment?

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Disclosure Statement

- ▶ This presentation is offered to the New York State Osteopathic Medical Society freely and with no remuneration or expectation thereof.
- ▶ All preparations for this presentation, including my office space, staff, equipment, and time were all done freely and without any honorarium or expectation of remuneration.
- ▶ Dr. Richard Chmielewski
- ▶ Founder, Medical Director
- ▶ The Falcon Clinic for Health, Wellness and Recovery

What Are Corona Viruses?

- ▶ Corona viruses are a large family of viruses that are common in many different species of animals, including camels, cattle, cats, and bats.
- ▶ Rarely, animal corona viruses can infect people and then spread between people such as with MERS-CoV, SARS-CoV, and now with SARS-CoV-2, the virus that causes COVID-19.
- ▶ Most often spread from a living person with close contact (i.e., within about 6 feet) via respiratory droplets produced when an infected person coughs or sneezes, similar to how influenza and other respiratory pathogens spread.

The Pathophysiology of the Corona Virus

- ▶ Corona viruses are named for the crown-like spikes on their surface.
- ▶ There are four main sub-groupings of corona viruses:
 - ▶ Alpha
 - ▶ Beta
 - ▶ Delta
 - ▶ Gamma

Human Corona Viruses

- ▶ Human corona viruses were first identified in the mid-1960s.

The seven corona viruses that can infect people are:

- ▶ 229E (alpha corona virus)
- ▶ NL63 (alpha corona virus)
- ▶ OC43 (beta corona virus)
- ▶ HKU1 (beta corona virus)
- ▶ MERS-CoV (the beta corona virus that causes Middle East Respiratory Syndrome, or MERS)
- ▶ SARS-CoV (the beta corona virus that causes severe acute respiratory syndrome, or SARS)
- ▶ SARS-CoV-2 (the novel corona virus that causes corona virus disease 2019, or COVID-19)

History of the Pandemic

- ▶ First reports of a “new” strain of Corona Virus reported from Wuhan, China in late December, 2019
- ▶ World Health Organization - declared a global pandemic on Wednesday, March 11, 2020
- ▶ The virus has spread through most countries throughout the world

Human Infection with Corona Viruses

- ▶ People around the world commonly get infected with human corona viruses 229E, NL63, OC43, and HKU1.
- ▶ Sometimes corona viruses that infect animals can evolve and make people sick and become a new human corona virus.
- ▶ Three recent examples of this are 2019-nCoV, SARS-CoV, and MERS-CoV

Treatment Strategies to Combat the Spread of the Corona Virus

- ▶ Preventative Measures - personal hygiene
- ▶ Social distancing - stay about 6ft away from people
- ▶ Avoid large gatherings of people, limiting number to 10 people or less
- ▶ Self quarantine if you have any flu-like symptoms
- ▶ Definite quarantine if tested positive for the virus
- ▶ Avoid emergency rooms/urgent care, if possible
- ▶ Call your doctor for advice/ use telemedicine

Treatment Strategies to Combat the Spread of the Corona Virus (cont.)

- ▶ Treatment is supportive.
- ▶ At present, there is no specific medication or vaccine to treat the Corona virus
- ▶ Various drugs, already in use, or in testing are being tried against the virus
 - ▶ Ebola medication and vaccine
 - ▶ Measles vaccine
 - ▶ Lipitor
 - ▶ Experimental anti-viral drugs
 - ▶ Chloroquine or Hydroxychloroquine w/wo azithromycin

Review of Hydroxychloroquine and Azithromycin as a treatment of COVID-19

- ▶ The paper reports a small, non-randomized trial in Marseille, France where 26 patients with PCR (nasopharyngeal sample) confirmed COVID-19 received 600mg hydroxychloroquine to treat their illness.
- ▶ Of these, 6 also received azithromycin, based on their clinical presentation.
- ▶ Outcomes in this group were compared to those of 16 control patients who were recruited from other medical centers (Nice, Avignon and Briançon), or patients in Marseille who refused consent to hydroxychloroquine treatment.

Review of Hydroxychloroquine and Azithromycin as a treatment of COVID-19

- ▶ The primary outcome was viral clearance (yes/no) at 6 days post-inclusion measured with PCR. After dropping 6 patients from the analysis for incomplete data, the authors reported that patients in the active arm were more likely to have achieved viral clearance (70%; 14/20) than those in the control arm (12.5%; 2/16; $p < 0.001$).
- ▶ They also reported that all 6 patients who were also treated with azithromycin achieved viral clearance, vs. 8/14 (57%) of patients that only received hydroxychloroquine.
- ▶ Based on these findings, they concluded that, “Despite its small sample size our survey shows that hydroxychloroquine treatment is significantly associated with viral load reduction/disappearance in COVID-19 patients and its effect is reinforced by azithromycin.”
- ▶ Interpretation of peer reviewers:

In our opinion, the conclusions are not supported by the reported results

Acute Respiratory Distress Syndrome (ARDS)

- ▶ Acute respiratory distress syndrome (ARDS) is breathing failure that can occur in critically ill persons with underlying illnesses. It is not a specific disease.
- ▶ Instead, it is a life-threatening condition that occurs when there is severe fluid buildup in both **lungs**. The fluid buildup prevents the lungs from working properly - that is, allowing the transfer of **oxygen** from air into the body and **carbon dioxide** out of the body into the air.
- ▶ In ARDS, the **capillaries** (tiny blood vessels) in the **alveoli** of the lungs are damaged because of an infection, injury, blood loss, or inhalation injury. Fluid leaks from the blood vessels into the alveoli. While some alveoli fill with fluid, others collapse. When this happens, the lungs can no longer fill properly with air and they become stiff. Without air entering the lungs properly, the amount of **oxygen** in the blood drops. When this happens, the person with ARDS must be given extra oxygen and may need the help of a breathing machine.

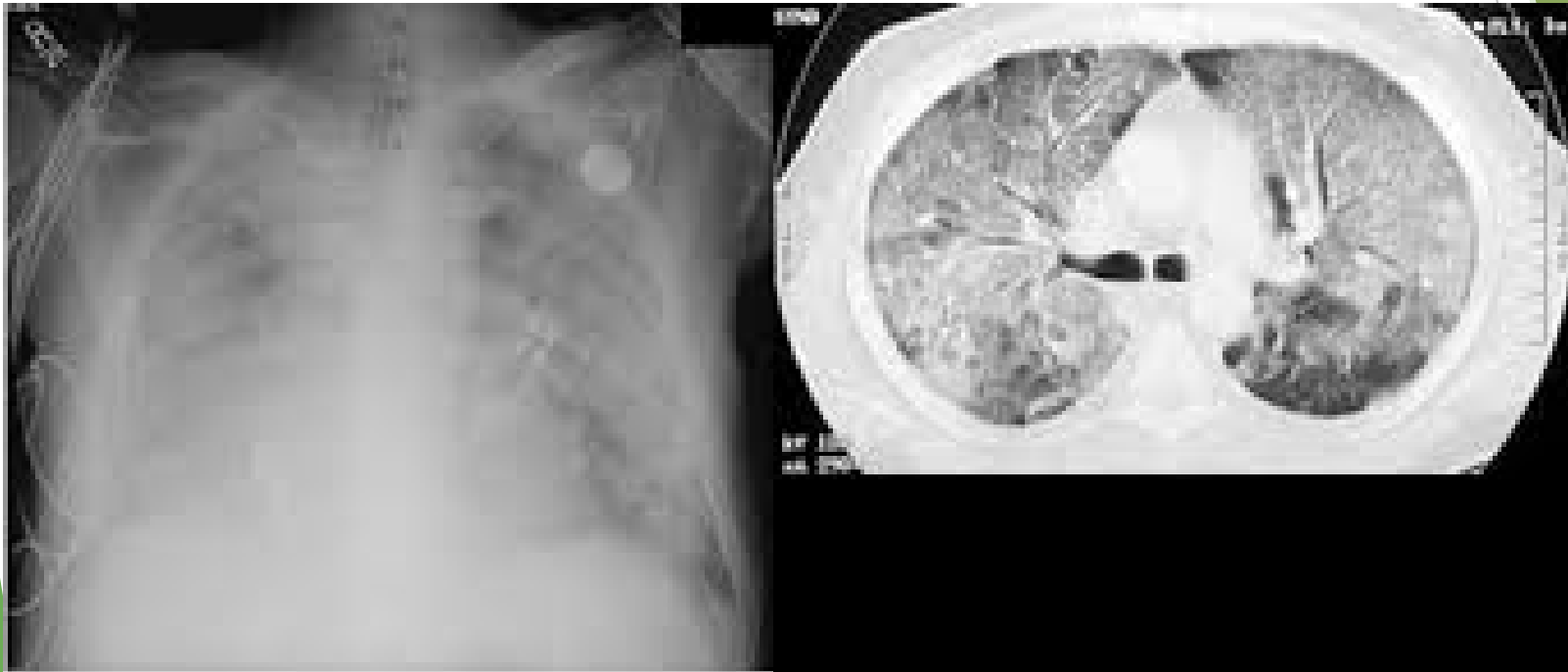
Acute Respiratory Distress Syndrome (ARDS) - Pathophysiology

- ▶ Causes may include sepsis, pancreatitis, trauma, pneumonia, and aspiration
- ▶ The underlying mechanism involves diffuse injury to cells which form the barrier of the microscopic air sacs of the lungs, surfactant dysfunction, activation of the immune system, and dysfunction of the body's regulation of blood clotting.
- ▶ In effect, ARDS impairs the lungs' ability to exchange oxygen and carbon dioxide.
- ▶ Diagnosis is based on a PaO₂/FiO₂ ratio (ratio of partial pressure arterial oxygen and fraction of inspired oxygen) of less than 300 mm Hg despite a positive end-expiratory pressure (PEEP) of more than 5 cm H₂O.
- ▶ Heart related pulmonary edema, as the cause, must be excluded

Acute Respiratory Distress Syndrome (ARDS) - Treatment

- ▶ The primary treatment involves mechanical ventilation together with treatments directed at the underlying cause.
- ▶ Ventilation strategies include using low volumes and low pressures. If oxygenation remains insufficient, lung recruitment maneuvers and neuromuscular blockers may be used.
- ▶ If this is insufficient, extracorporeal membrane oxygenation (ECMO) may be an option.
- ▶ The syndrome is associated with a death rate between 35 and 50 %

Acute Respiratory Distress Syndrome (ARDS)



Autopsy Results from 2 Patients from Wuhan with Covid-19

- ▶ Article in February, 2020 on 2 patients who were being operated on, in Wuhan, for lung cancer, found to be infected with Covid-19 and later died.

These two cases provide important first opportunities to study the pathology of COVID-19.

- ▶ Pathologic examinations revealed that apart from the tumors, the lungs of both patients exhibited edema, proteinaceous exudate, focal reactive hyperplasia of pneumocytes with patchy inflammatory cellular infiltration, and multinucleated giant cells. Hyaline membranes were not prominent.
- ▶ Because both patients did not exhibit symptoms of pneumonia at the time of operation, these changes likely represent an early phase of the lung pathology of COVID-19 pneumonia.

1) Pulmonary Pathology of Early-Phase 2019 Novel Coronavirus (COVID-19) Pneumonia in Two Patients With Lung Cancer

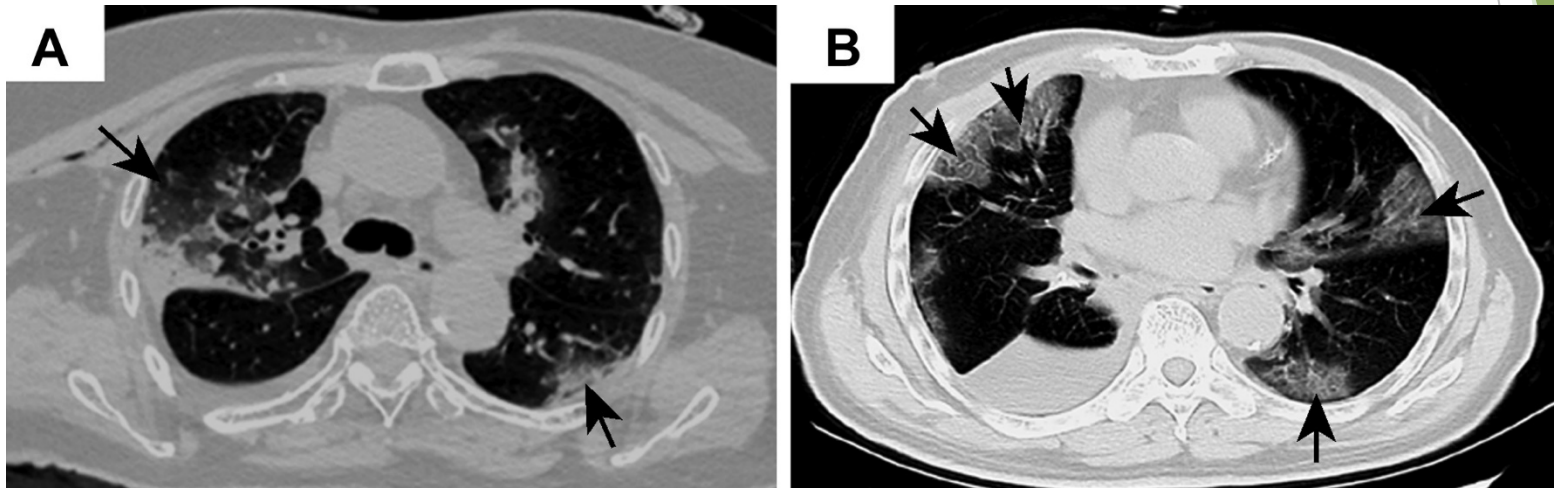
2) First-ever pathology of the early phase of lung infection with the 2019 novel coronavirus (COVID-19)

Autopsy Report Reveals COVID-19 Mainly Attacks Lungs

- ▶ The lung damage is particularly noticeable and viscous secretions can be found seeping through the air sacs, which may explain the drowning sensation reported by patients of the disease in severe and critical condition.
- ▶ In another series of autopsies, the results on COVID-19's damage to the heart, kidneys, brain, spleen and digestive tract are inconclusive, and will require further investigation, the report said.
- ▶ This is partly due to the fact that the 11 bodies come from people who ranged in age from 52 to 80, and their organs may have suffered other underlying health problems that interfered with the research.

Early Changes in the Lungs in Covid-19 infection -

Representative images of chest computed tomography scan. (A) Case 1: image on postoperative day 1 revealing changes in the right lung and increased ground-glass opacities bilaterally (arrows); (B) case 2: foci of ground-glass opacity seen bilaterally (arrows).

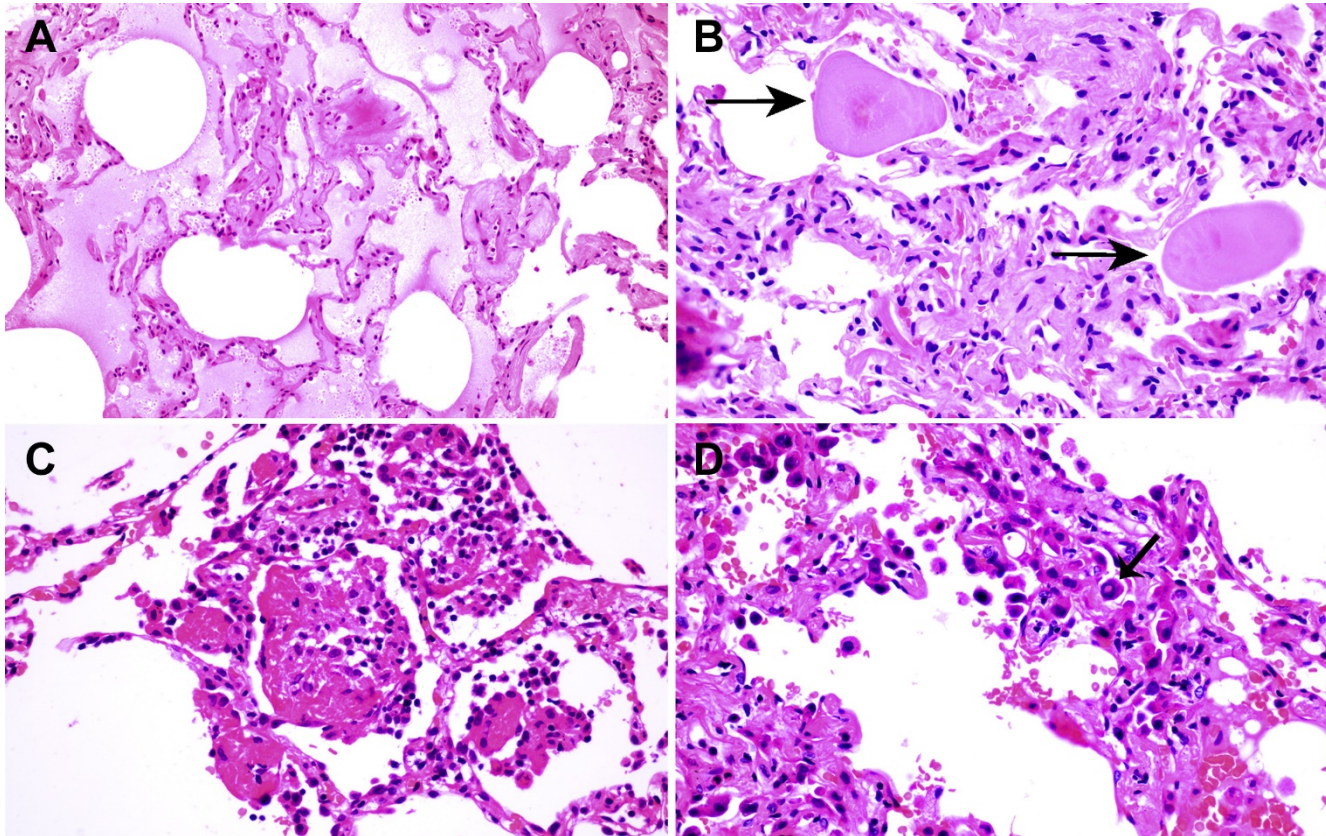


Pulmonary Pathology of Early-Phase 2019 Novel Coronavirus (COVID-19) Pneumonia in Two Patients With Lung Cancer

Journal of Thoracic Oncology DOI: (10.1016/j.jtho.2020.02.010)

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Alveolar Tissue Changes Early in Patient #1 with Lung CA and Unsuspected Covid-19 Infection

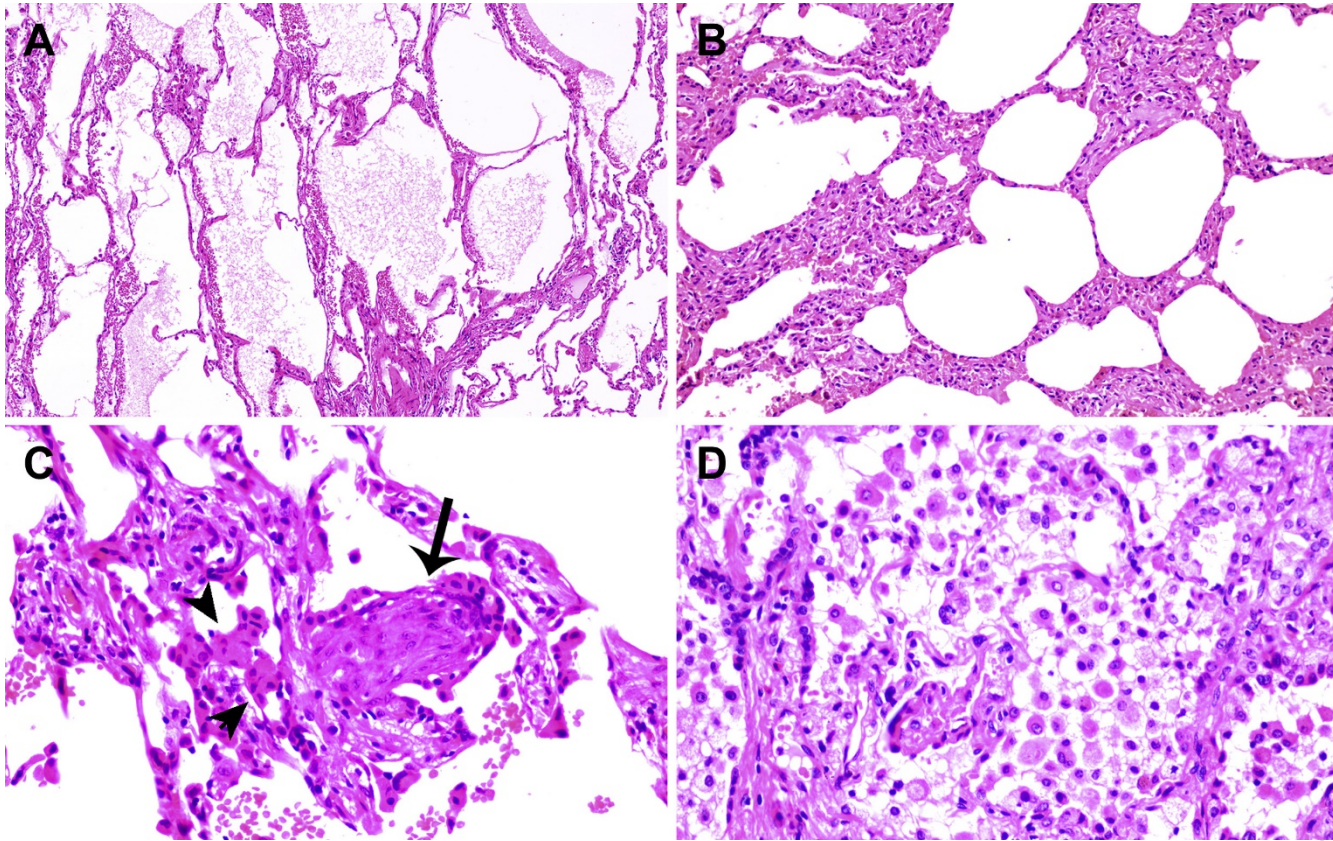


Pulmonary Pathology of Early-Phase 2019 Novel Coronavirus (COVID-19) Pneumonia in Two Patients With Lung Cancer

Journal of Thoracic Oncology DOI: (10.1016/j.jtho.2020.02.010)

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Alveolar Tissue Changes Early in Patient #2 with Lung CA and Unsuspected Covid-19 Infection

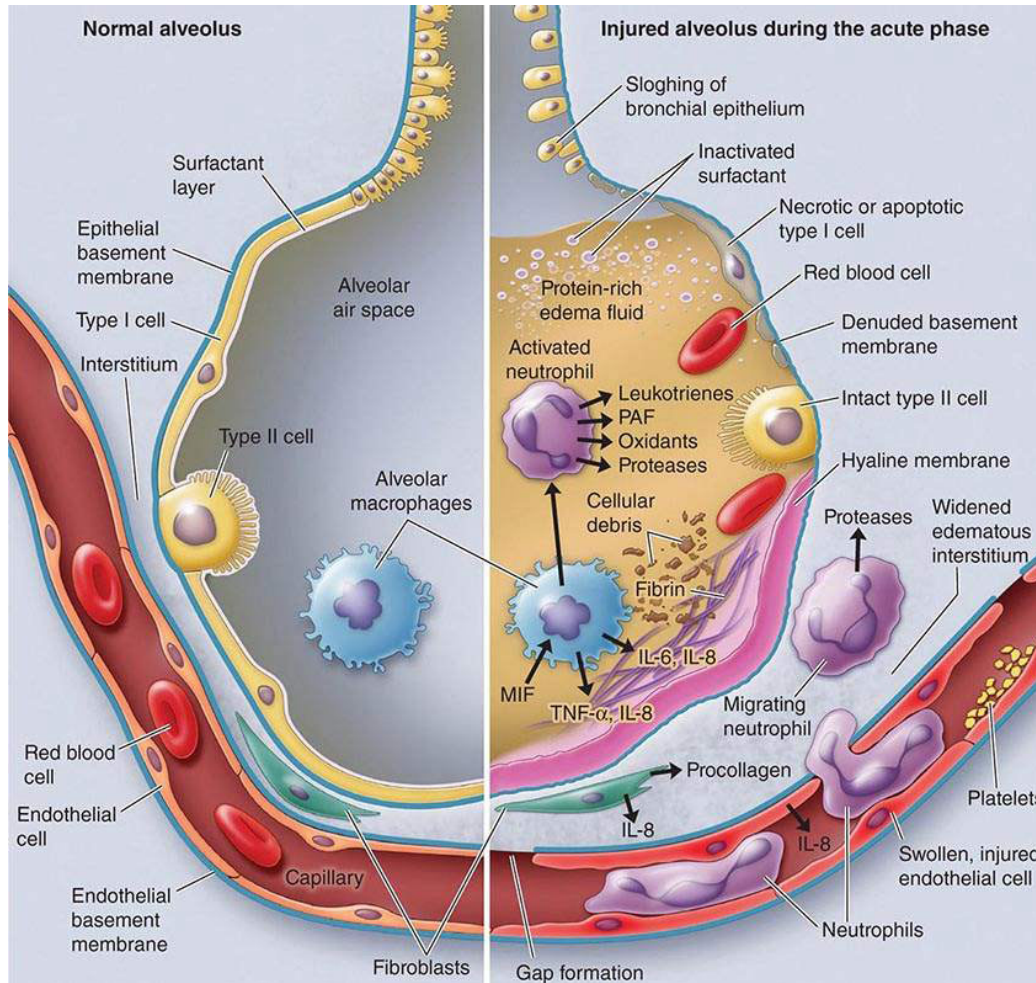


[Pulmonary Pathology of Early-Phase 2019 Novel Coronavirus \(COVID-19\) Pneumonia in Two Patients With Lung Cancer](#)

Journal of Thoracic Oncology DOI: (10.1016/j.jtho.2020.02.010)

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Artist Rendition of Pathophysiology of ARDS



There is a Missing Link to the
Pulmonary Circulation as
portrayed in the Artist's
Rendition seen earlier

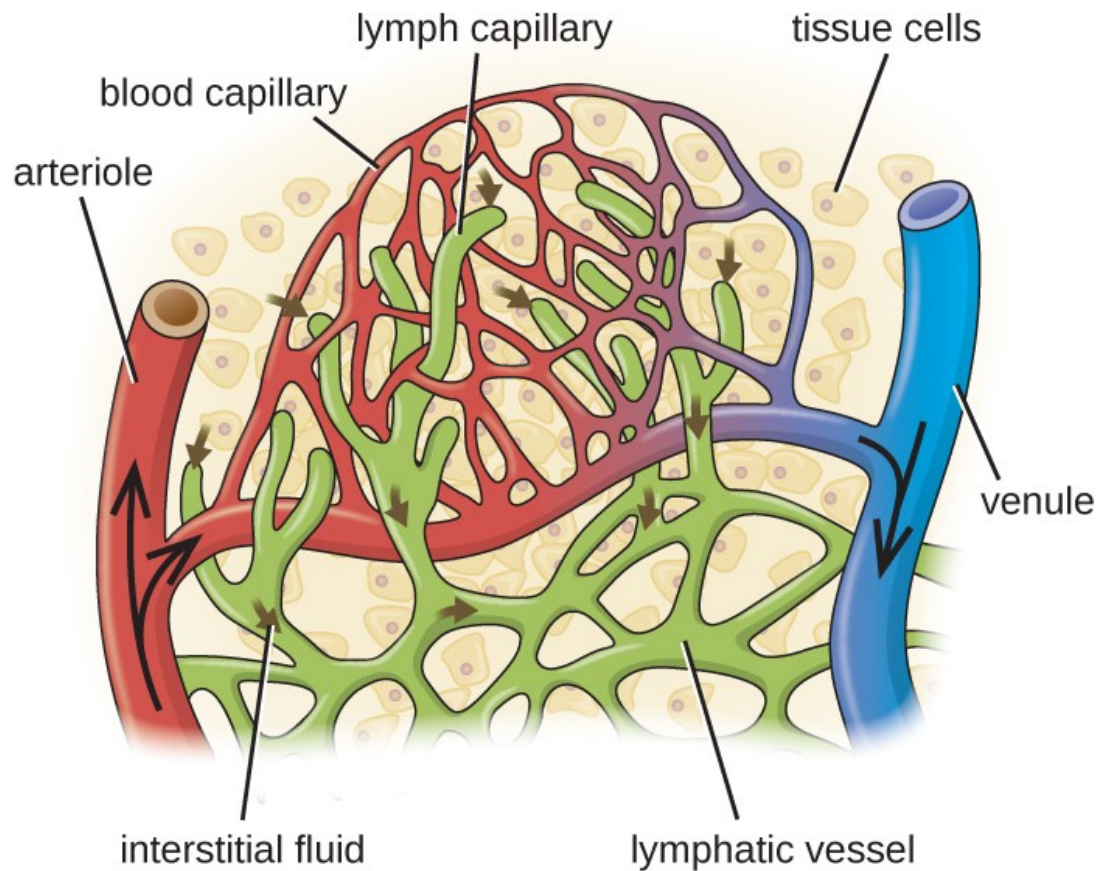


Anatomic and Physiologic Considerations – Coronavirus Infection and Pulmonary Complications

- ▶ Pathophysiology
- ▶ Inflammation
- ▶ Fluid exudate into the alveoli
- ▶ Fibrin products into the alveoli
- ▶ Extreme hypoxia/ thickening of the alveolar membranes
- ▶ Hyper- volume and slowing of the capillary circulation

Is this the trigger that causes fibrin deposits to be released into the alveoli?

The Lymphatic System/ Capillaries

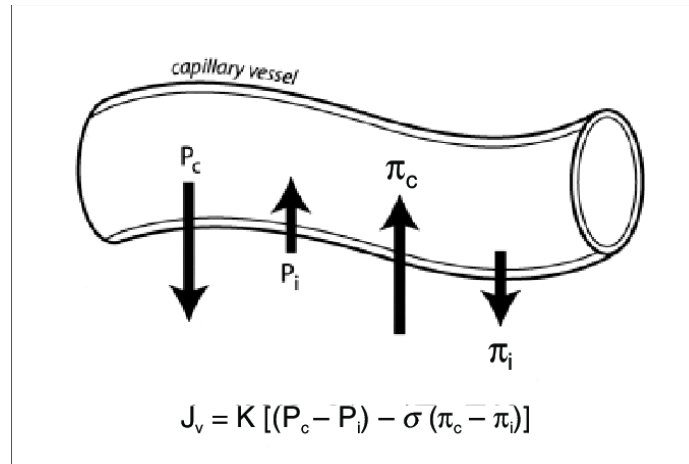


The Importance of the Lymphatic System in the Lungs

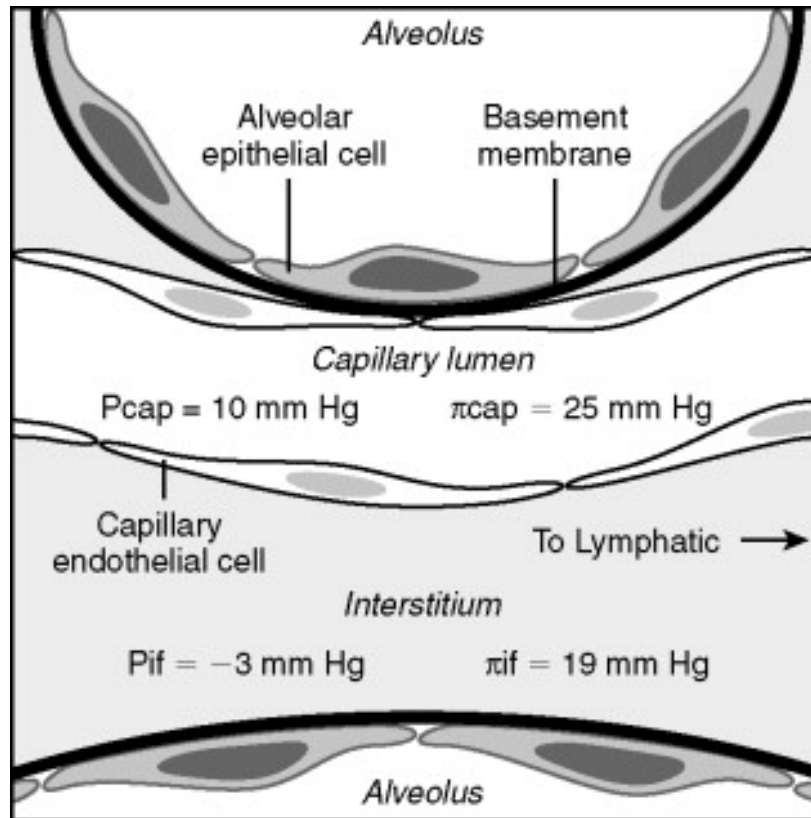
- ▶ Lymph vessels are important to drain excess extracellular fluid and transport antigens as well as immune cells to lymph nodes to initiate an adaptive immune reaction.
- ▶ Especially in the lung, fluid balance and efficient immune reactions are essential since accumulation of fluid as well as failure to fight infections may lead to impairment of gas exchange and ultimately death.

The Starling Equation

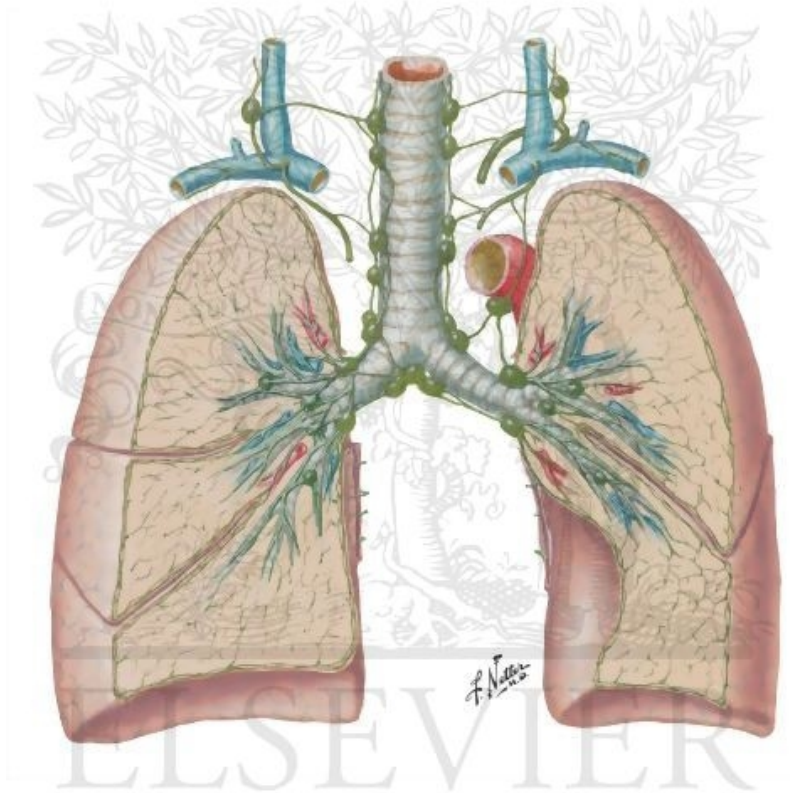
- ▶ Assuming that the net driving force declines linearly, then there is a mean net driving force outwards from the capillary as a whole, which also results in that more fluid exits a capillary than re-enters it.
- ▶ The lymphatic system drains this excess.



The Applicability of Starlings Law on the Alveoli and their Capillaries



Lymphatic System of the Lungs



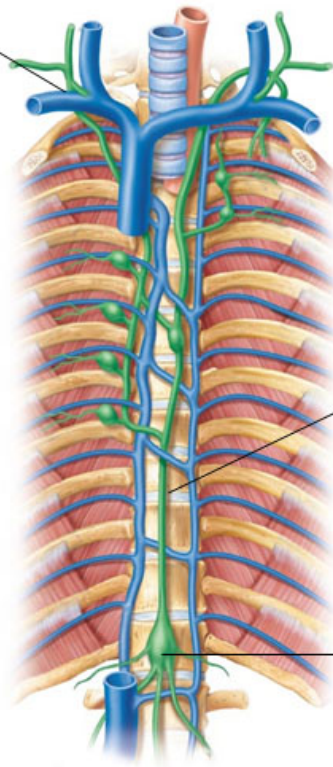
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<https://www.netterimages.com/lymph-vessels-and-nodes-of-lung/routes-of-lymphatic-drainage-of-lungs-unlabeled-general-anatomy-frank-h-netter-117.html>

The Lymphatic Ducts

Lymphatic Ducts

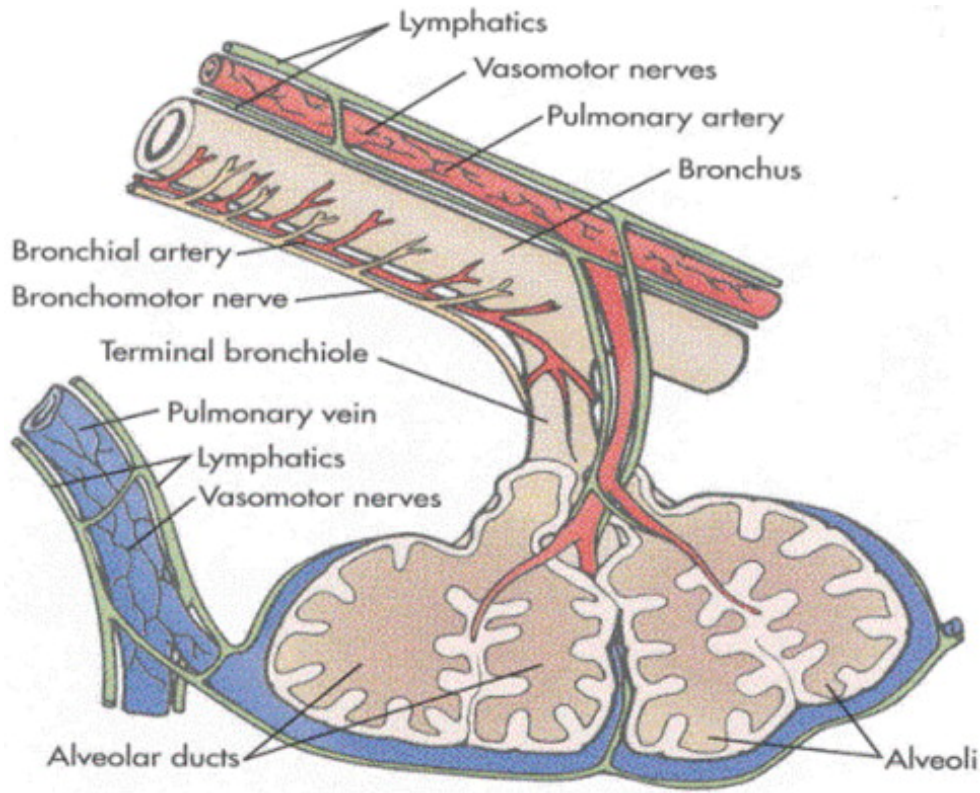
Right Lymphatic Duct empties at junction of right internal jugular and right subclavian veins



Thoracic Duct - empties into junction of left internal jugular and left subclavian veins

Cisterna Chyli – most inferior part of thoracic duct

Lymphatic Circulation of the Alveoli



The Pulmonary Changes in Covid-19 from the Chinese Autopsy Reports

- ▶ Fluid exudate into the alveoli
- ▶ Fibrin products into the alveoli
- ▶ Extreme hypoxia/ thickening of the alveolar membranes
- ▶ Hyper- volume and slowing of the capillary circulation -
- ▶ *Is this the trigger that causes fibrin deposits to be released into the alveoli?*

Flow Influences Fibrin Structure and Deposition

- ▶ Reduced flow promotes fibrin deposition
- ▶ ...platelet adhesion and aggregation play a predominant role only at high, i.e., arterial, blood flow velocities and function independent of coagulation.
- ▶ Fibrin deposition at the subendothelial surface on the other hand appears to require stagnant blood.
- ▶ <https://www.ncbi.nlm.nih.gov/pubmed/4694283>

MOST OF THE SLIDES WHICH I AM USING NEXT IN THIS PRESENTATION ARE A RESULT OF THE PERMISSION AND COURTESY OF MY GOOD FRIEND AND COLLEAGUE :

- ▶ DR. DENNIS DOWLING
Nassau University Medical Center Physical Medicine & Rehabilitation
- ▶ Director of Osteopathic Manipulative Services
- ▶ 2201 Hempstead Tpke
- ▶ East Meadow , NY , 11554

The Osteopathic Approach to the Flu Pandemic

Why?

- ▶ During the Spanish influenza pandemic, an
- ▶ estimated 30% of the world's population became ill and 50
- ▶ million people died

Johnson NP, Mueller J. Updating the accounts: global mortality of the 1918-1920 "Spanish" influenza pandemic. Bull Hist Med. 2002;76:105-15.

A case series report of Vietnamese patients with H5N1 influenza suggested that:

- ▶ **“supportive care may be the only option available”.**

Even if more effective standard pharmaceutical treatments are produced, it is unlikely that sufficient quantities will be rapidly or widely available because of financial, logistical, and health care delivery limitations.

Tran TH, Nguyen TL, Nguyen TD, Luong TS, Pham PM, Nguyen VC, et al. Avian influenza A (H5N1) in 10 patients in Vietnam. *N Engl J Med.* 2004; 350:1179-88

- ▶ It may very well be that, depending on the availability of resources including antiviral drugs, hospital beds, ICU beds, respirators, antibacterial antibiotics, personnel healthy enough to care for the sick, the treatment of a massive Covid-19 pandemic will include many different approaches.



WHAT ABOUT OSTEOPATHY?



- ▶ The philosophy and methodology of Osteopathic Medicine was founded by Dr. Andrew Taylor Still in the 1870s.



- ▶ He served as a surgeon in the Union Army during the Civil War. By the early 1870's Still criticized the misuse by doctors of drugs common to the day.

Still supported a different philosophy of medicine:

He advocated the use of osteopathic manipulative treatment.

Still's philosophy focused on the unity of all body parts.

He identified the musculoskeletal system as a key element of health.

He recognized the body's ability to heal itself and stressed preventive medicine, eating properly, and keeping fit.

Osteopathy is “Leveropathy”

The philosophy and techniques of OSTEOPATHY are not about treating bone disorder or “popping joints” to make a noise. That doesn’t heal anything.

The body’s FASCIA, which contains all of the elements of the nervous system and circulatory system, attach at some point to various bony structures in the body.

By using the bones as LEVERS (thus, “leveropathy”), an osteopathic physician can affect the various elements of the circulatory and nervous system.

This assists in making the body more effective in the healing process of many disorders.

Andrew T. Still, M.D., D.O.

“ I have successfully treated many cases of pneumonia, both lobar and pleurotic, by convecting the ribs at their spinal articulations... I carefully adjust misplaced ribs...”

Andrew T. Still, M.D., D.O.

“The osteopathic prognosis for speedy relief of influenza is good when the osteopath has been called to the case within reasonable time.”



A nationwide casket shortage was evidence of a mounting death toll.



"...It is only a matter of a few hours until death comes. It is horrible."



By September 11, 1918, influenza had spread to Boston's civilian population.



Bond drives fostered patriotism and helped spread influenza.



San Francisco residents, still fearful of influenza, wear masks during an armistice parade.



Public gathering places were ordered closed by the leaders of many major cities.

Spanish influenza-what and why?

E.E. Tasker, D.O.

J.A.O.A. 1919 Volume 19

Insurance companies 13% deaths due to influenza and 87% due to pneumonia

1,350 D.O.s

43,500 cases of flu

only **160 deaths** (apparent 0.375% mortality vs. 2.5%)

at the allopathic rate, would have expected death toll of **2,175** from cases treated by D.O.s

One hundred thousand cases of influenza with a death rate one-fortieth of that officially reported under conventional medical treatment

R.K. Smith, M.D., D.O.
J.A.O.A. 1920 Volume 19

- ▶ **2,445 D.O.s**
- ▶ **sometimes 100-120 cases per physician**
- ▶ **1/40th the mortality rate of patients treated by MDs**

“In a non-controlled observational study that lacked today's rigorous scientific standards, Smith reports that patients that received [OMT] had a mortality rate of 0.25% as compared to the 5% for those that did not receive manipulative treatment.”

One Hundred Thousand Cases of Influenza With a Death Rate of One-Fortieth of That Officially Reported Under Conventional Medical Treatment (LETTER)

Vol 108 • No 9 • September 2008 • 484-530

JAOA •

MarkAlain Déry, DO, MPH, Fellow, Infectious Diseases

Tulane University School of Medicine Section of Adult Infectious Diseases New Orleans, La

INFLUENZA AND PNEUMONIA TREATMENT

L. K. TUTTLE, M. D., D. O., New York

- ▶ J.A.O.A. January 1919
- ▶ 62 cases
 - ▶ 9 developed pneumonia
 - ▶ 7 bronchopneumonia - 2 lobar pneumonia
 - ▶ 1 case developed edema glottitis and required surgery
 - ▶ 2 cases terminal
- ▶ *“When rib mobility is re-established in pneumonia, your case has progressed far towards recovery.”*

The Specific Cure of Pneumonia

C. EARL MILLER, D. O.
Bethlehem, Pa.

Lymphatic Treatment as Applied to Acute Infections in Children*

C. EARL MILLER, D. O., BETHLEHEM, PA.

Osteopathic Principles and Thoracic Pump Therapeutics Proved by Scientific Research

C. EARL MILLER, D.O.
241 East Broad Street, Bethlehem, Pa.

The Mechanics of Lymphatic Circulation

LYMPH HEARTS

C. EARL MILLER, D. O.,
Bethlehem, Pa.

C. Earl Miller, D.O.

- ▶ Prolific writer and teacher on Lymphatic fluid techniques (1920's)
- ▶ So much so that thoracic pump technique has been referred to as the eponymous "*Miller thoracic pump technique*"

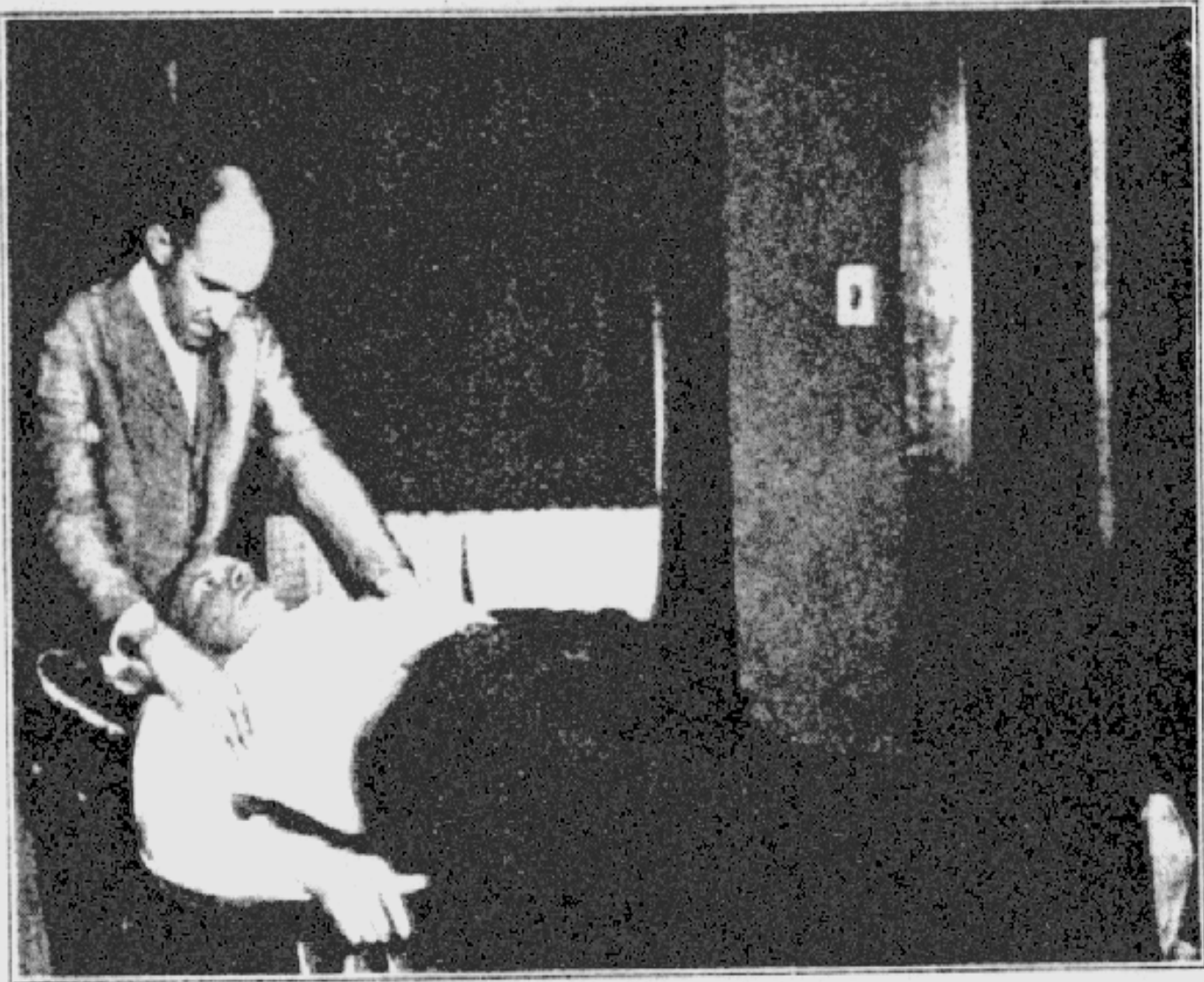


Fig. 1—Best Position to Treat an Adult. Lymphahtic Pump Manipulated as Well as Thoracic Spine.

Pneumonia

J. BYRON LARUE, D. O., Zanesville, Ohio.

(Paper read at A. O. A. Convention, Boston, Mass., July 1-6, 1918.)

- ▶ J.A.O.A. January 1919
- ▶ Description of physical and clinical signs associated with pneumonia
- ▶ “Pneumonia may be defined from an osteopathic viewpoint, as a general infection with local manifestations in the lungs.”
- ▶ “Osteopathic lesions present in all pneumonia cases.”
- ▶ “We have it from many of our most reliable (osteopathic) physicians that they have treated 100, 200, or 300 cases of lobar pneumonia without a single fatality.”
- ▶ Estimates less than **2% mortality vs. 10-25 % otherwise**

The Journal of Osteopathy

G. HULBURT, Editor

CHAS. C. TEALL, D. O., Osteopathic Editor

C. RIVERS SCHMIDT, D. O., Associate Editor

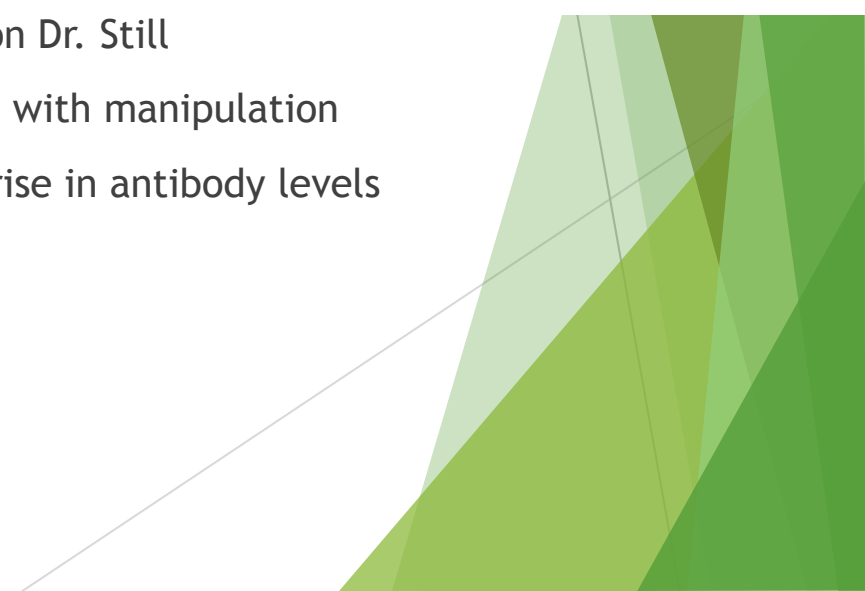
XXVII

JUNE, 1920

No. 6

INCREASING THE ANTIBODY CONTENT OF THE SERUM BY MANIPULATION OF THE SPLEEN

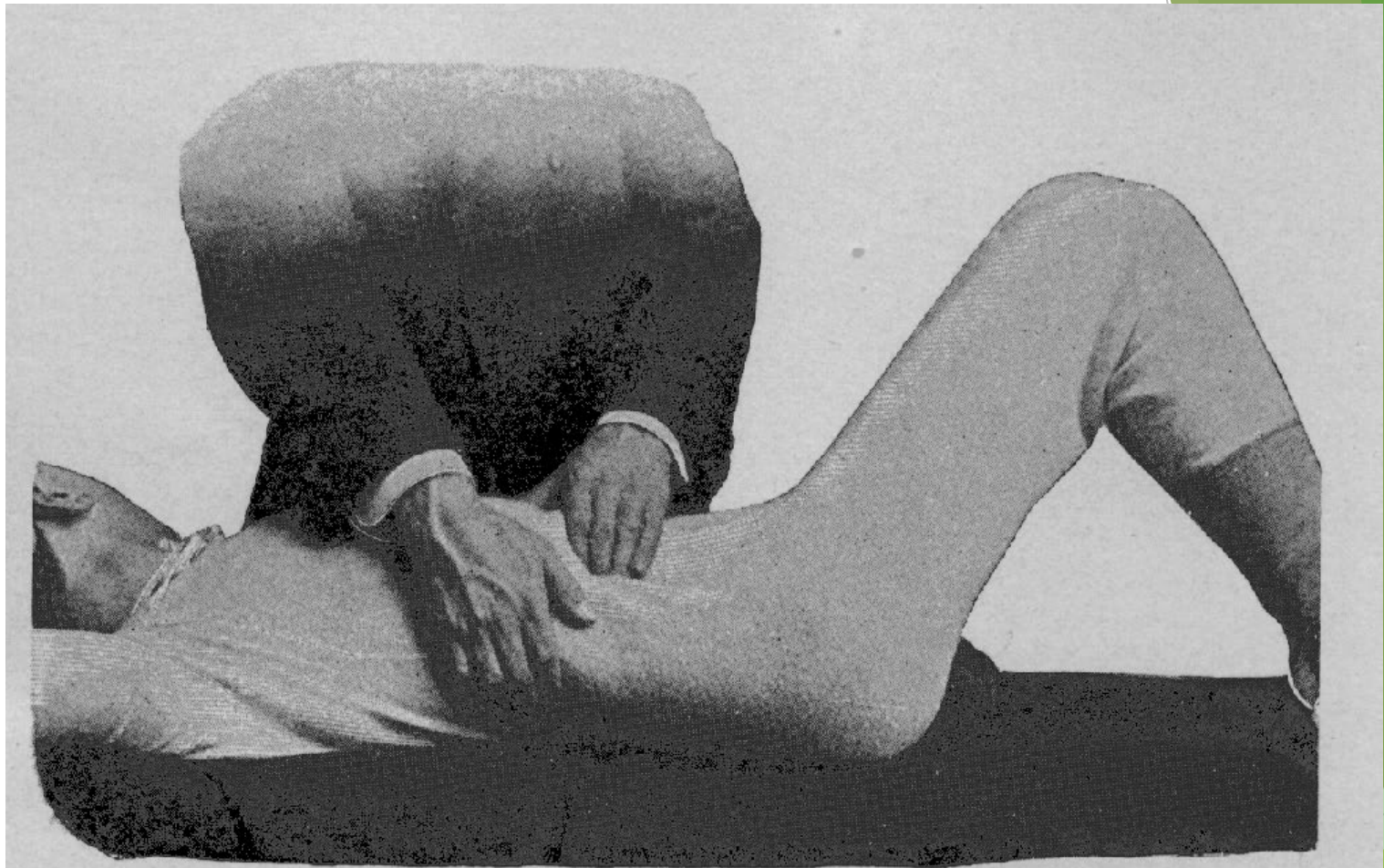
M. A. LANE, Professor of Pathology and Immunology in the American School
of Osteopathy at Kirksville

- ▶ M.A.Lane also author of rare but informative book on Dr. Still
 - ▶ Experiment with rabbits exposed to antigen treated with manipulation
 - ▶ Possible relationship of continued manipulation on rise in antibody levels
- 

How To Make Examination For Lymphatic Disorders*

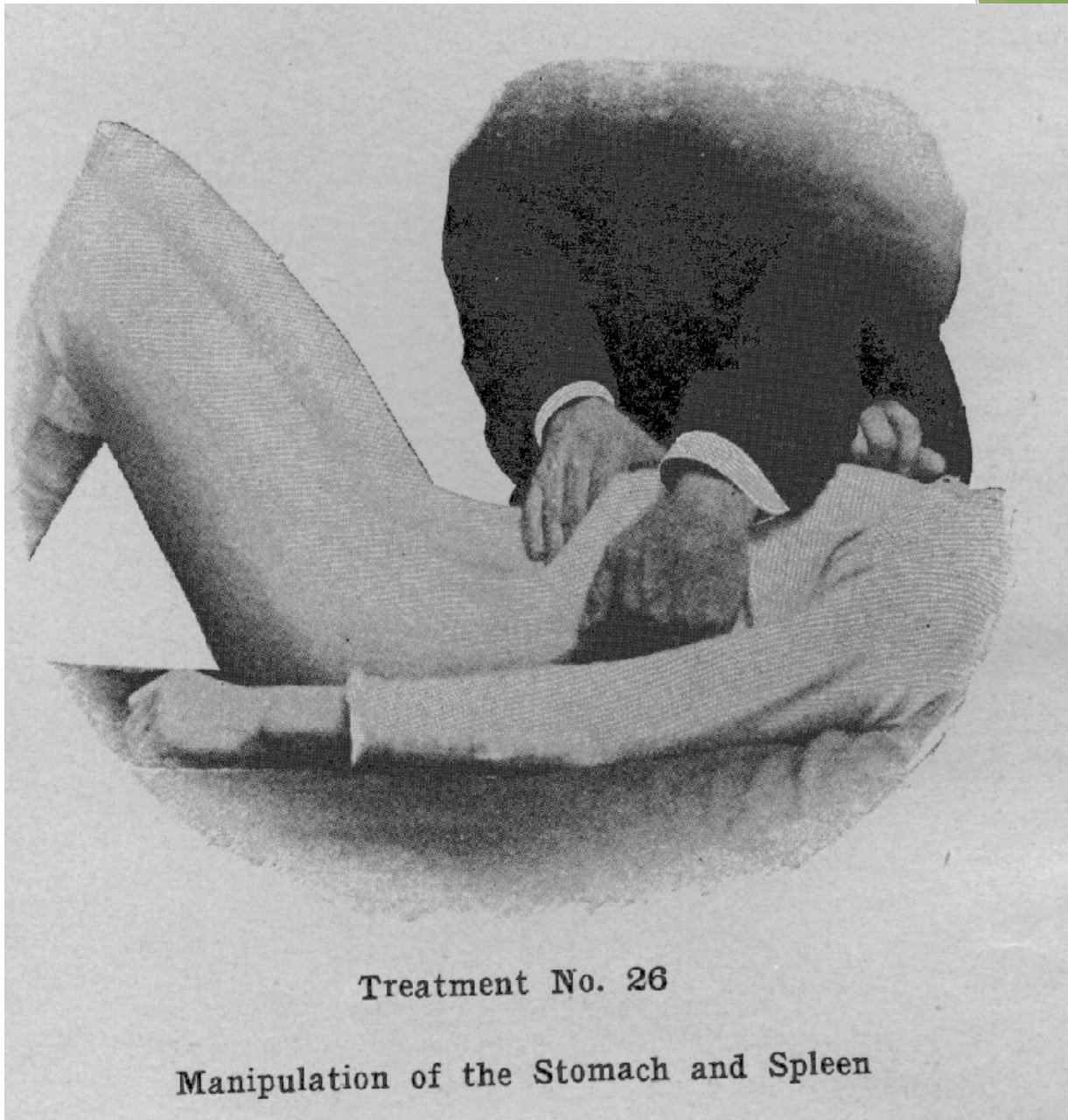
F. P. MILLARD, D.O., Toronto

- ▶ J.A.O.A. February 1922
- ▶ Canadian D.O. wrote on specific findings and treatment of Lymphatic tissues
- ▶ Textbook devoted specifically to treatment of lymphatics
- ▶ Brief treatments repeated several times per week



Treatment No. 25

Manipulation of the Liver



Treatment No. 26

Manipulation of the Stomach and Spleen

The effect of direct splenic stimulation on the cells and antibody content of the blood stream in acute infectious diseases

Castillo - Ferris - Swift- 1934

- ▶ **Splenic stimulation**
- ▶ increase in leukocyte count in 80% cases
 - ▶ **average increase 2,000 cells**
 - ▶ **shift to the right** (mature cells)
- ▶ increase in **opsonic index in >80%** cases with expulsion of formed antibodies into the general circulation
- ▶ decrease in erythrocyte count in 75% cases
- ▶ **bacteriolytic power of serum increased in 68%**

Benefits of osteopathic manipulative treatment for hospitalized elderly patients with pneumonia

DONALD R. NOLL, DO; JAY H. SHORES, PhD; RUSSELL G. GAMBER, DO;
KATHRYN M. HERRON, MPH; JON SWIFT, JR, MA

While osteopathic manipulative treatment (OMT) is thought to be beneficial for patients with pneumonia, there have been few clinical trials—especially in the elderly. The authors' pilot study suggested that duration of intravenous antibiotic use and length of hospital stay were promising measures of outcome. Therefore, a larger randomized controlled study was conducted. Elderly patients hospitalized with acute pneumonia were recruited and randomly placed into two groups: 28 in the treatment group and 30 in the control group. The treatment group received a standardized OMT protocol, while the control group received a light touch protocol. There was no statistical difference between groups for age, sex, or simplified acute physiology scores. The treatment group had a significantly shorter duration of intravenous antibiotic treatment and a shorter hospital stay:

(Key words: osteopathic manipulative treatment, pneumonia, hospitalization)

WHAT SHOULD WE DO?

OMT

Osteopathic Manipulative Treatment

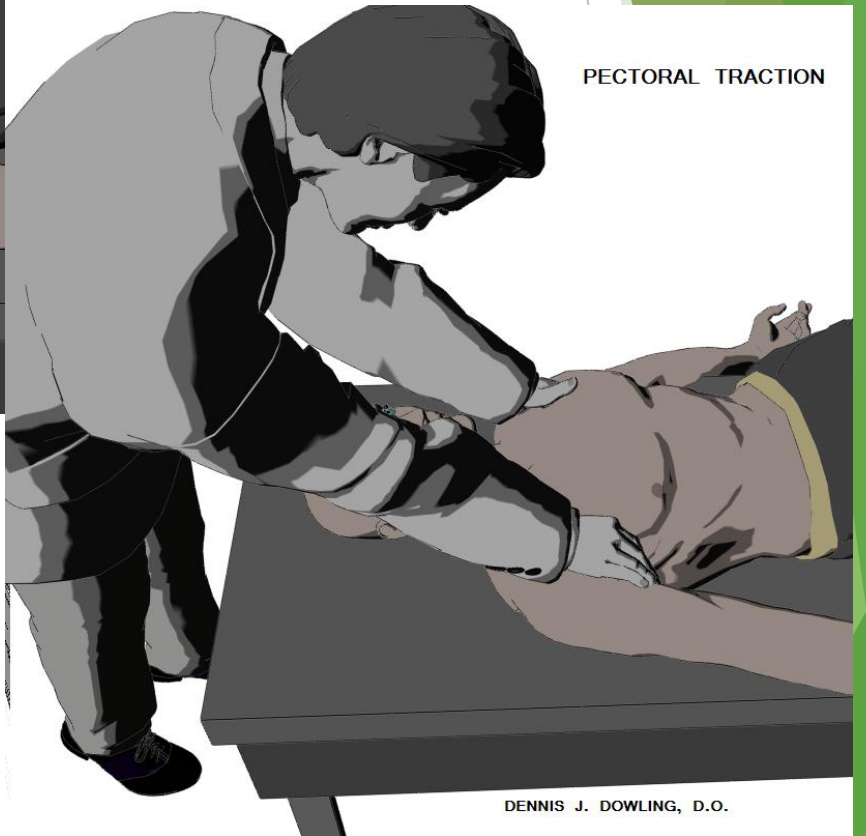
Influenza Epidemic or Pandemic?

Time to Roll Up Sleeves, Vaccinate Patients, and Hone Osteopathic Manipulative Skills !!!

Gilbert E. D'Alonzo, Jr, DO

AOA Editor in Chief

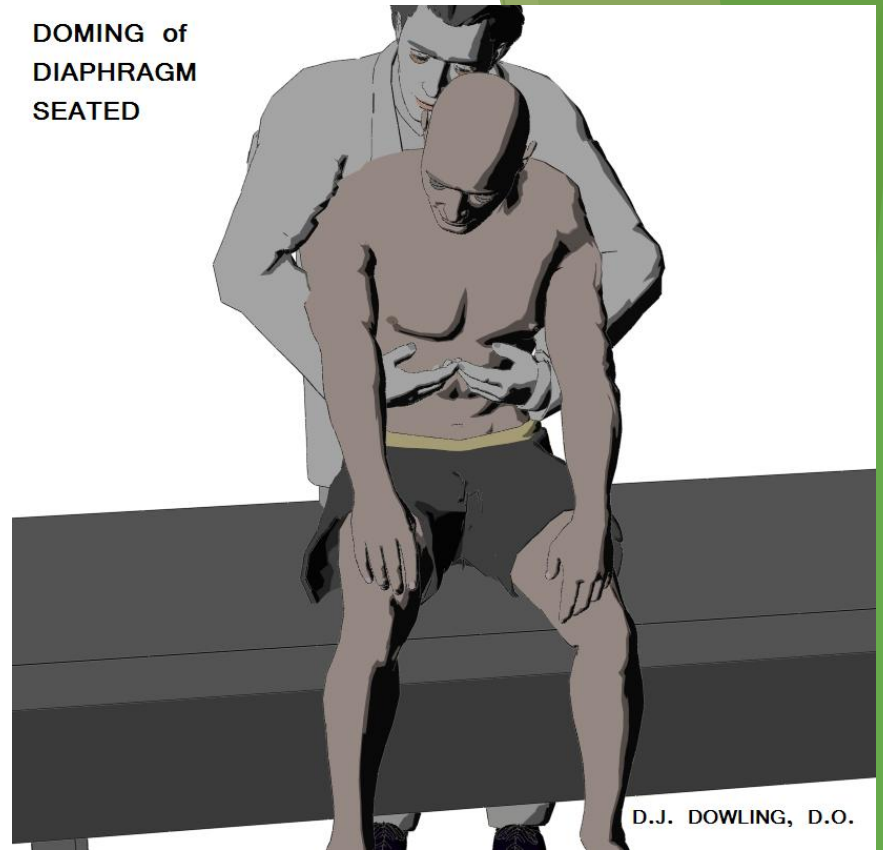
JAOA • Vol 104 • No 9 • September 2004 • 370-371



PECTORAL TRACTION

DENNIS J. DOWLING, D.O.

DOMING of
DIAPHRAGM
SEATED



D.J. DOWLING, D.O.



DOMING of DIAPHRAGM
SUPINE

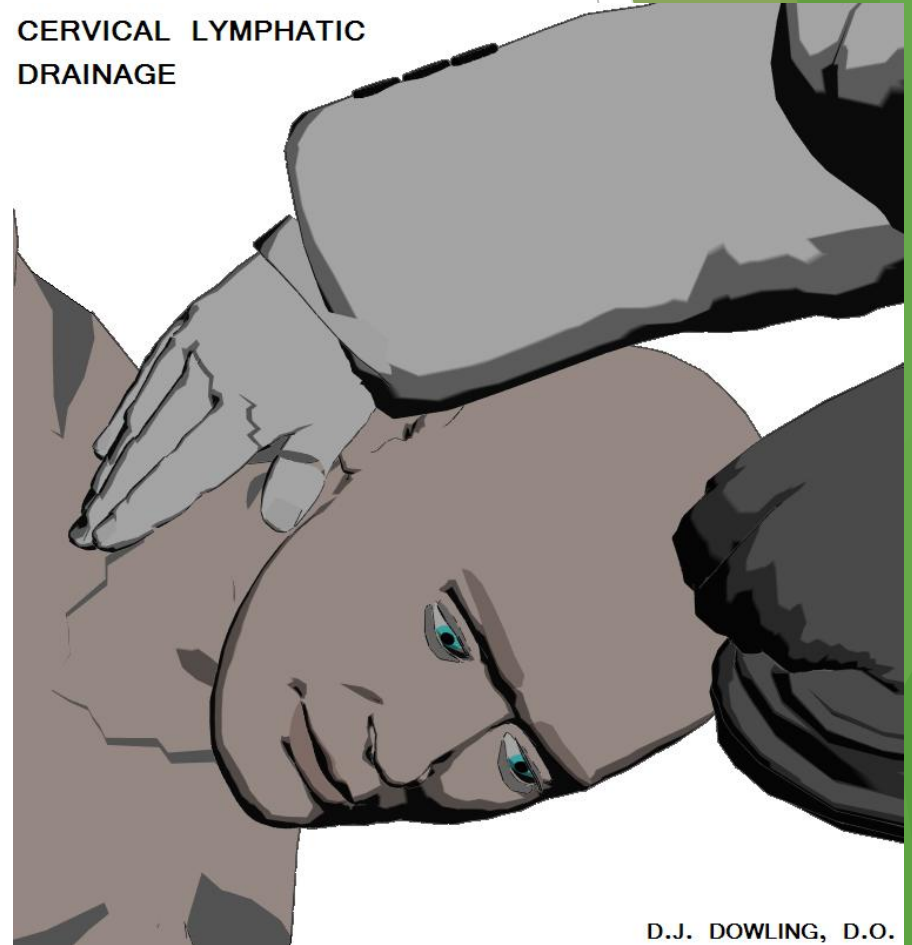
D.J. DOWLING, D.O.

HYOID & TRACHEA MOBILIZATION



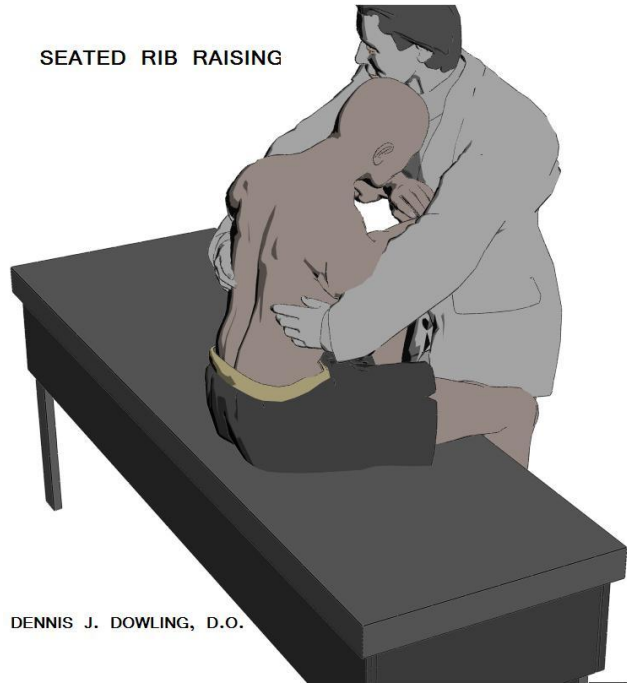
D.J. DOWLING, D.O.

CERVICAL LYMPHATIC DRAINAGE



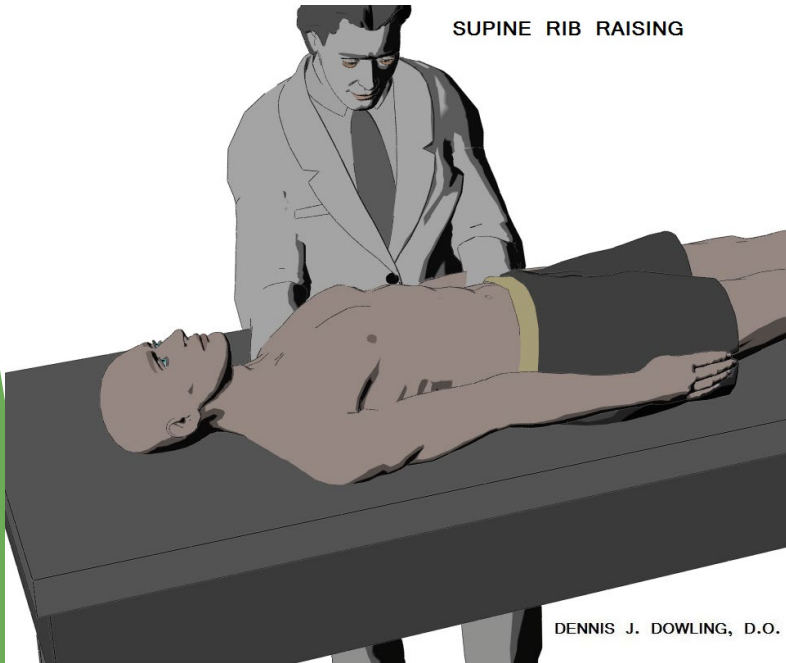
D.J. DOWLING, D.O.

SEATED RIB RAISING



DENNIS J. DOWLING, D.O.

SUPINE RIB RAISING



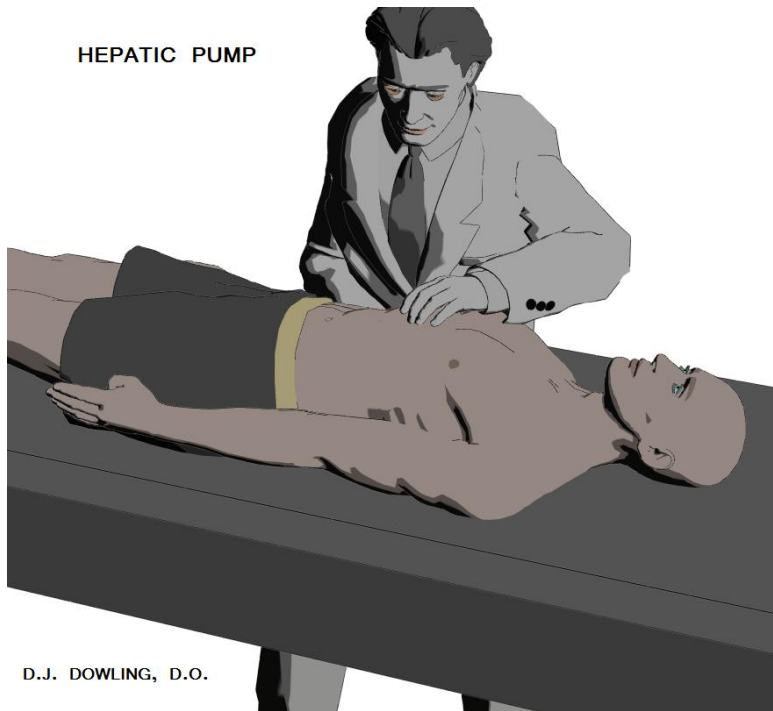
DENNIS J. DOWLING, D.O.

SIDELYING RIB RAISING



DENNIS J. DOWLING, D.O.

HEPATIC PUMP



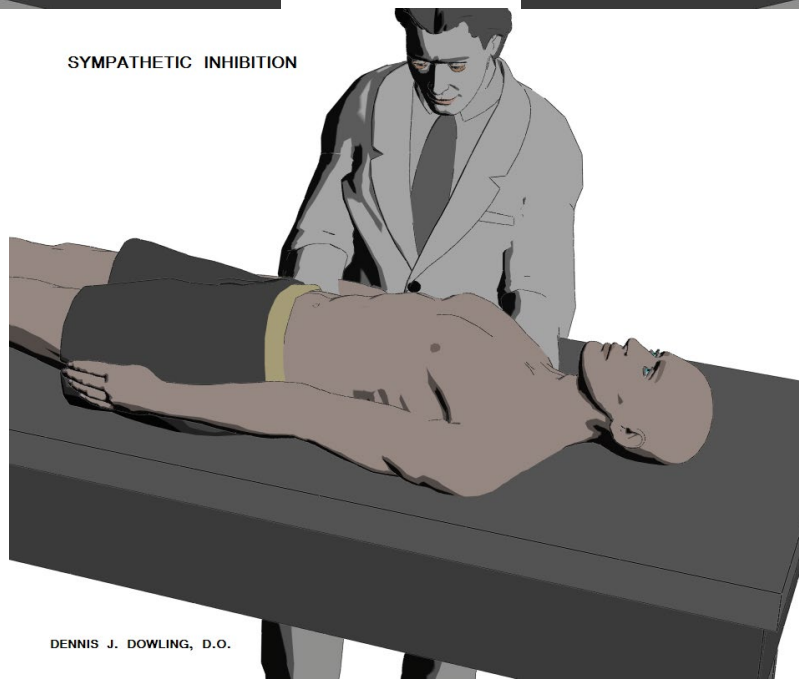
D.J. DOWLING, D.O.

SPLENIC PUMP



D.J. DOWLING, D.O.

SYMPATHETIC INHIBITION



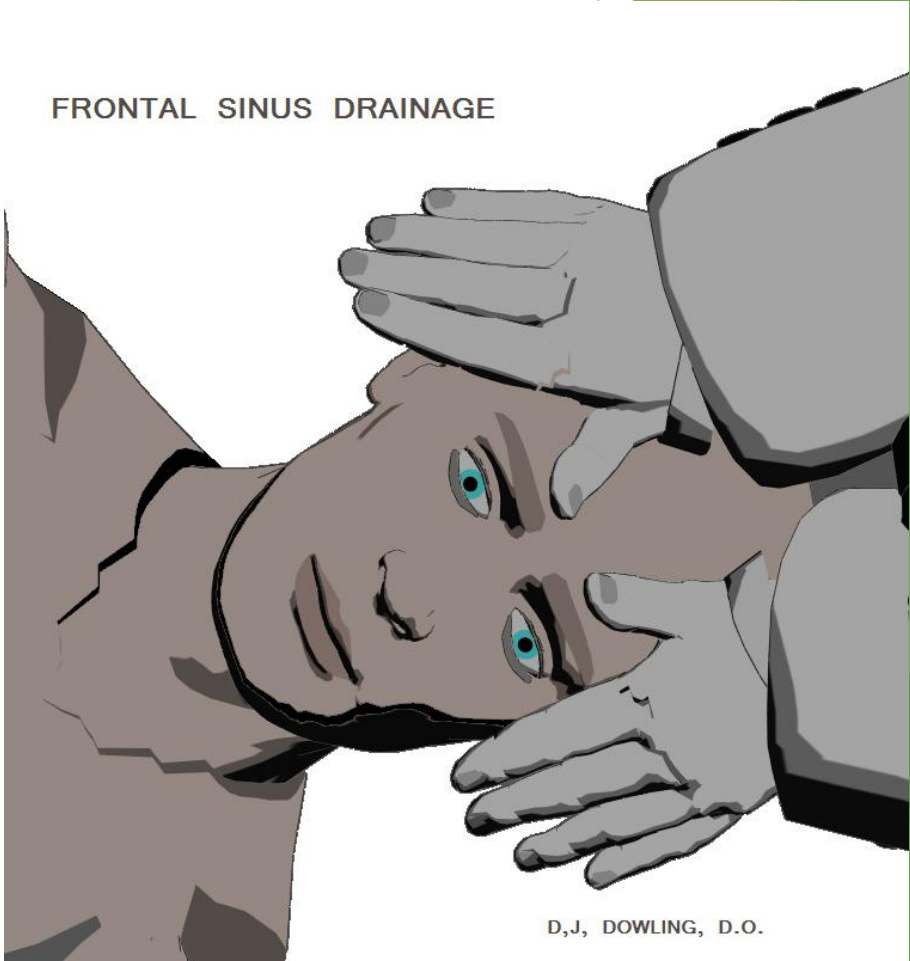
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MAXILLARY SINUS DRAINAGE



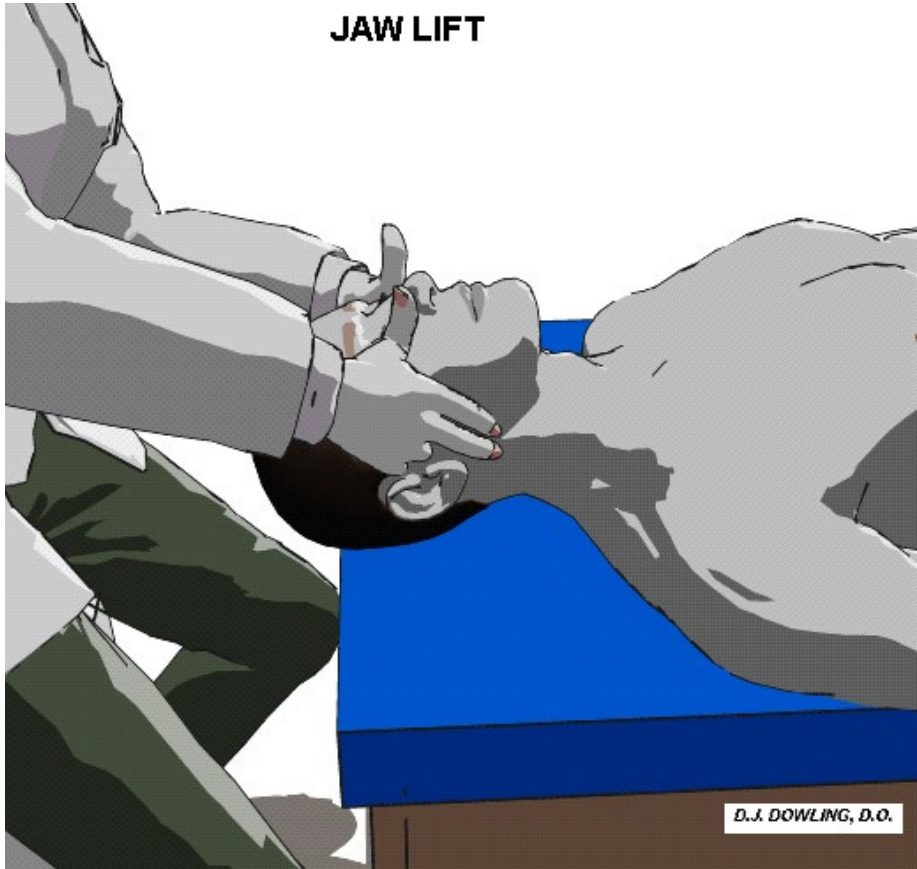
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FRONTAL SINUS DRAINAGE



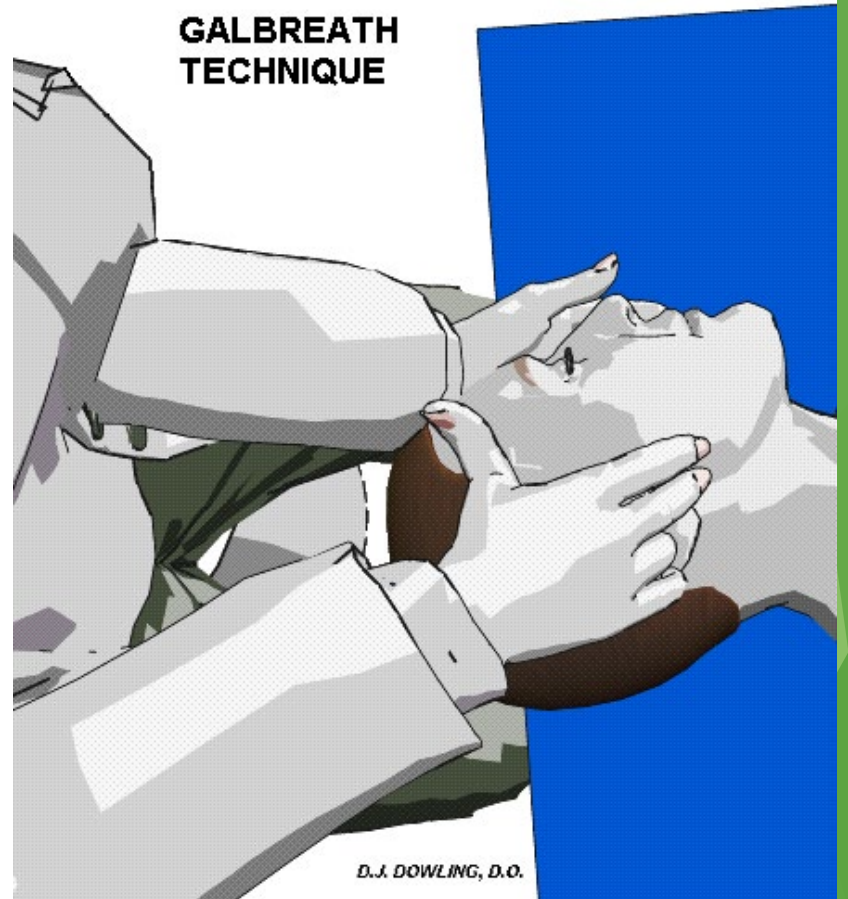
D,J, DOWLING, D.O.

JAW LIFT



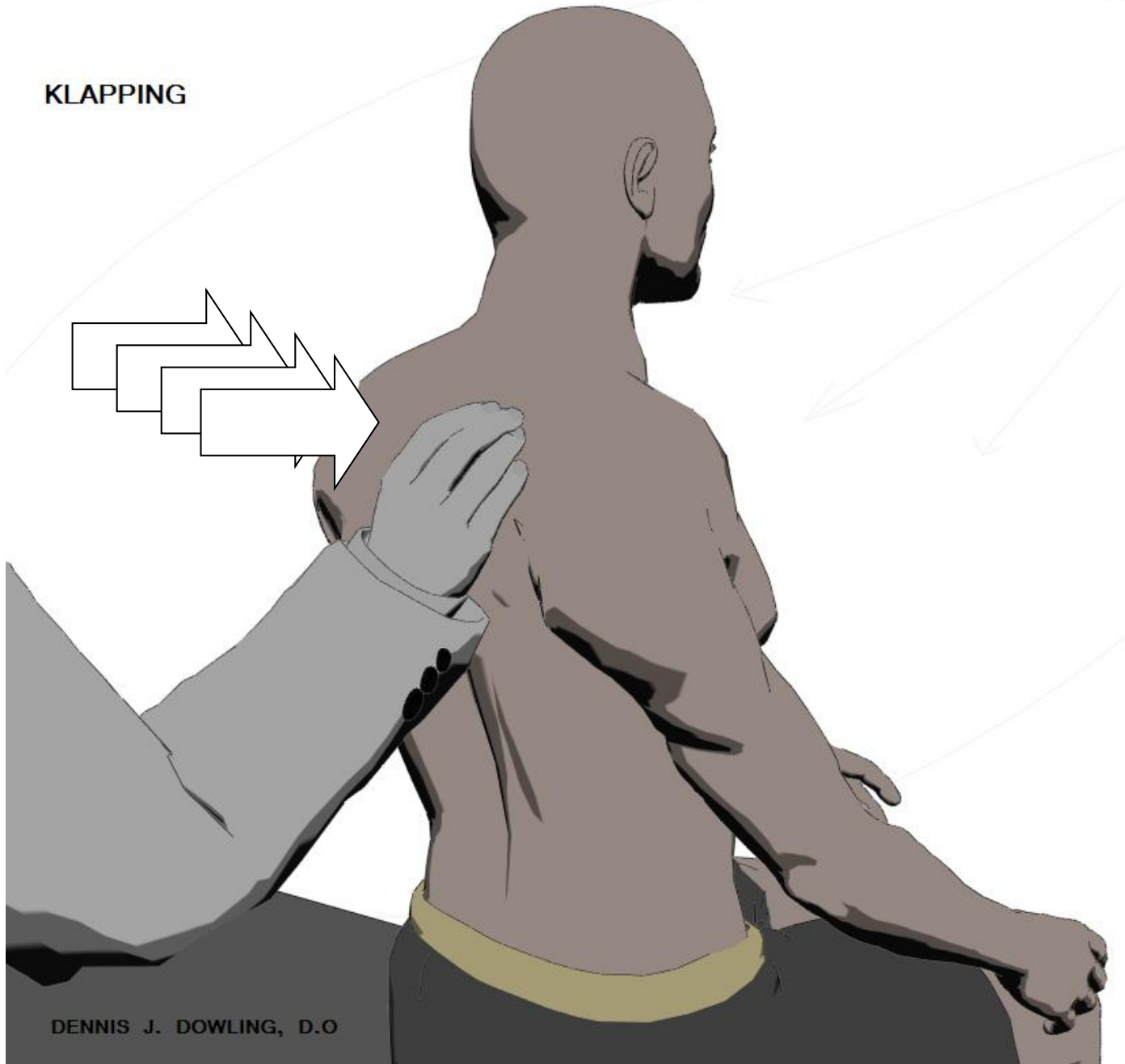
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GALBREATH TECHNIQUE



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KLAPPING



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DALRYMPLE PEDAL PUMP



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EFFLEURAGE



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PERIPHERAL PUMPING



D.J. DOWLING, D.O.

Thank
you.....