

# LYMPHATICS AND THE IMMUNE SYSTEM

## ENHANCING THE IMMUNE SYSTEM WITH OMT

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# DEFINITION OF LYMPH

- [New Latin *lymphā*, from Latin, water]
- : a usually clear coagulable fluid that passes from intercellular spaces of body tissue into the lymphatic vessels, is discharged into the blood by way of the thoracic duct, and resembles blood plasma in containing white blood cells and especially lymphocytes but normally few red blood cells and no platelets

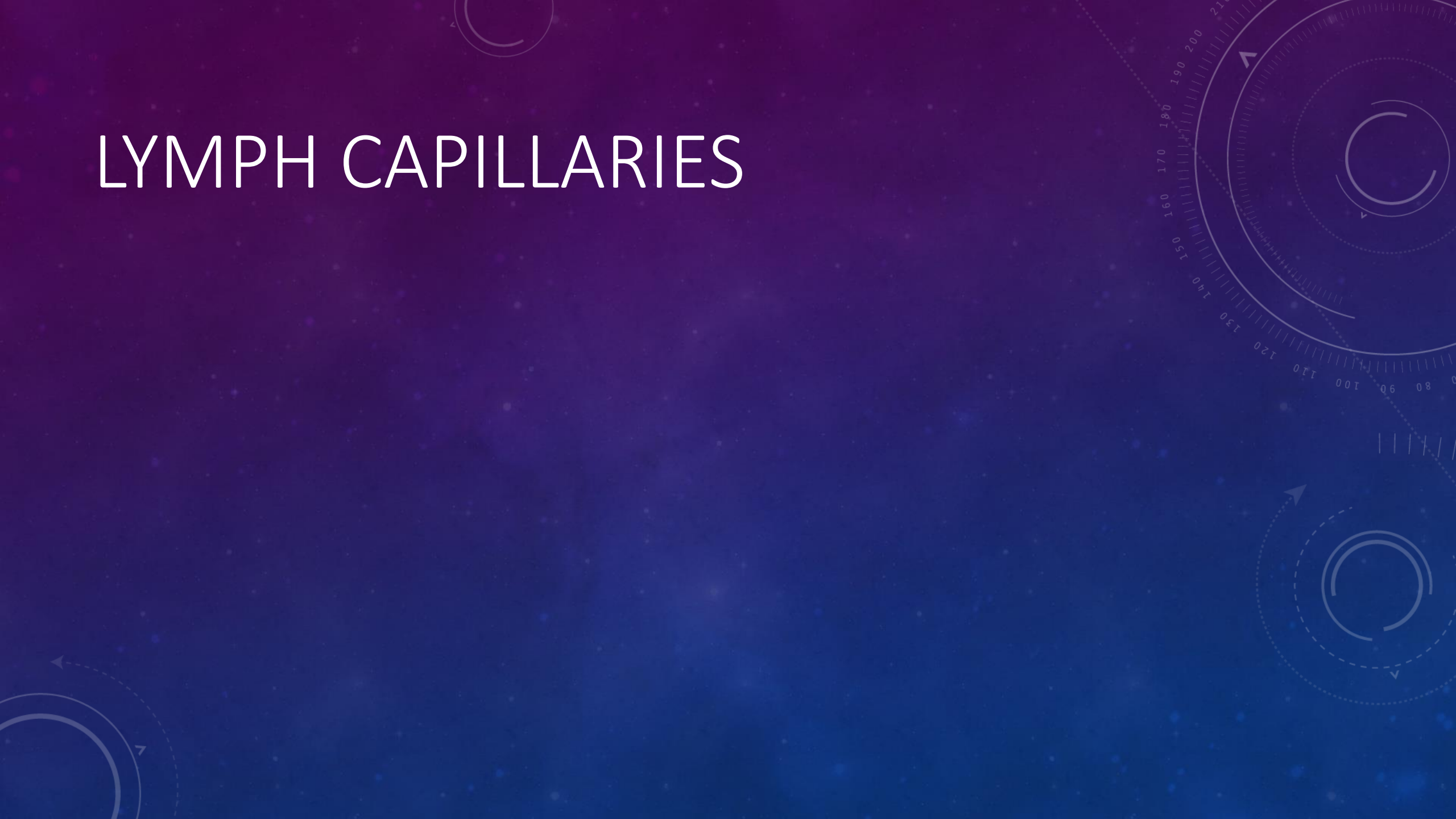
# LYMPHATICS

- Originate as lymph capillaries
- Capillaries unite to form larger vessels
  - Resemble veins in structure
  - Connect to lymph nodes at various intervals
- Lymphatics ultimately deliver lymph into 2 main channels
  - Right lymphatic duct
    - Drains right side of head & neck, right arm, right thorax
    - Empties into the right subclavian vein
  - Thoracic duct
    - Drains the rest of the body
    - Empties into the left subclavian vein

# THE LYMPHATIC SYSTEM



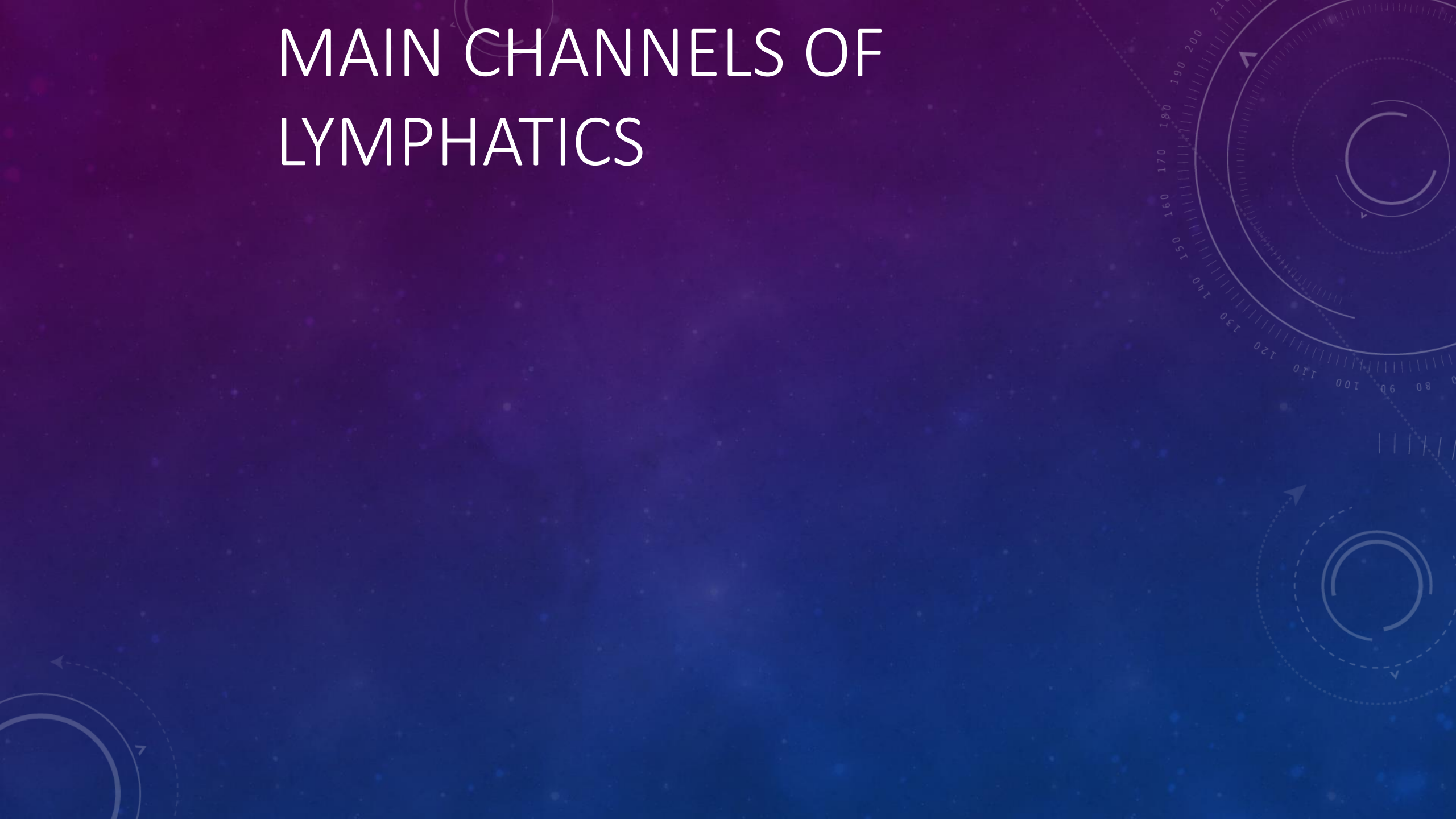
# LYMPH CAPILLARIES



# LYMPHATIC VESSELS



# MAIN CHANNELS OF LYMPHATICS



“LYMPHOMANIAC”

Gordon Zink, DO: “Lymphomaniac”



# RESPIRATORY–CIRCULATORY MODEL

- J. Gordon Zink, DO, FAAO
  - Developed the Respiratory–Circulatory model
- Goal: Improve all diaphragm restrictors in the body
- Diaphragms
  - “Transverse restrictors” of motion
  - Venous drainage
  - Lymphatic drainage
  - CSF

Collected works of J. Gordon Zink, DO, FAAO. American Academy of Osteopathy. Indianapolis, IN. 2007.

# DIAPHRAGMS & LYMPHATICS

## RESPIRATORY-CIRCULATORY CONNECTION

- Balancing the diaphragms has a direct impact on improving lymphatic flow.
- Core diaphragms:
  - C-T Junction [C-T Diaphragm]
  - T-L Junction [T-L Diaphragm]
  - L-Spine/Pelvis/Sacrum [Urogenital Diaphragm]

# OSTEOPATHIC HISTORY OF LYMPHATICS

- [\[PDF\] Manual techniques addressing the lymphatic system: origins and development](#)
- BJ Chikly - Journal of the American Osteopathic Association, 2005 - Am Osteopathic Assoc
- ... including “manipulation of the thorax” to increase the “force as well as the number of excursions of the **pump** [diaphragm].”<sup>36</sup> ... I might describe it as milking the **lymphatics**.” Dr Miller<sup>33</sup> continued: The technique just described is the method I use specifically for **lymphatic** drainage

# HISTORY OF LYMPHATIC TECHNIQUES

- Lymphatic knowledge late to medicine
- Elements of lymph were described in Greek, Chinese literature
- 1600' lymphatic described
- 1622 Italian surgeon Aselli described lymphatic system in dogs
- Swedish anatomist described transit of lymph from the gut to the thoracic duct, 1650's

[Manual techniques addressing the lymphatic system: origins and development](#)

BJ Chikly - Journal of the American Osteopathic Association, 2005 - Am Osteopathic Assoc

# “TURNEN”

- Notion of health and movement 19<sup>th</sup> century
- Movement of structures moved lymphatics
- Described by German physical educators : Jahn

[Manual techniques addressing the \*\*lymphatic system\*\*: origins and development](#)

BJ Chikly - Journal of the American Osteopathic Association, 2005 - Am Osteopathic Assoc

# MEDICAL GYMNASTICS

- Movements noted to move fluids in body
- Developed by Swedish gymists in 1800 by Ling
- Known as the “Swedish movement treatment” or “Ling System”

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# ENGLAND 1851

- Mathis Roth, MD wrote a book on the Ling System.
- He trained Dr Charles Fayette Taylor from New York
- Now in the US 1858
- He and his brothers (2 MD's) wrote the book "Exposition of the Swedish Movement Cure" 1860

Manual techniques addressing the **lymphatic system**: origins and development

BJ Chikly - Journal of the American Osteopathic Association, 2005 - Am Osteopathic Assoc

## LING SYSTEM INVOLVED

- Muscle strengthening and general physical education
- Cures for physical ailments
- The practitioner-induced passive motion, now widely known as Swedish massage, consisted of the application of pressure in long, firm motions along muscles, as well as clapping, cupping, effleurage, friction, pétrissage, tapotement, and vibration
- Later it was learned that extreme pressure may actually hurt the lymphatics

[Manual techniques addressing the \*\*lymphatic system\*\*: origins and development](#)

BJ Chikly - Journal of the American Osteopathic Association, 2005 - Am Osteopathic Assoc



## A.T.

- Osteopathic Tenets announced 1874
- Armed with profound knowledge of anatomy he developed his own thoughts of Lymphatic and blood flow uninfluenced by the European Ling system
- He did evaluate such therapies later
- 1892 he found the American School of Osteopathy
- He developed a multi-dimensional approach to manual medicine with lymphatics playing a central role

→ [Manual techniques addressing the lymphatic system: origins and development](#)

BJ Chikly - Journal of the American Osteopathic Association, 2005 - Am Osteopathic Assoc

## ACCORDING TO A.T.

- “Those truths are found in the spinal column with all its intricate bony framework, plus the beautiful circulation of blood and lymph through the nerve centers of the spinal cord and throughout the body.”

[Manual techniques addressing the lymphatic system: origins and development](#)

BJ Chikly - Journal of the American Osteopathic Association, 2005 - Am Osteopathic Assoc

# A.T. THOUGHT

- Although he did not publish a “How to book”, he did expect every osteopathic physician to use his extensive knowledge of anatomy and physiology to find the best osteopathic approach to the patient.

[Manual techniques addressing the lymphatic system: origins and development](#)

BJ Chikly - Journal of the American Osteopathic Association, 2005 - Am Osteopathic Assoc

# ORIGINS OF THE LYMPHATIC PUMP

- 1920 C. Earl Miller, developed the “Miller Thoracic Pump”
- Confirmed the osteopathic tenet that cures for many ailments are found within the body

➤ [Manual techniques addressing the lymphatic system: origins and development](#)

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# INCREASE IN PHAGOCYTOSIS AND ANTIBODY FORMATION

- Measel et al (1934) cited studies showing effect of lymphatic pump on the immune system.
- Whiting, DO (1910), showed 91% of patients had increased of phagocytic index after pump
- Lane, DO (1920), Showed rabbits had increased antibodies to sheep red blood cells after pump
- Castlio, DO (1930), showed increase in lymphocyte count in 80% of patients after pump
- Later he also found an increase in opsonic index (80% percent of patients) , bacteriolytic power (~60% of patients).
- **Creasy, (2013). Thoracic and abdominal lymphatic pump techniques inhibit the growth of S. pneumoniae bacteria in the lungs of rats.**

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# PROOF

- 1982: Measel investigated immune response to pneumococcal vaccine on medical students
- Statistically greater response in pump students.
- 1986: Measel demonstrated an increase in WBC, and increase in B (from 5% to 9%) and T cells (from 73% to 81%)
- 1990: Jackson showed pump with hepatitis B vaccine, achieved protective titers sooner in 50% of treated and 16% without treatment.
- 1998 Mesina et al showed a increase in basophils after pump
- 1993: Sleszynski and Kelso did thoracic pump in post op choles in one year randomized control study showing a increased recovery in those that received pump.

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→ BJ Chikly - Journal of the American Osteopathic Association, 2005 - Am Osteopathic Assoc

# BENEFICIAL EFFECTS TO IMMUNE SYSTEM

- OMT theoretically improves immune system
- Lymphatic Pump techniques
- Increased basophil count

Mesina, J; Hampton, D; Evans, R; Ziegler, T; Mikeska, C; Thomas, K; Ferretti, J.  
Transient basophilia following the application of lymphatic pump techniques: a pilot study. JAOA. February 1998, Vol. 98, 91-91.

# TRANSIENT BASOPHILIA FOLLOWING THE APPLICATION OF LYMPHATIC PUMP TECHNIQUES: A PILOT STUDY.

## Method

- Lymphatic pump techniques (LPTs) consisting of pectoral traction and splenic pump were performed on seven male medical students following blood collection for baseline value determinations.
- Blood was collected from each subject at 15, 30, 60, 120, and 240 minutes post-LPT.
- The samples were analyzed for serum chemistry and complete blood cell count.

Mesina, J; Hampton, D; Evans, R; Ziegler, T; Mikeska, C; Thomas, K; Ferretti, J. Transient basophilia following the application of lymphatic pump techniques: a pilot study. JAOA. February 1998, Vol. 98, 91-91.



# TRANSIENT BASOPHILIA FOLLOWING THE APPLICATION OF LYMPHATIC PUMP TECHNIQUES: A PILOT STUDY.

## Results

- All subjects showed an increase in the percentage of basophils.
- There was variation in the time points for the initial occurrence of basophilia among the subjects.
- A separate cohort of five male medical students served as control subjects.
- The control group did not receive LPTs.
- Blood samples collected at the same time points as the experimental group did not show the basophilia.

Mesina, J; Hampton, D; Evans, R; Ziegler, T; Mikeska, C; Thomas, K; Ferretti, J. Transient basophilia following the application of lymphatic pump techniques: a pilot study. JAOA. February 1998, Vol. 98, 91-91.

# TRANSIENT BASOPHILIA FOLLOWING THE APPLICATION OF LYMPHATIC PUMP TECHNIQUES: A PILOT STUDY.

## **Abstract**

Lymphatic pump techniques (LPTs) consisting of pectoral traction and splenic pump were performed on seven male medical students following blood collection for baseline value determinations. Blood was collected from each subject at 15, 30, 60, 120, and 240 minutes post-LPT. The samples were analyzed for serum chemistry and complete blood cell count. All subjects showed an increase in the percentage of basophils. There was variation in the time points for the initial occurrence of basophilia among the subjects. A separate cohort of five male medical students served as control subjects. The control group did not receive LPTs. Blood samples collected at the same time points as the experimental group did not show the basophilia.

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- **Hodges (2010) Lymphatic pump treatment mobilizes leukocytes from the gut associated lymphoid tissue into lymph**
- **Anglund (2011) Contribution of osteopathic medicine to care of patients with chronic wounds.**
- **Noll, (2013) The short-term effect of a lymphatic pump protocol on blood cell counts in nursing home residents with limited mobility: a pilot study.**

# PROCEDURES TO ENHANCE LYMPHATIC FLOW

Miller's Thoracic pump

Pedal Pump

Pectoral Pump

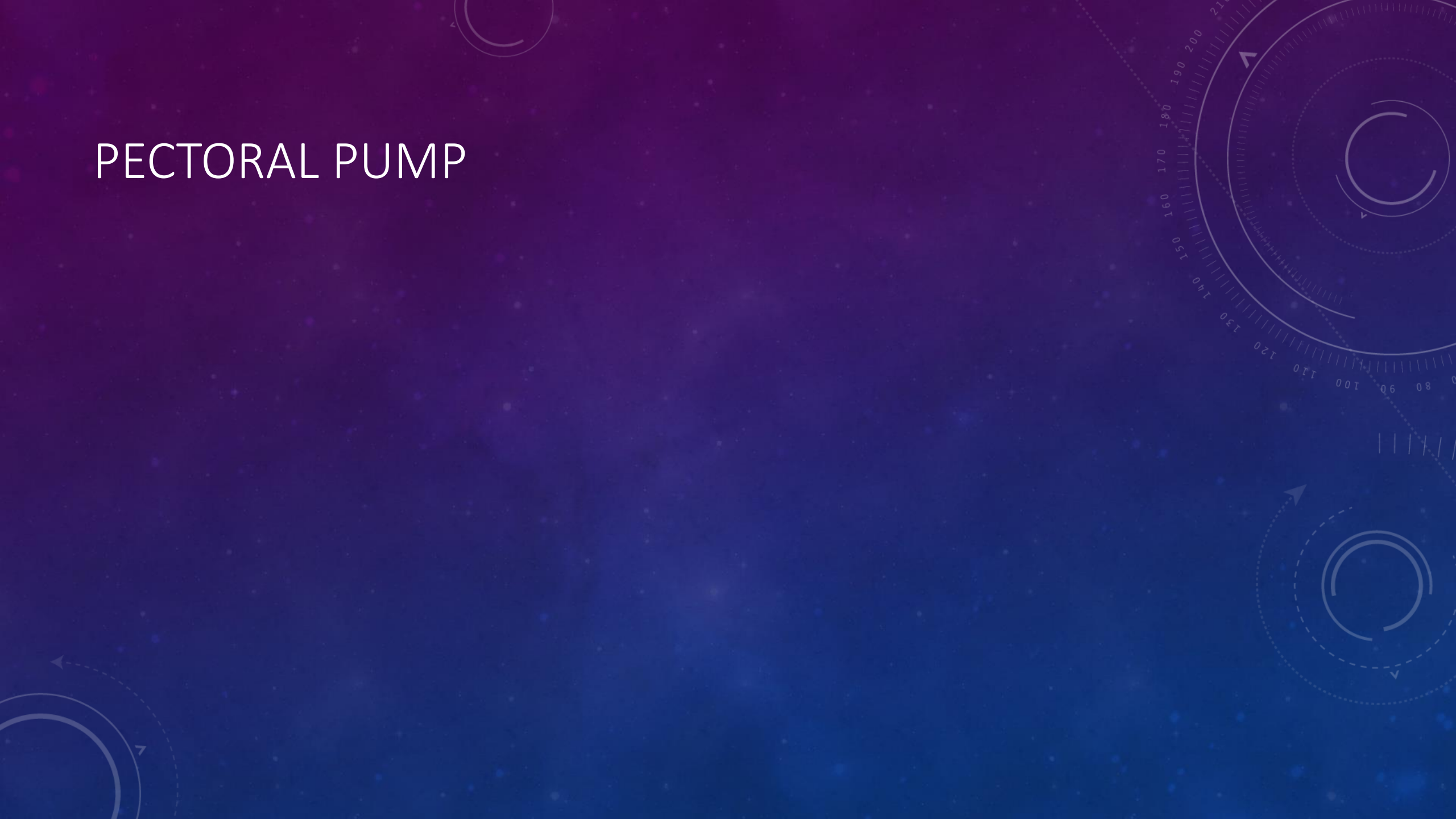
Splenic Pump

Doming the Diaphragm

# MILLER'S THORACIC PUMP



# PECTORAL PUMP



# DOMING THE DIAPHRAGM



# PEDAL PUMP





## CONCLUSION:

- Lymphatics control the flow of vital immunological cells and responses
- Historic observations and the literature verify its usefulness in the resolution human pathology
- Specific procedures to enhance flow are available in the osteopathic profession
- Further studies are needed to further support the observations