

The University of North Carolina at Chapel Hill  
  
 DIVISION OF PHYSICAL THERAPY  
Celebrating the year: Advancing the Future

# Mechanical Neck Pain in patients with COPD

*NCPTA Fall Conference 2018*

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## Objectives

- › By the end of today's presentation you will have –
  - **Familiarity** with using the **ICF, PT-CRT and biopsychosocial** considerations when assessing a patient
  - **Reviewed chronic obstructive pulmonary disease** through the lens of an orthopedic assessment
  - Gone through an **actual case** of a patient with mechanical neck pain and comorbidity of COPD
  - **Considered assessment and treatment** options for patients with COPD and mechanical neck pain



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## AGENDA

- › Thinking about thinking & clinical self-reflection
- › Getting the whole picture
  - ICF, PT-CRT and biopsychosocial considerations
  - Chronic pain and pain science
- › Case study presentation
  - Review actual case, course of assessment & treatment, and outcomes
  - Considerations for improvement
- › Future research & Conclusions



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## Clinical Self-Reflection

- › Metacognition
  - Awareness or analysis of one's own learning or thinking processes (Miriam-Webster)
  - Activities may include<sup>1</sup>
    - › Planning how to approach a specific task
    - › Monitoring comprehension
    - › Evaluating progress towards completing a task
  - "Thinking about thinking"
- › Heuristic
  - A rule or method that helps you solve problems
  - A "rule of thumb"
- › Heuristic Error
  - Making a short cut error –
    - › often based on
      - History
      - experiences
      - biases



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## Clinical Self-Reflections

- › TODAY
  - **Think about how we think** when faced with a patient with any diagnosis...my case example is one with mechanical neck pain in a pt with severe COPD
  - Consider our **method** (heuristic) of **problem solving** for these patients – do we have errors in our thinking and/or is there room for growth?
  - This presentation today is a response to my self-reflection and the realization that I may have been a limiting factor to his improvement

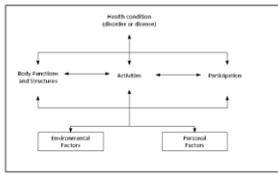


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## Getting the Whole Picture

- › Function is a dynamic interaction between <sup>2</sup>
  - Health condition
  - Environmental factors
  - Personal factors

Box 1: The ICF Model: Interaction between ICF components



WHO 2001, 18



**Getting the Whole Picture**

› PT – Critical Reasoning Tool (helping you learn by self-reflection)<sup>3</sup>

- Initial impressions
  - › Paint the picture of who this patient is
- Data gathering
  - › Probably over 80% of what you need to know will come from talking with the patient – gather data from interview and exam
- Diagnosis and treatment planning
  - › Share what you're thinking with the patient
  - › Set expectations – let them know you expect to make changes and to hold yourself accountable

**Getting the Whole Picture**

	<b>Health Condition</b>	
	-Mechanical neck pain -COPD -HTN	
<b>Body Structure/Function</b>	<b>Activity (tasks)</b>	<b>Participation</b>
-Decreased AROM neck -Decreased postural control -Decreased ability to carry/lift	Work Sleep Driving car	Able to work – missed some days  Difficulty w/ social activities
<b>Environmental</b>		
Very personally motivated to get better Has fear he won't get better Supportive family		

**Getting the Whole Picture**  
*Pain and Multimorbidity*

› Pain and Multimorbidity

- Comorbidity is an additional health condition
- Multimorbidity is the existence of two or more long-term conditions<sup>4</sup>

› Prevalence of multimorbidity is rising<sup>4</sup>

› Estimated that up to 55-98% of adults have multimorbidity<sup>4,5</sup>

- Pts with CAD and heart failure often have COPD
- Pts with diabetes and CAD have increased risk of COPD

**Getting the Whole Picture**  
*Pain and Multimorbidity*

› Can be a causal relationship between MSK disorder and other long-term conditions<sup>4</sup>

- Rheumatoid arthritis → increased risk of cardiovascular disease and osteoporosis
- Poor MSK health is related to poor mental health
- Estimated that nearly half of people with lung disease also have a chronic MSK condition

**Getting the Whole Picture**  
*Pain and Multimorbidity*

› Treatment Burden

- "...a concept that encapsulates the physical effects of treatment, financial losses and the psychosocial effects of time demands and dependence on others for assistance"<sup>4</sup>
- Things to consider
  - › Number of treatments a patient is receiving (for various conditions)
  - › Polypharmacy
  - › Time spent on care (visit MD, pharmacy, PT, monitor glucose levels, etc)
  - › Cost to patient
  - › Symptoms from condition(s) and/or interventions
  - › Level of independence – if losing independence → (-) psychosocial effect

**Getting the Whole Picture**  
*Pain and Multimorbidity*

› Multimorbidity

- Reduces quality of life
- Worsens health outcomes
- Increases mortality
- Cause more reliance on health care system

**Getting the Whole Picture**  
COPD and Multimorbidity

- > 51% of people with COPD have  $\geq 1$  additional conditions<sup>6</sup>
  - Associated with
    - > Increased mortality
    - > Hospitalization
    - > Lower quality of life
    - > Lower self-efficacy (downward spiral)
  - Most common additional conditions are<sup>7</sup>
    - > Other lung disease (i.e.-Cancer, asthma)
    - > Diabetes
    - > Obesity
    - > Depression
    - > Osteoporosis
    - > Cardiovascular diseases

**Getting the Whole Picture**  
COPD and Multimorbidity

- > Depression is highly prevalent in patients with COPD
- > Multifactorial
- > Pts with COPD and emotional frailty are at increased risk for poor health outcome<sup>8</sup>
- > Up to 85% of people with COPD have anxiety<sup>9</sup>
- > Increased dyspnea  $\rightarrow$  incr anxiety & depression<sup>10</sup>

Figure 4 Contributing factors to cognitive deficits in patients with COPD<sup>11</sup>  
Notes: \*Cause-effect relationships between the contributing factors, cognitive deficits, and COPD are not implied.  
From Ouellette, 2017<sup>11</sup>

**Getting the Whole Picture**  
Overview of COPD

- > **Most common lung diseases**
  - Asthma
  - Pneumothorax (collapse)
  - Bronchitis (swelling & inflammation)
  - **COPD**
    - Lung cancer
    - Infection (pneumonia)
    - Pulmonary edema
    - Pulmonary embolism

**Getting the Whole Picture**  
Overview of COPD

- > **Asthma & COPD**
- > **Similarities**
  - Inability to get air into the lungs
  - Treated with some of the same medications
  - Initial symptoms of SOB, chest tightness, wheezing and cough
- > **Differences**
  - **Asthma**
    - > Has early onset (usually ~5 years old)
    - > Due to inflammatory reaction (cause unknown)
    - > Can be well controlled, some outgrow condition
  - **COPD**
    - > Has later onset (usually >40 years old)
    - > Due to damage caused by smoking
    - > Progressive condition

**Getting the Whole Picture**  
Overview of COPD

**COPD**

**EMPHYSEMA**

- > Air sacs damaged
- > Difficulty breathing
- > Cigarette smoke is major cause
- > SOB with activity
- > Not curable

**CHRONIC BRONCHITIS**

- > Inflammation of bronchial tubes
- > Difficulty breathing
- > Coughing & mucous production
- > Cigarette smoke is most common cause

<https://ne.illnesses.gov/chronicbronchitis.html>

**Getting the Whole Picture**  
Overview of COPD

- > "Progressive respiratory condition in which the airways are abnormally narrowed so much so that airflow is limited and breathing becomes very difficult."<sup>12</sup>

From Bing Online Pictures, 2018

**Getting the Whole Picture**  
*Overview of COPD*

› Symptoms often not present until later stages (from lung.org - <http://www.lung.org/lung-disease/copd/symptoms-early-late>)

› Main cause is smoking (85-90% of cases)

› Prevention

- Stop smoking
- Avoid air pollution
- Avoid 2<sup>nd</sup> hand smoke
- Avoid exposure to chemicals and dust



From Bing Online Pictures, 2018

**Getting the Whole Picture**  
*Overview of COPD*

› Symptoms<sup>13</sup>

- Dyspnea
- Cough and sputum production
- Wheezing
- Chest tightness
- Chest congestion
- Fatigue with activities of daily living

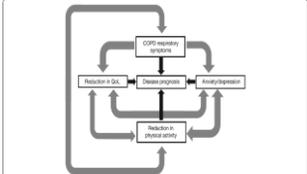


Fig. 3 The relationship between symptoms, disease severity, reduction in physical activity, impact on quality of life, and disease prognosis. COPD severity contributes to reduced physical activity, which leads to reduced physical fitness, which leads to reduced quality of life.

**Getting the Whole Picture**  
*Overview of COPD*

› Phenotypes of COPD<sup>8</sup>

- "Phenotype" are observable properties produced by genotype
- Describing patients with COPD who have similar characteristics
- Identifying symptom patterns improves treatment choices
- Not all patients with COPD are the same

**Getting the Whole Picture**  
*Overview of COPD*

› Factors affecting activity level<sup>14</sup>

- (+) Factors
  - › Higher self efficacy
  - › Higher exercise capacity
  - › Lower (less) lung hyperinflation
- (-) Factors
  - › More severe COPD
  - › Higher lung hyperinflation
  - › Worse dyspnea
  - › Worse leg muscle function
  - › Increased use of supplemental oxygen

**Getting the Whole Picture**  
*Muscles of respiration and COPD*

› Normal breathing

- GOAL: "provide oxygen to the tissues and to remove carbon dioxide."<sup>15</sup>
- At rest<sup>16</sup>
  - › 12 - 20 breaths per minute at rest
  - › Tidal volume is ~0.5 liters
  - › Key muscles of 'quiet breathing'
    - Diaphragm - performs 70-80% of work of inspiration
    - Scalenes
    - Intercostales

**Getting the Whole Picture**  
*Muscles of respiration and COPD*

› Normal breathing

- Forced inspiration
  - › Key muscles
    - Muscles of quiet breathing
    - Sternocleidomastoid
    - Serratus posterior superior/inferior
    - Latissimus dorsi
    - Levator costae
    - Pectoralis minor
    - Pectoralis major
    - Iliocostalis thoracis & cervicis
    - Serratus anterior
    - Quadratus lumborum

**Getting the Whole Picture**  
*Muscles of Respiration and COPD*

- > COPD → <sup>17</sup>
  - Damage to lung parenchyma (i.e.-alveoli, alveolar ducts, bronchioles) impairing gas exchange
  - Lung hyperinflation
  - Muscles of inspiration are shorter (mechanical disadvantage)
  - Mechanical resistance to chest wall expansion



- Increased work on muscles of respiration

**Getting the Whole Picture**  
*Pain and COPD*

- > Up to 68% of people with COPD have pain<sup>18</sup>
- > Majority of reported pain was in the chest, neck, shoulders and thorax
- > Increased pain in patients with COPD has been associated with<sup>19</sup>
  - Interference with life activities
  - Greater fear of activities
  - Lower frequency of energy expenditure
  - Dyspnea is associated with increased kinesiophobia<sup>20</sup>

**Getting the Whole Picture**  
*Pain and COPD*

- > Cross Sectional Study<sup>21</sup>
  - Take from 2-surveys with N=22,188 and N=22842
  - In people with COPD
    - > 41% had chronic neck pain (vs 26.1% in general population)
    - > 45% had chronic low back pain (vs 28.4% in gen pop.)
    - > 23% had migraines (vs 13% in gen.pop.)

ORIGINAL ARTICLE

**Prevalence of Pain in COPD Patients and Associated Factors**  
*Report From a Population-based Study*

Javier de Miguel-Diez, PhD,\* Ana López-de-Andrés, PhD,†  
Fátima Hernández-Barrera, MEd,† Isabel Sánchez-Pedraza, PhD,‡  
José L. del Barrio, PhD,† Luis Pantoja-Martin, PhD,\*  
María A. Martínez-Muñoz, PhD,‡ and Rodrigo Jimeno-García, PhD†

**Getting the Whole Picture**  
*Pain and COPD*

- > Cross Sectional Study<sup>21</sup>
  - Associated factors increasing risk of pain were
    - > Younger age
    - > Female gender
    - > Fair/poor self-rated health
    - > Hypertension
    - > Mental disorders
    - > Obesity
    - > Use of pain medication

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**Getting the Whole Picture**  
*Pain and COPD*

- > Additional factors that may increase risk of pain in patients with COPD include<sup>21</sup>
  - Hyperinflation of chest
  - Dyspnea
  - Sleep disorders
  - Anxiety
  - Depression

**Getting the Whole Picture**  
*Pain and COPD*

- > Interview study, patients with COPD and pain<sup>22</sup>
  - 3 main themes
    - > Pts felt incomprehensible and unbearable pain
    - > Pts felt locked in own body and shut out of the world
    - > Pts felt stuck in a vicious COPD cycle

**ISSUES IN PULMONARY NURSING**

**Qualitative study of pain of patients with chronic obstructive pulmonary disease**

Yibekce Lohse, RN, PhD,\* Beatriz Castiella Domínguez Ibarra, RN,† Marit Andersen, RN, PhD,‡  
Christine Munkwicz, RN, PhD,§ Johnny Kongstad, MD, PhD,|| and Torun Rasmussen, RN, PhD,¶

## Getting the Whole Picture

Pain and COPD

- › Interview study, patients with COPD and pain<sup>22</sup>
- Interview quote

› *“Anyway, it is not easy to live with pain and breathlessness at the same time. The pain is so severe that you hyperventilate, you know .and everybody in pain ties up, like us, having COPD, we are constantly moving around with our shoulders up to our ears”*

### ISSUES IN PULMONARY NURSING

#### Qualitative study of pain of patients with chronic obstructive pulmonary disease

Yibekr Lohse, RN, PhD,<sup>1</sup> Ramona Camilla Dragunski Heer, RN,<sup>2</sup> Marit Andersen, RN, PhD,<sup>3</sup> Christine Muskowiak, RN, PhD,<sup>4</sup> Johnny Kongstad, MD, PhD,<sup>5</sup> and Torun Rasmussen, RN, PhD<sup>6\*</sup>



Obtaining the pain: Obtaining the future

## Getting the Whole Picture

- › Chronic pain and the brain

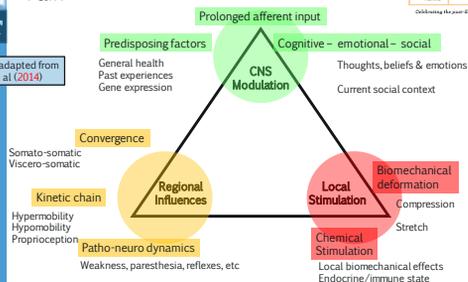
- Iannetti (2010)<sup>23</sup> states “nociception is most often the cause of pain, it is not synonymous with pain, which is a conscious experience that can even occur in the absence of nociception.”
- Jones (2014)<sup>24</sup> states “three categories have been created to facilitate (the understanding of human pain experience) – central modulation, regional influences, and local stimulation.”



Obtaining the pain: Obtaining the future

## Getting the Whole Picture Pain

Graphic adapted from Jones et al (2014)



Obtaining the pain: Obtaining the future

## Case Study Presentation

- › Pt saw MD at 1-month pain and 2-months pain → MD recommended
  - Heating pad
  - General stretches for neck and neck isometrics
    - › Pt tried, made pain worse
  - Diclofenac and Ibuprofen
    - › Pt tried, made pain worse
  - Muscle relaxers (Flexeril)
    - › Helped a little
  - Pt tried new pillow
    - › Did not help
  - Recommend PT at 8-weeks of pain (pt reports he “doesn’t think P.T. will help”)



Obtaining the pain: Obtaining the future

## Case Study Presentation

- › Patient examination for neck pain<sup>25</sup>
- › Outcome measure
  - NDI
  - PSFS
- › AROM
- › Segmental mobility
- › CCTT
- › ULTT
- › Spurling and distraction
- › Additional considerations
  - FABQ
  - Tampa Scale for Kinesiophobia
- › Neurological assessment upper quarter
- › MMT
- › Thorough exam of pain
- › Functional assessment



Obtaining the pain: Obtaining the future

## Case Study Presentation

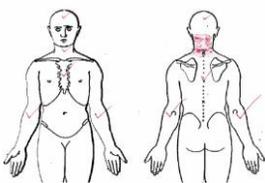
- › 48 y.o. male with chief complaint of severe neck pain x12 weeks, insidious onset. Pt denies UE weakness, paresthesia or radiculopathy.
- › PMHx:
  - Severe COPD
  - Chronic smoker
  - Asthma
  - Hypertension
- › Imaging
  - None
- › ADLs
  - Works in construction (heavy work, bent forward a lot)
- › Red Flags (-)
  - No trauma/fall from height, (-) bilateral or quadrilateral neurological symptoms, no h/o cancer, no unexplainable weight loss, no recent infections, (-) syncope, (-) nausea/vomiting



Obtaining the pain: Obtaining the future

**Case Study Presentation**  
*Examination*

- > Pain
  - 8-10/10 (best - worst)
  - **Aggs**-all neck motion, yawn, look down at work
  - **Ease**-Flexeril
- > Posture
  - Bilat. Shoulder elevation, increased t/s kyphosis, forward head



**Case Study Presentation**  
*Differential diagnostic hypotheses*

- > Mechanical neck pain
- > Cervical muscle strain
- > Emerging cervical disc injury
- > Central sensitization of pain

> **Examination should be directed at these hypotheses**

**Case Study Presentation**  
*Examination*

- > Cervical AROM
  - Flexion 16° (pain)
  - Extension 30° (pain)
  - Lateral flexion R 18° (pain Bil)
  - Lat flexion L 11° (pain Bil)
  - Rotation R 29° (pain Bil)
  - Rotation L 25° (pain Bil)
- > Cervical distraction (-)
- > Cervical compression (-)

- > Palpation
  - Muscle
    - > TTP R>L SCM, scalenes and upper trapezius
  - Joint accessory glides
    - > Central and unilateral PA mobilizations hypomobile C1 - T5 with local pain
    - > Lateral glides C1 - 7 R and L → local pain

**Case Study Presentation**  
*Test Treatment*

- > **REVIEW** - where are we at this point?
  - **Cervical disc**
    - > No directional preference (all motions painful)
    - > No ADL indicators of directional preference
    - > No mechanism of injury
    - > No benefit from anti-inflammatory medication
    - > No change in pain with Valsalva or coughing
    - > (-) neurological signs
  - **Cervical muscle strain**
    - > Neck muscles tender to palpation
    - > Limited AROM neck with contralateral pain with lat.flex and rotation
  - **Mechanical neck pain**
    - > Accessory motions of cervical and thoracic spine (+) local pain
    - > Limited AROM neck with ipsilateral pain with lat.flex and rotation
  - **Central sensitization**
    - > We did not consider this at the time

**Case Study Presentation**  
*Test Treatment - Day 1*

- > We decided to do a **test treatment** for **mechanical neck pain** with a **"test - treat - retest"** approach
- > Joint mobilization
  - Gr II - III-, central and unilateral PA mobilizations C1 - 7 (right and left)
  - Gr II - III-, lateral glides, C1 - 7 (R and L) - painful therefore changed to same + manual distraction (less pain)
  - RETEST AROM ROTATION
    - > Rotation R 32° (increased 3°)
    - > Rotation L 34° (increased 9°)
- > HEP → cervical retraction and scapular retraction; educated patient on resting position of shoulders (reduce elevation, use mirror for visual feedback)

**Case Study Presentation**  
*Treatment - Day 2 (9-days after initial visit)*

SUBJECTIVE	OBJECTIVE
<ul style="list-style-type: none"> <li>&gt; Pain - no change (constant 8-9/10)</li> <li>&gt; Pt now sleeping in recliner intermittently due to pain at night and in morning</li> <li>&gt; Doing HEP - symptoms are 'no worse, no better'</li> <li>&gt; Feels increased pain at work (heavy manual labor)</li> <li>&gt; Cannot afford to miss work, cannot reduce workload</li> </ul>	<ul style="list-style-type: none"> <li>&gt; AROM neck rotation R 35, L 36</li> <li>&gt; Heat to neck while review HEP</li> <li>&gt; Change of plan to address neck muscles today (due to no reduction of pain and pt concern P.T. can't help)</li> <li>&gt; Soft-tissue mobilization to scalenes, SCM, upper trap muscles</li> <li>&gt; Pt displayed significant apprehension to techniques → increased neck guarding, unable to relax head/neck</li> <li>&gt; RETEST AROM neck rotation - no change</li> </ul>



## Case Study Presentation

*Treatment – Day 3 (13-days after visit #2)*

**SUBJECTIVE**

- › Pain – no change (constant 8-9/10)
- › Missed 2-days of work last week due to pain
- › Doing HEP – symptoms are 'no worse, no better'

**OBJECTIVE**

- › AROM neck rotation R 35, L 36
- › Heat to neck while review HEP
- › Change back to original plan of joint mobilization (due to inability of pt to relax and no benefit)
- › Instruction in resting supine with rolled towel under neck + tetraxions; also with diaphragmatic breathing
- › Gr II – III-, PA mobilizations C1 – 7, R and L
- › Same with lateral glides R and L
- › RETEST AROM neck rotation R 41, L 36
- › Pain reported at 7/10



## Case Study Presentation

- › Pt stopped coming to PT (16 weeks of neck pain)
- › Back to MD
  - Trigger point injections x3 on "R" paravertebral muscles
  - Medrol dose pack
- › 3-weeks later to MD (19 weeks neck pain)
  - No improvement
  - XR neck (was (-) except small osteophytes at uncovertebral joints C4-5, C6-7)
  - MD proposed "prolonged PT," patient declined
- › 24 weeks neck pain
  - At some point pt tried chiropractic without benefit
  - NOW → Pt to ER
  - MRI → (-) except for "mild vertebral body height loss from C4 - C6"
  - Lidocaine patch, d/c from ER same day
- › 5-days later
  - To ER for influenza
  - Treated with fluids & Tamiflu
  - d/c same day
- › 36 weeks neck pain
  - To MD – pt's pain is 50% less
  - Unclear as to why improved
- › No further report of neck pain thereafter



## Case Study Presentation

*Self Reflections*

- › We should have used outcome measures
  - FABQ
    - › Some have found a higher FABQ score as a negative prognosticator
    - › George et al (2011)<sup>26</sup> found
      - Higher FABQ score correlated with higher pain & lower function
      - Higher FABQ score correlated with better outcomes
  - TSK (Tampa scale for kinesiophobia)
    - › Kinesiophobia associated with disability, pain and lower quality of life
  - NDI (neck disability index)



## Case Study Presentation

*Self Reflections*

- › Patient interview
  - Need more details about work in construction
  - More questions about patient perceptions
    - › Unable to relax neck during manual therapy, especially while lying supine
    - › Why did he feel PT would not work prior to starting PT?
  - Pain
    - › More detail about aggs and eases – pt reported a constant 8/10 pain
    - Seems unlikely if he has mechanical neck pain



## Case Study Presentation

*Self Reflections*

- › Additional areas for reflection
  - Improve patient education about pain
  - Consider graded exposure as method of treatment



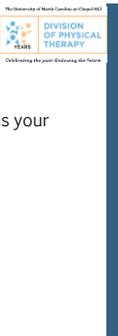
## Conclusion

- › Patient with severe COPD and severe neck pain x2-months.
  - Yellow flags
    - › Pt perception that PT won't work
    - › Pt fears associated with COPD and inability to get rid of neck pain
    - › Previous failed treatments
- › Need to address the whole patient as a biopsychosocial emotional spiritual being
  - Make a plan to address each of the involved areas

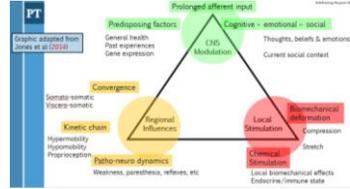


### Conclusion

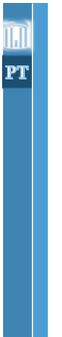
- › Teach the patient your expectations
- › Solicit questions, ensure the patient understands your plan and expectations
- › Hold yourself accountable to expectations
- › Use a thorough examination process
- › Test-Treat-Retest approach



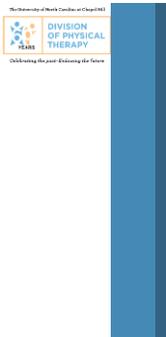
### Conclusion



- › Patients with mechanical neck pain and severe COPD will likely have issues across the spectrum of their whole being...find them all using a thorough assessment and address your findings.

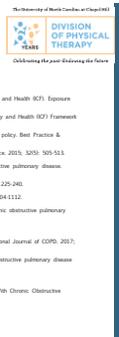


Thank you!



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