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- Email customerservice@OccupationalTherapy.com

Living and Breathing with COPD

The OT Role

Camille Tovera-Magsombol, OTD, OTR/L

1

Learning Outcomes

1. State the pathophysiology of and functional limitations from COPD
2. Identify key areas to assess and address on individuals with COPD
3. Identify self-management strategies to promote optimal living of individuals with COPD

2

Chronic Obstructive Pulmonary Disease

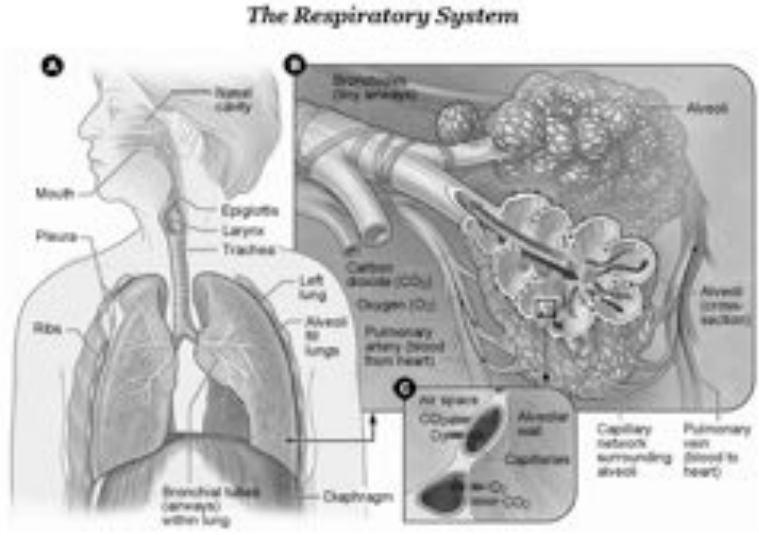
Definition and Pathophysiology

3

Chronic Obstructive Pulmonary Disease

- Pulmonary disease that is common, preventable, and treatable
- Persistent respiratory symptoms and airflow limitation
- Mixture of:
  - Alveolar abnormalities
  - Small-airway disease
- Difficulty with getting air out of the lungs

4



http://www.nhlbi.nih.gov/health/health-topics/topics/hlw/system.html

5

Risk Factors

- Main risk factor: tobacco smoking
- Environment: air pollution (indoor and outdoor)
- Occupational exposure: dust, chemical agents, fumes
- Genetics: alpha-1 antitrypsin deficiency
- Age and female gender
- Lung growth and development
- Socioeconomic status
- Asthma and airway hyper-activity
- Chronic bronchitis
- Infections

1. Global Initiative for Chronic Obstructive Lung Disease, Inc. (2019). *Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease.* (No. 2019 Report).Global Initiative for Chronic Obstructive Lung Disease.

6

CONTINUED

Pathophysiology

- **Airflow limitation and gas trapping**
- Gas exchange abnormalities
- Mucus hypersecretion
- Pulmonary hypertension

1. Global Initiative for Chronic Obstructive Lung Disease, Inc. (2019). *Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease.* (No. 2019 Report).Global Initiative for Chronic Obstructive Lung Disease.

7

CONTINUED

Pathophysiology

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1. Global Initiative for Chronic Obstructive Lung Disease, Inc. (2019). *Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease.* (No. 2019 Report).Global Initiative for Chronic Obstructive Lung Disease.

8

CONTINUED

Pathophysiology

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1. Global Initiative for Chronic Obstructive Lung Disease, Inc. (2019). *Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease.* (No. 2019 Report).Global Initiative for Chronic Obstructive Lung Disease.

9

CONTINUED

Pathophysiology

- Airflow limitation and gas trapping
- Gas exchange abnormalities
- Mucus hypersecretion
- **Pulmonary hypertension**

1. Global Initiative for Chronic Obstructive Lung Disease, Inc. (2019). *Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease.* (No. 2019 Report).Global Initiative for Chronic Obstructive Lung Disease.

10

COPD Common Tests

- Pulmonary function tests (PFTs)
  - Spirometry is the gold standard for COPD diagnosis
  - Spirometry, lung volumes, diffusing capacity
  - Forced vital capacity (FVC), Forced expiratory volume in one second (FEV_1), and FEV_1 /FVC ratio.
  - COPD: FEV_1 /FVC = < 0.70
- Chest imaging: chest X-Ray, CT, MRI
- Arterial Blood Gasses (ABGs): PaO2, PaCO2, pH

http://www.nhlbi.nih.gov/health//dci/Diseases/Copd/Copd_WhatIs.html

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Classification of Airflow Limitation Severity

- FEV_1/FVC < 0.70
- Gold 1: Mild FEV_1 ≥ 80% predicted
- Gold 2: Moderate 50% ≤ FEV_1 ≥ 80% predicted
- Gold 3: Severe 30% ≤ FEV_1 ≥ 50% predicted
- Gold 4: Very Severe FEV_1 < 30% predicted

1. Han, M., Dransfield, M. & Martinez, F. (2019). Chronic obstructive pulmonary disease: Definition, clinical manifestations, diagnosis, and staging. Retrieved from https://www.uptodate.com/contents/chronic-obstructive-pulmonary-disease-definition-clinical-manifestations-diagnosis-and-staging#H18807517

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Assessment of Symptoms

- Modified British Medication Research Council (mMRC) Questionnaire
  - Grades 0-4
  - 0: breathless only with strenuous exercise
  - 1: breathless when hurrying (level) or walking up a slight hill
  - 2: because of breathlessness, slower than people of same age on level, have to stop for breath when walking on own pace on level
  - 3: stop for breath after 100 meters or after a few minutes
  - 4: too breathless to leave the house, breathless when dressing or undressing

1. Han, M., Dransfield, M. & Martinez, F. (2019). Chronic obstructive pulmonary disease: Definition, clinical manifestations, diagnosis, and staging. Retrieved from https://www.uptodate.com/contents/chronic-obstructive-pulmonary-disease-definition-clinical-manifestations-diagnosis-and-staging#H18807517

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Assessment of Symptoms

- COPD Assessment Test (CAT)
  - Patient report at the impact of COPD on health status.
  - 8 questions: cough, phlegm, chest tightness, breathlessness when walking up a hill or flight of stairs, activity limitation at home, confidence in leaving home, sleep, energy
  - Scale of 1-5
  - 0-40 with higher scores indicating more impact of COPD symptoms on health status[1]

1. American Thoracic Society. (2016). COPD assessment test (CAT). Retrieved from https://www.thoracic.org/members/assemblies/assemblies/srn/questionaires/copd.php

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Assessment of Symptoms

- Clinical COPD Questionnaire (CCQ)
  - 10 items, health-related quality of life questionnaire
  - Quantifies the clinical status of the airways
  - Understanding of the activity limitation and emotional dysfunction experienced by the individual
  - 3 domains: symptoms, functional state, mental state
  - 0-6 (least to worst impairment)
  - 2 minutes to complete
  - MCI: -0.4 points

1. Kon, S., Dilaver, D., Mittal, M., Nolan, C., Clark, A., Canavan, J., . . . Man, W. (2014). The clinical COPD questionnaire: Response to pulmonary rehabilitation and minimal clinically important difference. *Thorax, 69*, 793-798.
2. van der Molen, T., Miravitlles, M., & Kocks, J. (2013). COPD management: Role of symptom assessment in routine clinical practice. *International Journal of Chronic Obstructive Pulmonary Disease, 8*, 461-471. doi:10.2147/COPD.S49392

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Combined COPD Assessment

- Spirometry: severity of airway limitation
- Dyspnea assessment with mMRC or CAT™
- History of moderate and severe exacerbations (and prior hospitalizations)
- Airflow limitations: 1-4
- Symptom burden and risk of exacerbation: A-D

C	**GOLD 3-4** **Exacerbations per year ≥ 2** **CAT <10** **mMRC 0-1**	**D**	**GOLD 3-4** **Exacerbations per year ≥ 2** **CAT ≥ 10** **mMRC ≥ 2**
A	**GOLD 1-2** **Exacerbations per year ≤1** **CAT <10** **mMRC 0-1**	**B**	**GOLD 1-2** **Exacerbations per year ≤1** **CAT ≥ 10** **mMRC ≥ 2**

1. Global Initiative for Chronic Obstructive Lung Disease, Inc. (2019). *Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease.* (No. 2019 Report).Global Initiative for Chronic Obstructive Lung Disease.

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Bode Index

- Assessment of COPD severity and prognosis
- Survival prediction in 4 years
- Calculation based on FEV_1, 6MW, mMRC dyspnea scale, and BMI
  - 0-2 points 80%
  - 3-4 points 67%
  - 5-6 points 57%
  - 7-10 points 18%

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COPD Foundation system

- Based on: spirometry, regular symptoms, number of exacerbations in the past year, oxygenation, emphysema on CT scan, chronic bronchitis, and comorbidities.
  - 0: spirometry normal
  - 1: mild, FEV_1 /FVC < 0.70, $FEV_1 \geq 60\%$ predicted
  - 2: moderate, FEV_1 /FVC < 0.70, FEV_1 30-60% predicted
  - 3: severe, FEV_1 /FVC < 0.70, FEV_1 <30% predicted
  - U: undefined, FEV_1 /FVC > 0.70, FEV_1 <80% predicted

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The COPD Patient

Assessment and Treatment

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Persistent Respiratory Symptoms

1. Cough
2. Dyspnea
3. Sputum production

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Chronic Obstructive Pulmonary Disease

- Increased / frequent use of accessory breathing muscle use: scalenes, upper trapz, SCM
- Barrel chest
- Kyphotic posture with protracted and/or elevated shoulders
- Pink puffers
- Blue bloaters
- Dyspnea, anxiety, and fatigue barriers to reengagement in occupation

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Chart Review

- COPD stage/severity and date of diagnosis
- Symptoms on admission
- Past medical history
- Current medications
- Risk factors for cardiovascular and pulmonary disease
- Lab values and trends
- Radiologic studies
- Oxygen therapy and other respiratory treatment

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Chart Review

- Surgical history
- EKG results if any
- PFTs
- ABGs
- Other diagnostic tests
- Vitals and trends
- Hospital course
- Diet and intake
- Social history
- Home environment

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Occupational Profile

- COPD stage and other comorbidities, number of exacerbations
- Occupations: successful, unsuccessful, desired
- What is valuable for them and what are their interests?
- Roles, change in roles, anxiety and depression with changes?
- Symptoms and medical management
- Barriers and facilitators to occupational engagement
- Goals

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Occupational Performance

- Assistance needed and reason for needing assistance
- Vitals during occupational participation
  - Oxygen saturation
  - HR
  - BP
  - Borg RPE
  - Borg Dyspnea Scale
- Breathing pattern during activity participation

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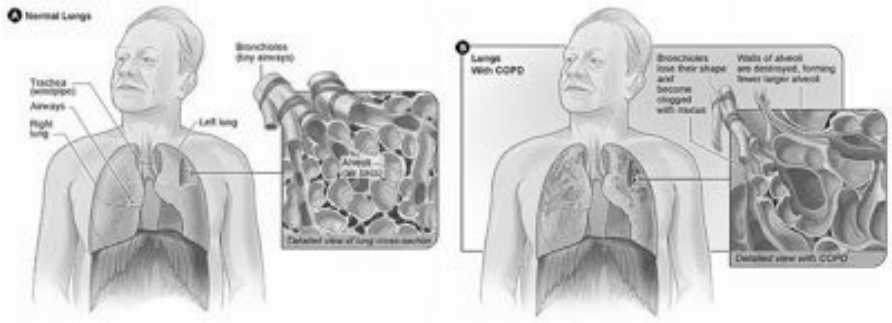
Hyperinflation

- Static: decrease in lung elasticity
- Dynamic: during exercise or increased activity, the patient's decreased ability to exhale fully leads to air trapping



http://www.nhlbi.nih.gov/health//dci/Diseases/Copd/Copd_WhatIs.html

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Hypercapnia

- AKA CO2 retention
- Elevated carbon dioxide in the arterial blood
- Causes:
  - Hypoventilation
  - Increased dead space – alveoli ventilated but not perfused
- ABG: PaCO2 > 42 mmHg
- Clinicians must use caution in providing supplemental oxygen – if patients are used to having a high concentration of CO2 in there system, an increase in blood O2 suppresses the drive to breathe

http://www.nhlbi.nih.gov/health//dci/Diseases/Copd/Copd_WhatIs.html

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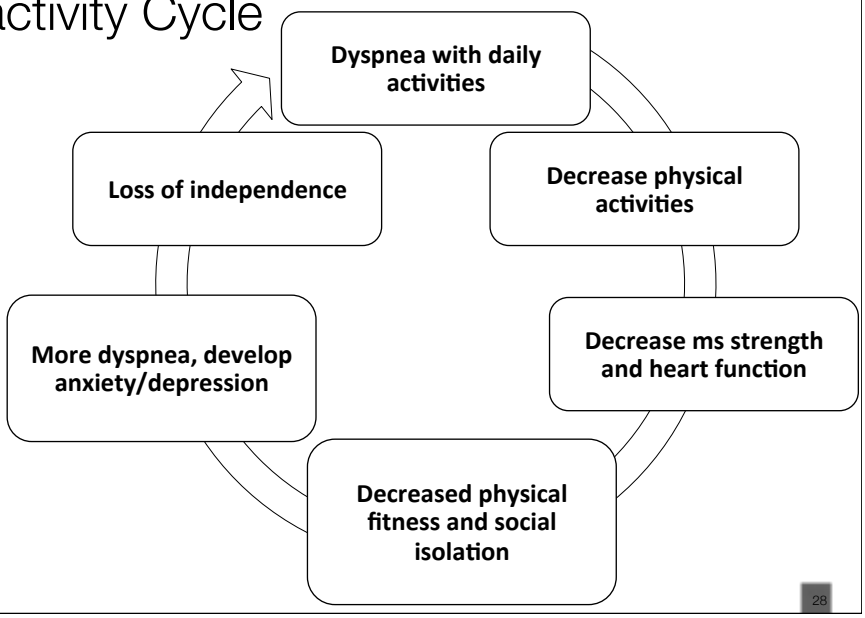
Inactivity Cycle



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Supplemental Oxygen

- Each patient using oxygen should have an oxygen prescription
  - SpO2 at rest
  - SpO2 with activity
  - 88-92% saturation goal for patients to avoid hypoxemia and decrease risk for oxygen-induced hypercapnia
- Can be continuous flow or intermittent
- With an oxygen conserving device, oxygen is only released on inhalation
- The numbers on the device does not correspond to oxygen liter flow

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Functional Status Measures

- Multiple measures that look at different components
- What is the goal of the intervention?
- Paper and pencil test?
- Performance-based?
- English language and European-based cultures
- Health literacy can impact accuracy of instrument results

30

Activity Tolerance

Activity	Level of Assistance	Assistance provided	Vitals:
Grooming	Supervision	Verbal cues on pacing and performing seated vs standing to conserve energy	O2: 2L NC SpO2: 88% in standing, increasing to 91% sitting HR: 104 in standing decreasing to 95 in sitting with back supported Dyspnea scale: 5/10 in standing, 3/10 in sitting
Lower body dressing	Minimal assist	Demonstration to use assistive devices for energy conservation, verbal cues for incorporating rest breaks within task to manage fatigue Needed assistance to doff left shoe due to fatigue, asked for assistance to complete activity	O2: 2-3L NC SpO2: 92% at start of activity, decreasing to 82% after doffing pants, increasing to 90% with O2 flow rate increase to 3L and PLB HR: 88 start of activity, increasing to 110 after doffing pants Modified Borg RPE scale: 7/10 after doffing pants

Patient requires 2-3L if supplemental oxygen to complete grooming and LB dressing. He was noted to hold his breath when reaching down to doff his pants and when reaching for grooming items located on the shelf. This breath hold elicits dyspnea as low as 82%. He continues to require MIN verbal cues to apply previously learned ECT and PLB when feeling dyspneic and fatigued and to increase supplemental oxygen as a response to decreased SpO2.

PLAN: ADL retraining focusing on identifying optimal positions to perform morning self-care routine prior to engaging in task, anticipating problems that could occur such as desaturation and appropriate action to take.

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Functional Status Measures

1. Activity Measures
   - Ability to participate in self-care, home management, ambulation, social and recreation activities
2. Impact Measures
   - How symptoms affect ability to participate in activities
3. Surrogate Measures
   - Overall health or health-related quality of life
4. Indirect Performance-based Measures
   - Potential to engage in activities
5. Disability Based Measures
   - Self-report of independence with activities

1. Lareau S, Blackstock FC. Functional status measures for the COPD patient: A practical categorization . Chronic Respiratory Disease. 2018;16:1-31.

32

Individualized Measure

- Canadian Occupational Performance Measure
  - Semi-structured interview
  - Specific activities that are difficult
  - Activities: want to do, need to do, expected to do
  - Rate: importance
  - Rate: perception of how well task is done and satisfaction
  - Assesses an individual's functional performance

33

Activity Tolerance

- Vital signs response to activity participation
  - HR?
  - Oxygen saturation?
  - Respiratory rate?
  - Accessory muscle use
  - Borg RPE scale (6-20) and modified Borg RPE scale (1-10)
  - Borg dyspnea scale

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Fatigue

- Feeling tired and drained of energy
- Present in 50-70% of COPD patients
- Associated with frustration, depression, and concentration issues
- Exacerbations are important factors that precipitate moderate to severe fatigue
- Affects societal participation
- Time of day: more fatigue in the PM than AM

1. Spruit MA, Vercoulen JH, Sprangers MAG, Wouters EFM. Fatigue in COPD: An important yet ignored symptom. The Lancet Respiratory Medicine. 2017;5(7):542-544. https://www.thelancet.com/journals/lanres/article/PIIS2213-2600(17)30158-3/abstract. Accessed Aug 31, 2019. doi: 10.1016/S2213-2600(17)30158-3.

35

Energy conservation techniques

- Activities have energy costs
- Exercise vs ECT
- Energy conservation techniques: 4 P's
  - **P**lanning and organizing daily routine and tasks
  - **P**rioritizing
  - **P**ositioning ace activities
  - **P**acing

1. Lung Foundation Australia. Energy conservation. . . https://pulmonaryrehab.com.au/importance-of-education/education-topics/energy-conservation/. Accessed Aug 31, 2019..

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Dyspnea Management

- Positions to relieve dyspnea

Slight lean forward with back supported

Lean forward with hands resting on thighs

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Dyspnea Management

- Positions to relieve dyspnea

Elbow on wall, head on forearm, neck and shoulders relaxed

Hands on furniture, lean slightly forward

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Dyspnea Management

- Positions to relieve dyspnea

Feet on ground, lean forward, elbow on knees, optional: rest chin on hands

Feet on ground, lean slightly forward, arms on table

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Dyspnea Management

- Pursed Lip Breathing

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Dyspnea Management

- Controlled breathing between rest and activity
  - Pursed lip breathing: slows down respiratory rate and decrease airway collapse during expiration
  - Little upper chest rising
  - Begin with active expiration that is longer than inspiration by 2-3x
  - Active expiration NOT forceful
  - Helps avoid breath hold and facilitates efficient energy expenditure
  - Inhalation: movements against gravity
  - Exhalation: hardest part of an activity, towards gravity movements, pushing and lowering arms
  - Can help with anxiety

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Dyspnea Management

- Controlled breathing between rest and activity
  - To facilitate learning:
    - Biofeedback through pulse-oximeter
    - Breathing with auditory cues (app from smartphones, cue sounds)
    - Adjust according to patient's breathing pattern
    - Can alternate with biofeedback and no biofeedback sessions
    - Discuss any anxiety towards new breathing technique and dyspnea. Provide information, demonstration, and patience.

42

Dyspnea Management

- Diaphragmatic Breathing

Breathe out through the mouth for 4 counts

Hand on stomach goes lower

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Dyspnea Management

- Diaphragmatic Breathing

Breathe in through the nose for 2 counts

Hand on stomach should go up

44

Dyspnea Management

- Desensitization
  - Repeated exposure to dyspnea and letting the patient see that they will not suffocate or die from doing the new way of breathing
  - Practice environment should be safe and non-threatening

45

Upper Extremity

- Upper extremity strength lower in COPD patients.
- Deconditioning due to a sedentary lifestyle is also a factor
- UE strength influences walking distance
- Decreased UE strength associated with decreased exercise tolerance, quality of life, and survival

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Upper Extremity

- Daily arm and leg activities: intensity lower in COPD patients, trapezius worked twice as hard with same time and degree of arm elevation as healthy controls
- Changes in shoulder girdle kinematics:
  - Increased thoracic kyphosis
  - Less upward rotation and posterior tilting of the scapula
  - Less external rotation in the shoulder girdle
  - Decreased shoulder flexion
  - Predisposing UE to pain syndrome

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Upper Extremity

- Upper extremity strength
  - MMT
  - Grip and pinch strength
- Upper extremity endurance
  - Worse dyspnea and hyperinflation during peak arm exercises
  - Assessment Instruments:
    - 6 minute pegboard and ring test
    - Unsupported upper-limb exercise test
    - Grocery Shelving Test

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Frailty

- Frailty is an independent risk factor for exacerbation and COPD progression
- Individuals with COPD and frailty: 4x higher mortality; higher self-reported hospitalization, falls, lower gait speed
- Pulmonary rehabilitation interventions have reversed frail patients with COPD especially in the pre-frailty stage
- Critical to identify frailty at an early stage

1. Marengoni A, Vetrano DL, Manes-Gravina E, Bernabei R, Onder G, Palmer K. The relationship between COPD and frailty: A systematic review and meta-analysis of observational studies. Chest. 2018;154(1):21-40. https://www.ncbi.nlm.nih.gov/pubmed/29477493. doi: 10.1016/j.chest.2018.02.014.

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Frailty

- Frequently cited frailty tool is the Fried Frailty Phenotype (FFP), limited use for patient with advanced and critical lung disease
- Criteria:
  - Unintentional weight loss (10 lbs in the past year)
  - Self-reported exhaustion
  - Weakness as demonstrated by decreased grip strength
  - Slow walking speed
  - Low physical activity
- Scoring: 0- robust, 1-2 pre-frail, 3-5 frail

1. Fried LP, Tangen CM, Walston J, et al. Frailty in older adults: Evidence for a phenotype. The journals of gerontology. Series A, Biological sciences and medical sciences. 2001;56(3):M146-M157. https://www.ncbi.nlm.nih.gov/pubmed/11253156. doi: 10.1093/gerona/56.3.m146.

50

Exercise Program

- What is their perception of exercise?
- Do they know how often they should exercise?
- Are they able to follow a written exercise plan or will video exercise program work better?
  - Stretch: side neck, shoulder, thoracic spine, shoulder, triceps, lateral trunk
  - With resistance: Biceps curl, shoulder press, wall push up, standing row, seated row, lunge

1. Lung Foundation Australia. Better living with chronic obstructive pulmonary disease: A patient guide . ; 2016.

51

Balance and Falls Risk

- Common issue with people with COPD
- Deficits in balance: lead factor for falls in older adults
- Assess other factors that may contribute to a fall
  - Home environment hazards
  - Oxygen
  - Vision
  - Hearing
  - Patterns of assistive device use, disuse, or non-use as well as the reasons for : RW, rollator, cane

1. Beauchamp MK. Balance assessment in people with COPD: An evidence-based guide . Chroninc Respiratory Disease. 2018;16. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6313260/. Accessed Aug 31, 2019. doi: 10.1177/1479973118820311.
2. Rafaella Xavier, Ana Carolina Pereira, Lopes A, et al. Factors associated with balance impairment in COPD patients. European Respiratory Society. 2017;50(supplement 61).

52

Environmental Modification

- Decluttering
- Creating a straight pathway to often used areas of the house
- If with oxygen, ensuring wires and oxygen tubing is not a trip hazard
- Ramps, stair lifts
- Bring down often used items
- Making home wheelchair accessible

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Task Modification

- Use of assistive devices
- Perform tasks seated vs standing
- Increasing contrast of the environment to decrease tripping hazards

54

Cognition

- MCI present in 36% of COPD patients
- Severe cognitive impairments 10.4%
- Decreased hippocampal volume, increased deep or infratentorial microbleeds, white matter lesions
- Associated with disease severity
- Attention and EF commonly impaired
- Verbal memory and learning
- Health literacy
- Are they able to identify appropriate action for an exacerbation? Able to remember and use medication correctly? Self-management?

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Cognition

- PASS, EFPT, WCPA, MET, Kettle Test, CMT,
- Functional Cognition: use of inhaler, problem solving during exacerbation and oxygen titration, medication management, setting up follow-up appointments with what external aids?
- May have multiple comorbidities that also need to be managed, how are they managing this?

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Anxiety and Depression

- Symptoms overlap with COPD
- Less than 1/3 are receiving appropriate treatment
- Depression may be a consequence of COPD and a cause of COPD
- Anxiety disorders may be due to history of cigarette use and nicotine dependence
- Depression and anxiety leads to fear, panic and hopelessness, low self-esteem, social isolation, dependence on caregivers

1. Yohannes AM, Alexopoulos GS. Depression and anxiety in patients with COPD . European Respiratory Society. 2014;23(133):345-349. https://err.ersjournals.com/content/23/133/345.article-info.

57

Sleep and Sleep-related breathing disorders

- Sleep inefficiency, fragmented sleep, light sleep
- Causes: hypoxia, hypercapnia, nocturnal cough, pharmacological effects of medications
- Screen:
  - Sufficient sleep?
  - Refreshed after sleeping?
  - Regular sleep times?

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Dysphagia and Aspiration

- Breathing and swallowing incoordination associated with COPD exacerbation and risk of aspiration
- 33.3% silent aspiration in COPD patients with acute exacerbation
- Screen:
  - Difficulty swallowing?
  - Cough after a swallow?

1. Zheng Z, Wu Z, Liu N, et al. Silent aspiration in patients with exacerbation of COPD. *The European respiratory journal*. 2016;48(2):570-573. https://www.ncbi.nlm.nih.gov/pubmed/27338190. doi: 10.1183/13993003.00007-2016.

59

Nutrition

- 17% of patients with COPD are malnourished
- Spirometry lower with lower BMI and malnutrition
- Higher protein content, better muscle mass amount
- Meal preparation and grocery shopping: can they plan a healthy meal?
- What are the barriers for healthy eating?

1. Mete B, Pehlivan E, Gülbaş G, Günen H. Prevalence of malnutrition in COPD and its relationship with the parameters related to disease severity. *International journal of chronic obstructive pulmonary disease*. 2018;13:3307-3312. https://www.ncbi.nlm.nih.gov/pubmed/30349235. doi: 10.2147/COPD.S179609.

60

Sexuality and Intimacy

- Misconceptions? Many think their lungs will be affected with sexual activity.
- Dyspnea, anxiety, depression
- Use of medications, performing task at the time of the day that you have the most energy
- Oxygen, the same amount as when performing other tasks

1. Zheng Z, Wu Z, Liu N, et al. Silent aspiration in patients with exacerbation of COPD*The European respiratory journal*. 2016;48(2):570-573. https://www.ncbi.nlm.nih.gov/pubmed/27338190. doi: 10.1183/13993003.00007-2016..

61

Self-Management

- Action Plan
  - Empowers the patient to independently manage disease
  - Assists with problem solving, dictates appropriate course of action with noted health status
  - Provides a language for the patient to better communicate with health care professionals involved in care
  - Should be used daily, updated every 6 months with

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Self-Management

- Action Plan
  - Should be used daily, updated every 6 months with healthcare professional
  - Daily monitoring of the following symptoms:
    - Breathing
    - Cough and mucus
    - Sleep
    - Eating and appetite
    - Activity level

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COPD360 Action Plan used with written permission from the COPD foundation

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Signs of Exacerbation

- Low grade fever
- Increase in rescue medication use
- Mucus changes in color, thickness, odor, amount
- Tiredness more than a day
- New or increased ankle swelling

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Medications

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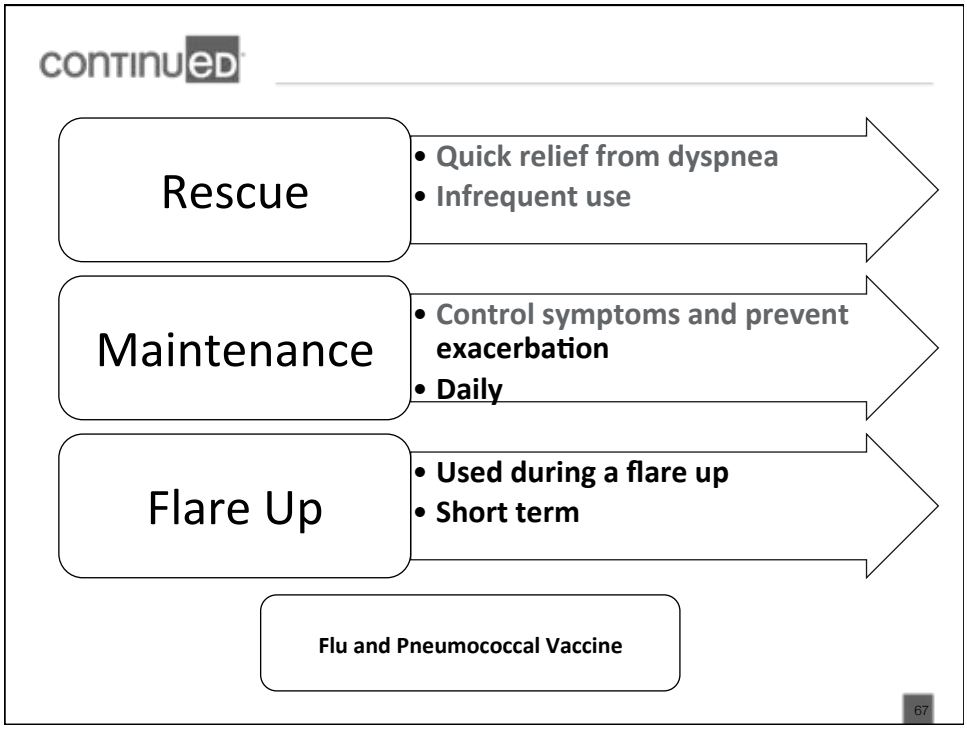

Bronchodilators

- Beta2-agonists
  - Fast-acting, aka "rescue inhalers" (3-5 minutes)
    - Albuterol, levalbuterol, pirbuterol, salbutamol, terbutaline
  - Slow-acting (20 mins)
    - Salmeterol, formoterol, indacatero, and vilanterol
  - Also available in pills but with more side effects than inhaled form and take longer to start working – discouraged
  - Side effects:
    - Tachycardia, tremors, cramping of hands, legs, feet (rare)
    - Side effects should last for only a few minutes after med intake and go away after a few days of regular use
    - Talk to HCP if this is not the case

1. Meek P, Lareau S, Fahy B, Austegard E. Medicines for COPD. *American Journal of Respiratory and Critical Care Medicine*. 2019;200(2):P3-P5. https://search.proquest.com/docview/2258165151. doi: 10.1164/rccm.2002P3.

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Bronchodilators

- Anticholinergics
  - Slower action than beta2-agonists, never for quick relief
  - Short-lasting:
    - acts in about 15 minutes and lasts 6-8 hours, taken up to 4x/day
    - Ipratropium
  - Long-lasting
    - 20 minutes to act, lasts for 12 hours (Aclidinium) or 24 hours (Tiotropium, Umedclidinum)
  - Side effects:
    - Dry mouth, urinary retention (rare)

1. Meek P, Lareau S, Fahy B, Austegard E. Medicines for COPD. *American Journal of Respiratory and Critical Care Medicine*. 2019;200(2):P3-P5. https://search.proquest.com/docview/2258165151. doi: 10.1164/rccm.2002P3.

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Steroids

- Used to reduce airway inflammation
- May take a week (or more) to take effect
- Pills act faster (24 hours), long term use of oral steroids are discouraged due to side effects
- Side effects:
  - Sore throat, hoarse voice, throat and mouth infections "thrush"
  - Rinse mouth and gargle after inhaling a steroid
  - Use a spacer

1. Meek P, Lareau S, Fahy B, Austegard E. Medicines for COPD. *American Journal of Respiratory and Critical Care Medicine*. 2019;200(2):P3-P5. https://search.proquest.com/docview/2258165151. doi: 10.1164/rccm.2002P3.

70

Phosphodiesterase-4 (PDE 4) inhibitors

- Used by individuals with severe COPD
- Aims to decrease risk of exacerbations
- Oral tablet taken once daily

1. COPD Foundation. COPD medicines In: *Slim skinny reference guide*. Miami, Florida: COPD Foundation; 2016:1-14.

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Mucolytics

- Thins mucus to make it easier to cough up
- Side effects: bronchospasm – often advised to use with a fast-acting bronchodilator before or with the meds

1. COPD Foundation. COPD medicines In: *Slim skinny reference guide*. Miami, Florida: COPD Foundation; 2016:1-14.

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Antibiotics

- Used during exacerbations

1. COPD Foundation. COPD medicines In: *Slim skinny reference guide*. Miami, Florida: COPD Foundation; 2016:1-14.

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Medications

- Inhaler use:
  - 74.8% performs 1 inhaler use step incorrectly
  - Face to face training improved inhaler use[1]
  - COPD patients with incorrect application had higher CAT, more cough difficulty, more breathless, poor control of COPD, hospitalized more, with poor quality of life[2]
- Challenges with device use
  - Manual dexterity
  - Arthritis
  - Patient[3]

1. Pothirat C, Chaiwong W, Phetsuk N, Pisalthanapuna S, Chetsadaphan N, Choomuang W. Evaluating inhaler use technique in COPD patients. International journal of chronic obstructive pulmonary disease. 2015;10(Issue 1):1291-1298. https://www.ncbi.nlm.nih.gov/pubmed/26185435. doi: 10.2147/COPD.S85681.
2. Gregoriano C, Dieterle T, Breitenstein A, et al. Use and inhalation technique of inhaled medication in patients with asthma and COPD: Data from a randomized controlled trial. Respiratory research. 2018;19(1):237. https://www.ncbi.nlm.nih.gov/pubmed/30509268. doi: 10.1186/s12931-018-0936-3.
3. Usmani OS. Choosing the right inhaler for your asthma or COPD patient. Therapeutics and clinical risk management. 2019;15:461-472. https://www.ncbi.nlm.nih.gov/pubmed/30936708. doi: 10.2147/TCRM.S160365.

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Metered-dose inhaler use considerations:

1. Inhaler priming: shake inhaler prior to use (new and not used for several weeks)
2. Position: sit upright or stand, tilt head slightly back
3. Deep breath in and exhale out completely
4. Hold breath up to 10 seconds
5. Mouthpiece in mouth, between teeth and above the tongue
6. Wait 1 minute between each dose

1. National Asthma Education and Prevention Program. Asthma tip sheet. . 2013.
2. Levy ML, Dekhuijzen PNR, Barnes PJ, et al. Inhaler technique: Facts and fantasies. A view from the aerosol drug management improvement team (ADMIT). NPJ Primary Care Respiratory Medicine. 2016;26:16017. https://www.openaire.eu/search/publication?articleId=dedup_wf_001::485ab91f8f07691129c5fe4389d3d3fb. doi: 10.1038/npjpcrm.2016.17.

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Metered-dose inhaler use considerations:

7. Empty inhaler: refill when inhaler has 30 puffs left; if no counter, help patient to keep track of dosages used and to have a spare device
8. Use a spacer: helps to get more medicine in the airways.
   - Metal vs plastic spacer
   - Wash with detergent and air-dry regularly
9. Wash mouth with water and spit with inhaled corticosteroid
10. Cleaning tips:
    - Do not put canister in water
    - Do not brush or wipe inside a spacer

1. National Asthma Education and Prevention Program. Asthma tip sheet. . 2013.
2. Levy ML, Dekhuijzen PNR, Barnes PJ, et al. Inhaler technique: Facts and fantasies. A view from the aerosol drug management improvement team (ADMIT). NPJ Primary Care Respiratory Medicine. 2016;26:16017. https://www.openaire.eu/search/publication?articleId=dedup_wf_001::485ab91f8f07691129c5fe4389d3d3fb. doi: 10.1038/npjpcrm.2016.17.

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Use of a Metered-Dose Inhaler with a Spacer

https://www.youtube.com/watch?time_continue=26&v=A8WT5moNJ0I

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Dry powder inhaler considerations:

1. Hold Diskus® flat
2. Do NOT shake inhaler
3. Do NOT blow into the inhaler
4. Store in a cool, dry place
5. Cleaning tips:
   - Wipe the mouthpiece at least once a week with dry cloth
   - Do NOT use water to clean

1. National Asthma Education and Prevention Program. Asthma tip sheet. . 2013.
2. Levy ML, Dekhuijzen PNR, Barnes PJ, et al. Inhaler technique: Facts and fantasies. A view from the aerosol drug management improvement team (ADMIT). NPJ Primary Care Respiratory Medicine. 2016;26:16017. https://www.openaire.eu/search/publication?articleId=dedup_wf_001::485ab91f8f07691129c5fe4389d3d3fb. doi: 10.1038/npjpcrm.2016.17.

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Use of a Dry Powder Inhaler

https://www.youtube.com/watch?time_continue=6&v=_Sc7j9iW9TM

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Use of a Nebulizer

https://www.youtube.com/watch?v=pEKFKZiLNaA

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Nebulizer use considerations:

1. Put mouth around mouthpiece
2. A dose needs 8-10 minutes to finish
3. Rinse bowl, mouthpiece or mask after each use.

1. National Asthma Education and Prevention Program. Asthma tip sheet. . 2013.
2. Levy ML, Dekhuijzen PNR, Barnes PJ, et al. Inhaler technique: Facts and fantasies. A view from the aerosol drug management improvement team (ADMIT). NPJ Primary Care Respiratory Medicine. 2016;26:16017. https://www.openaire.eu/search/publication?articleId=dedup_wf_001::485ab911f8f07691129c5fe4389d3d3fb. doi: 10.1038/npjpcrm.2016.17.

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https://www.aarc.org/wp-content/uploads/2018/03/aersol-guides-for-patients.pdf

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Thank You!

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