

Cardiopulmonary Obstructive Pulmonary Disease

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Fundamentals of Treatment III: PTA 1420

Dr. Stella Nemuseso, PT

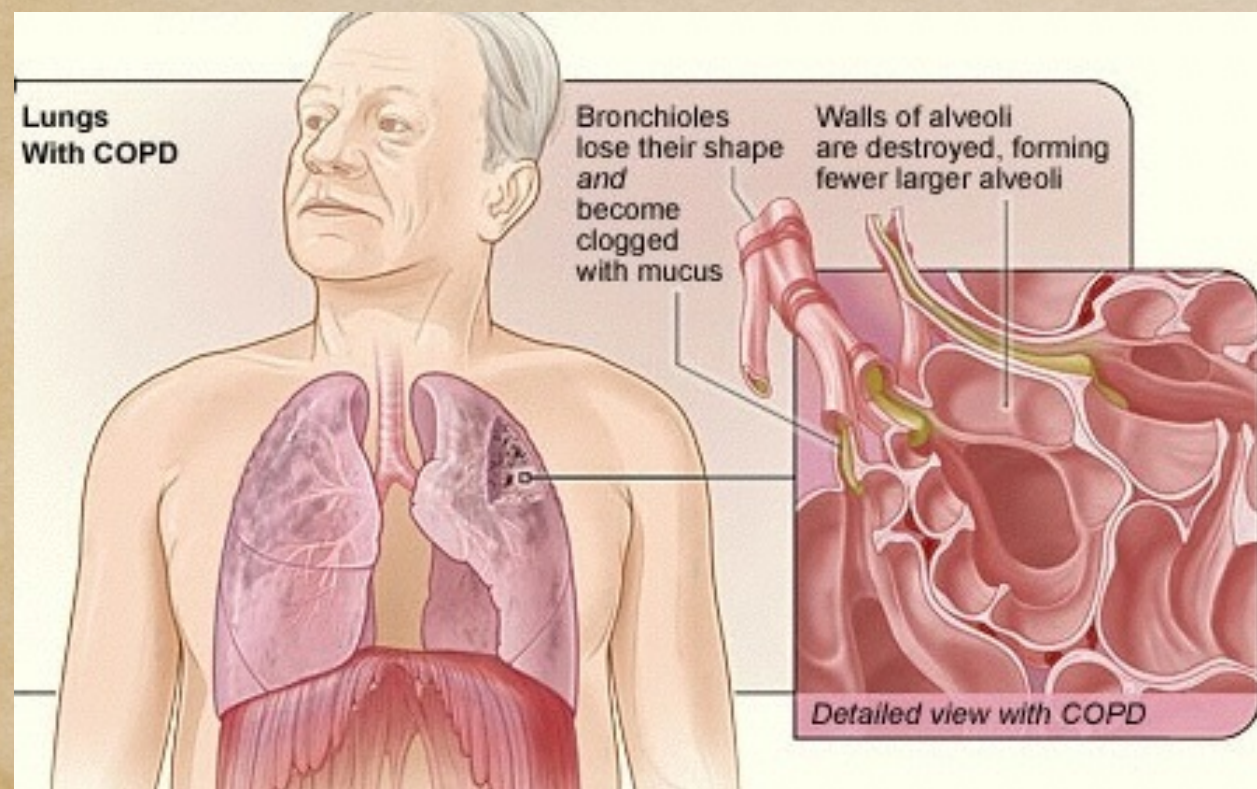
Introduction

- ◆ Afflicts 14 million adults in the U.S and is a leading cause of morbidity
- ◆ Disease state characterized by airflow limitation that is not fully reversible. It is progressive and is associated with an abnormal inflammatory response of the lungs to noxious particles or gases (Global Strategy for the Diagnosis, Management, and Prevention of COPD).
- ◆ Often not found until the disease is very advanced since people do not know the early warning signs.



-> Obstructive lung disease
that makes it hard to
breathe

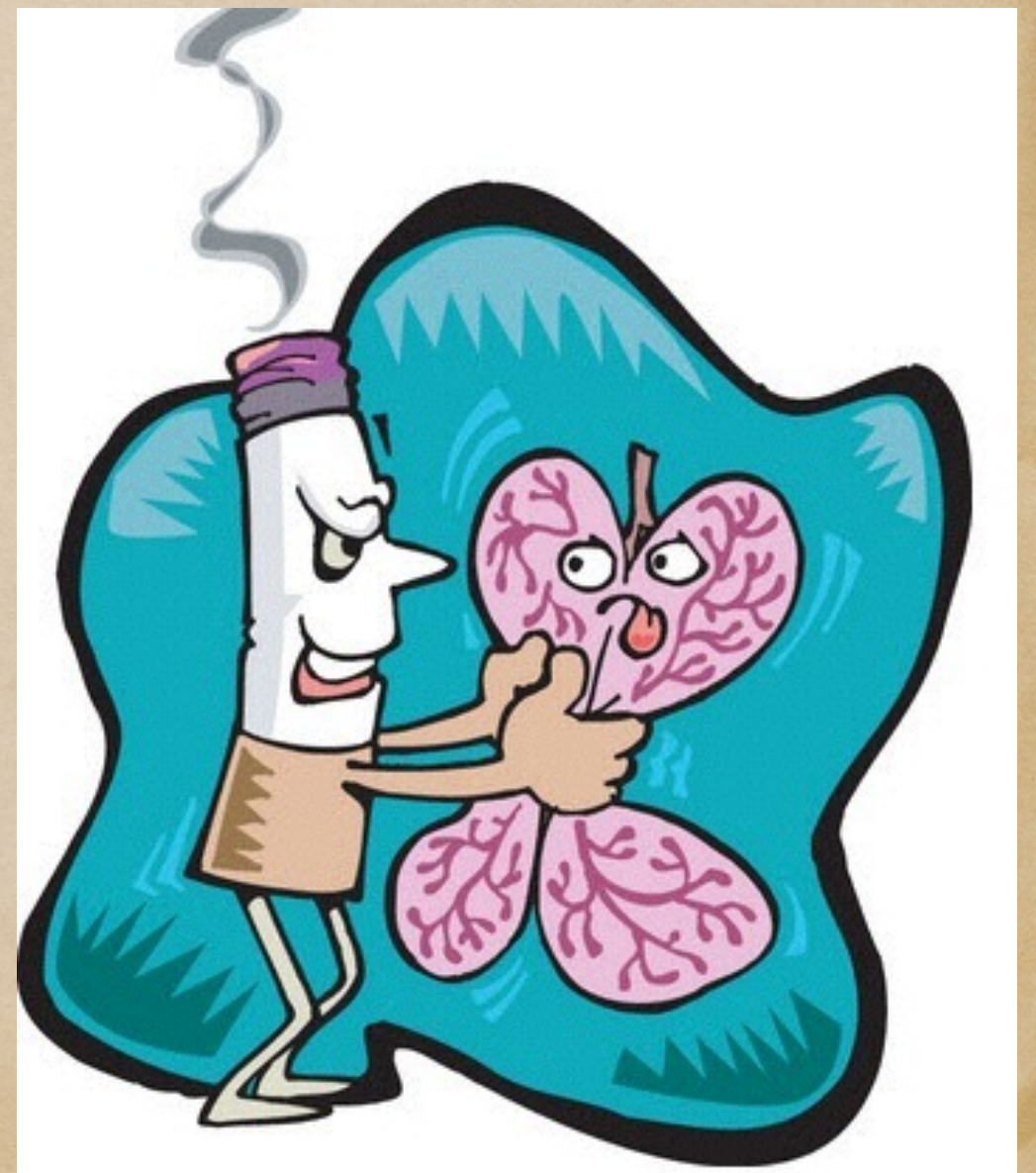
-> Airway thickening/
inflammation, Parenchymal
destruction, pulmonary
vascular thickening



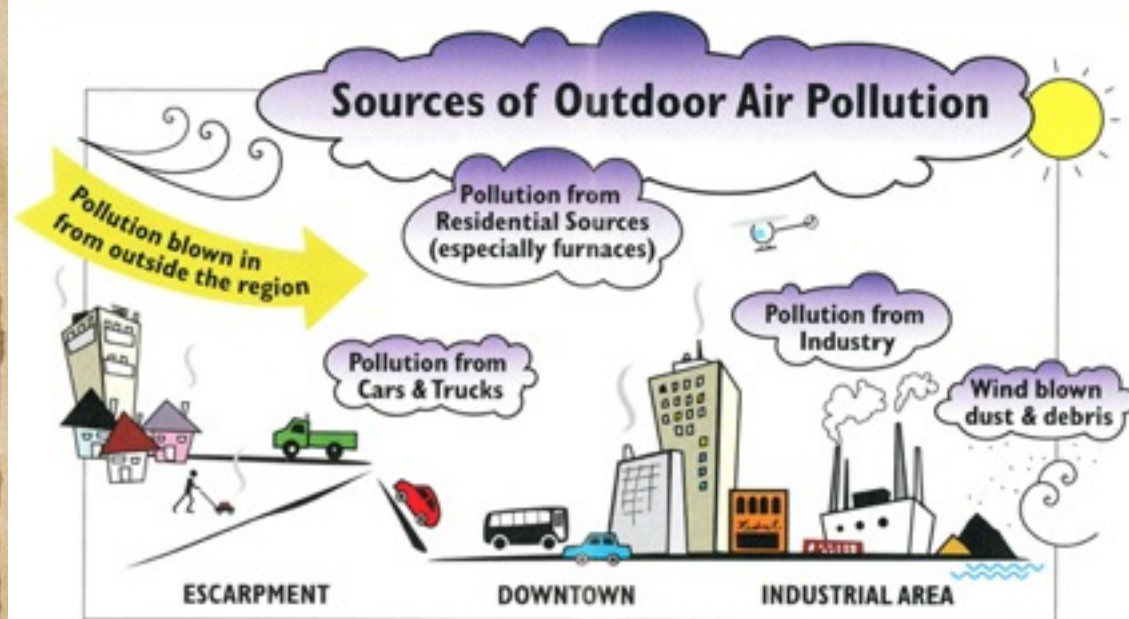
-> Involves destruction of the
tissue of the lung where
oxygen is exchanged



Etiology



The Air Pollution Picture

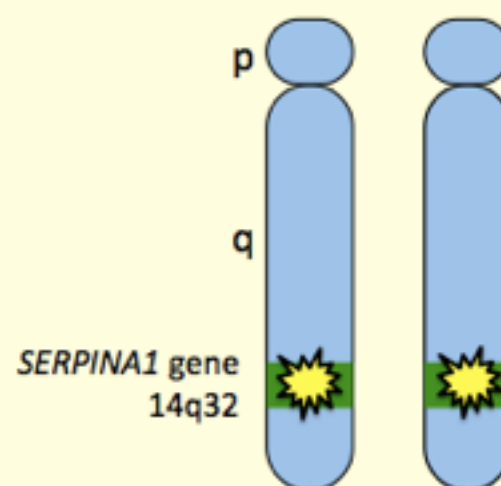


Alpha-1 Antitrypsin Deficiency

- Alpha-1 Antitrypsin Deficiency is a hereditary medical condition.
- Genetic mutation causes accumulation of mutant Z protein in liver cells.

For More Information Visit: www.ePainAssist.com

Alpha-1-Antitrypsin Deficiency



<http://www.genetics4medics.com/alpha-1-antitrypsin-deficiency.html>

Signs and Symptoms

COPD

CHRONIC AIRFLOW LIMITATION
"EMPHYSEMA AND CHRONIC BRONCHITIS"

- Easily Fatigued
- Frequent Respiratory Infections
- Use of Accessory Muscles to Breathe
- Orthopneic

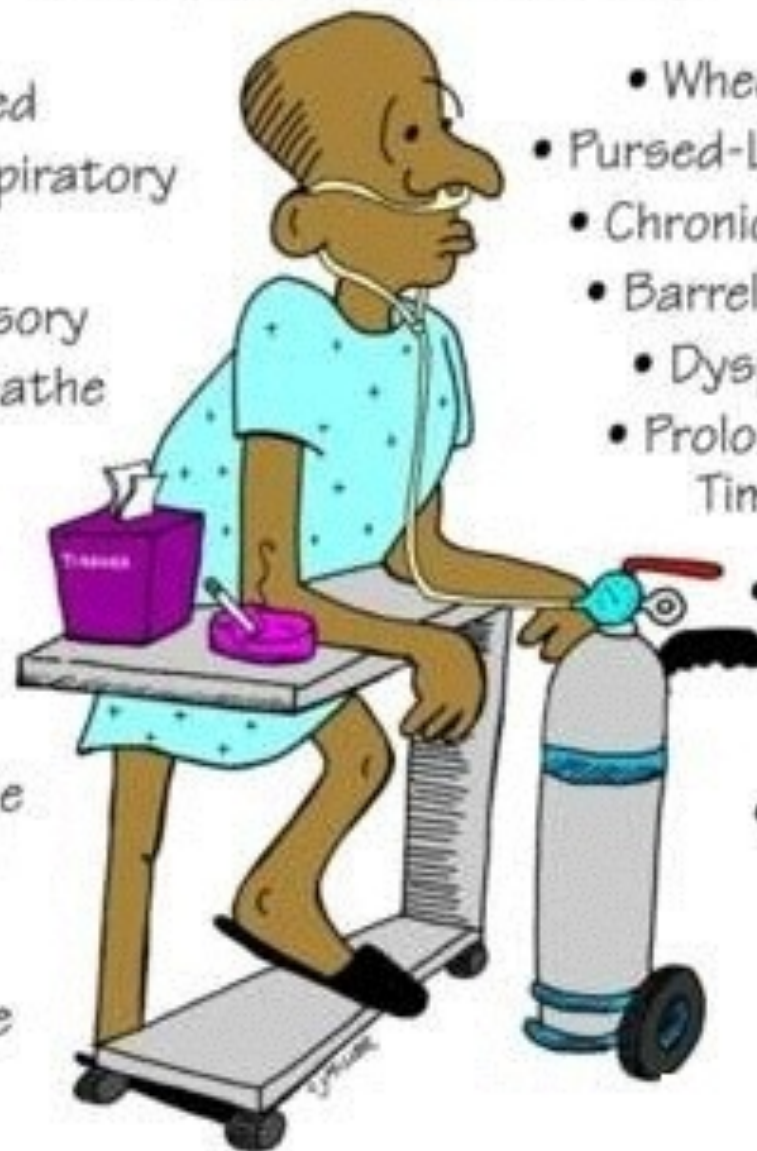
- Wheezing
- Pursed-Lip Breathing
- Chronic Cough
- Barrel Chest
- Dyspnea
- Prolonged Expiratory Time

- Cor Pulmonale (Late in Disease)

- Thin in Appearance

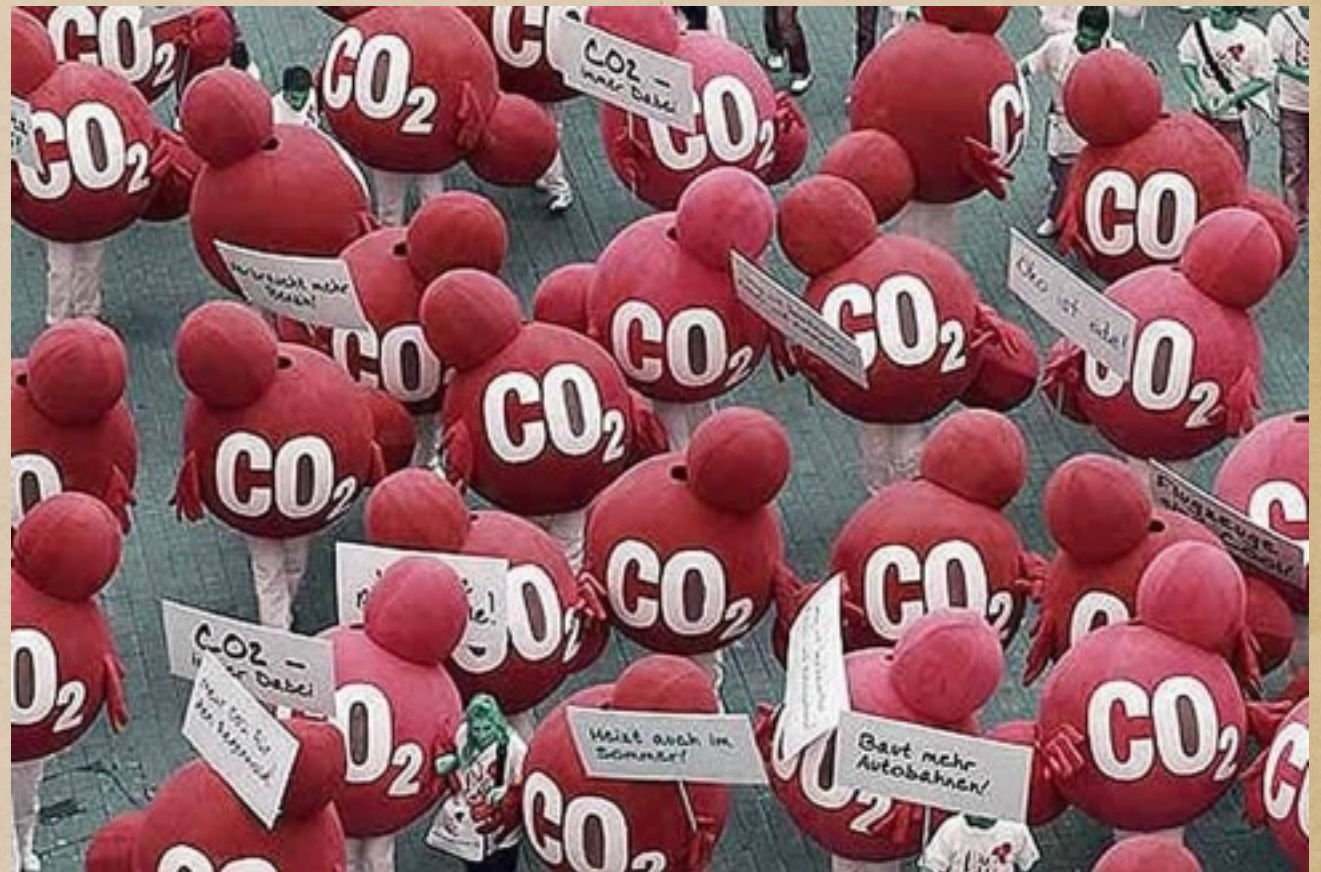
- Bronchitis - Increased Sputum

- Digital Clubbing



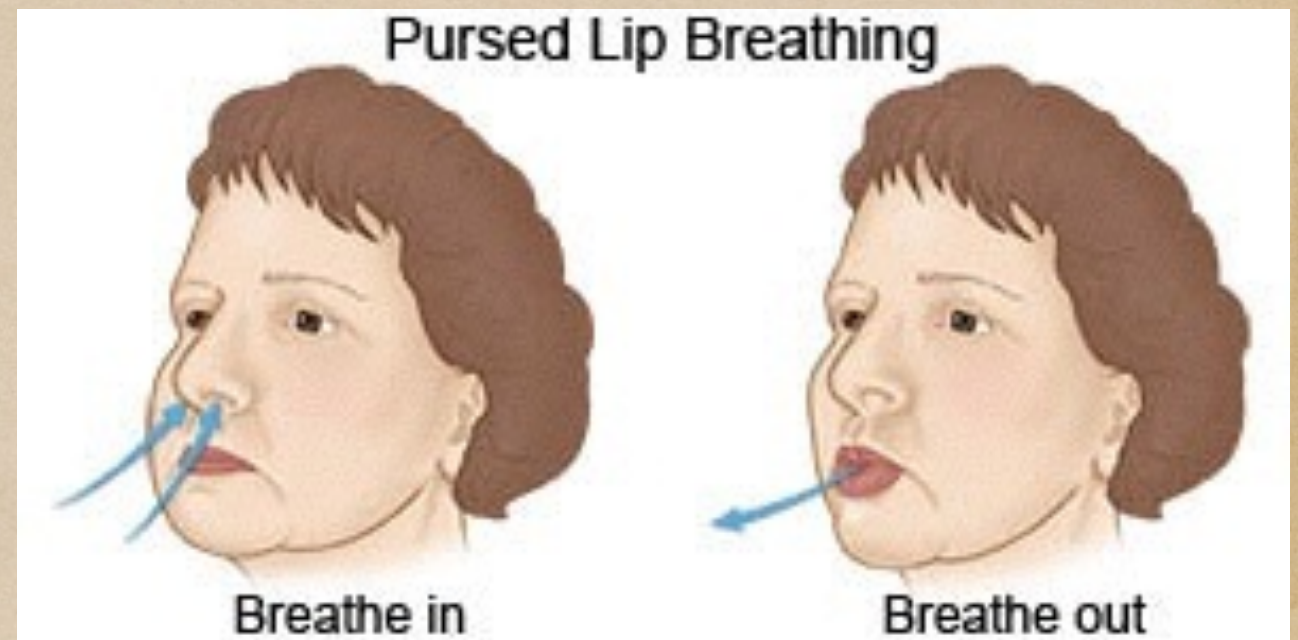
Disease Progression

- ◆ Lung volumes, capacities, residual volume = Increased due to air trapping
- ◆ Hypercapnia appears upon disease progression



Treatment Approach in Literature

- ◆ Cardiopulmonary rehabilitation
- ◆ Pursed-lip breathing exercises
- ◆ Activity pacing/Energy conservation techniques



Pharmacological Management



- ◆ Bronchodilators
- ◆ Inhaled steroids
- ◆ Supplemental oxygen
- ◆ Antibiotics
- ◆ Surgery (lung volume reduction, bullectomy, lung transplantation)

Physical Therapy Benefits

- ♦ Aims at reducing disease-specific impairments and improving quality of life in patients with COPD.
- ♦ PT interventions influence exacerbations since high-intensity exercise training has been shown to increase exercise tolerance
- ♦ Improves muscle oxidative capacity and oxygen recovery kinetics
- ♦ Exercise + optimal bronchodilation = Lowers degree of dynamic lung hyperinflation
- ♦ Balance training decreases fall risks in older patients with COPD.



Case Study: Background

- ◆ Patient is an 82 year old Caucasian admitted with a diagnoses of COPD exacerbation. She has a past medical history of COPD, hypothyroidism, chronic atrial fibrillation, deep vein thrombosis, and obesity.

Evaluation Findings

- ◆ Functional decline for bed mobility and transfers
- ◆ Continuous oxygen via nasal cannula
- ◆ Ambulation with concomitant generalized weakness
- ◆ Shortness of breath upon exertion
- ◆ Impaired balance and coordination
- ◆ Impaired safety awareness

Initial Assessment

- ◆ Continuous O₂ of 2L/min
- ◆ Bilateral lower extremities = Within Functional Levels (WFL)
- ◆ Static/Dynamic sitting = Fair
- ◆ Static standing = Fair
- ◆ Dynamic standing = Poor; Unable to weight shift

Initial Assessment

- ◆ BP at rest = 117/71
- ◆ O₂ sats = 95%
- ◆ Respirations = 16
- ◆ Pulse rate = 67



Vital Signs



Initial Assessment: Tone and Posture

- ◆ Posture = Asymmetrical posture
- ◆ LE muscle tone = Normal
- ◆ Edema = None
- ◆ Skin Integrity = Impaired (Wound on sacral area per nursing)
- ◆ Sensation = Intact
- ◆ Visual spatial perceptual skills = Intact



Cognition

- ◆ Alert and oriented x 3
- ◆ Safety awareness = impaired



Mobility

- ◆ Bed mobility = Minimal assist
- ◆ Transfers = Minimal assist



Gait

- ◆ Level surfaces = Minimal assist
- ◆ Assistive device = Rolling walker
- ◆ Gait analysis = Patient exhibits backward lean of trunk; Knee buckling and inadequate toe clearance which are associated with muscle paresis/weakness; reduced functional activity tolerance and compensatory deviation
- ◆ Gait pattern = Diminished single limb support, decreased velocity, and discontinuous steps
- ◆ Fall predictors = Inadequate postural control and reduced quadriceps strength



Short Term Goals

- ◆ Patient to improve ability to stand supported for >3-5 mins. w/o SOB and without signs or symptoms of inadequate pulmonary function
- ◆ Patient to improve dynamic standing balance to fair
- ◆ Patient to safely perform functional transfers with supervised assistance and 20% VC and 20% TC
- ◆ Patient to exhibit normalized gait pattern while safely ambulating 200 ft w/ SBA



Long Term Goals

- ◆ Patient to safely perform functional transfers w/ Mod I. and occasional verbal and tactile cues for implementation of safety techniques, for proper sequencing.
- ◆ Patient to exhibit normalized gait pattern while safely ambulating 350 feet with mod I. using AD on level surfaces.

Patient/Caregiver Goals

- ◆ Both patient and family agreed that they want the patient to get strong enough and return home to prior levels of functioning



Therapeutic Exercises

- ◆ Seated marching for 2 sets of 10
- ◆ Ankle pumps for 2 sets of 10
- ◆ Long arc quads for 2 sets of 10
- ◆ Hamstring curls for 2 sets of 10
- ◆ Hip adduction for 2 sets of 10
- ◆ Recumbent bike for 20 minutes



Therapeutic Activities

- ◆ Patient was instructed on proper hand and foot placement before initiating sit-to-stand transfers with increased emphasis on safe turns



Neuro-reeducation

- ♦ Static and dynamic balance activities
- ♦ Standing supported for >3-5 mins.
- ♦ Reaching across midline from various planes
- ♦ Balance righting reactions
- ♦ Postural correction strategies



Gait Training

- ◆ Patient ambulated for 100 ft, on even surfaces, using a rollator with CGA x 1. During gait training, 25% of verbal and tactile cues were used to educate and implement patient safety



Patient Education

- ◆ Breathing exercises
- ◆ Energy conservation techniques
- ◆ Pacing



Vital Signs



Patient Outcomes

- ◆ Patient demonstrated increased activity tolerance without supplemental oxygen
- ◆ Patient tolerated standing with 1 hand support for >5 minutes
- ◆ Patient demonstrated ability to right self as needed has moderate safety awareness with minimal verbal cues.
- ◆ Patient performed supervised assisted transfers with verbal cues 25% of the time for hand/foot placement.
- ◆ Patient ambulated for 300 ft. on level surfaces with a rollator with min. VC on safety
- ◆ Patient sustained oxygen saturation levels between 95-100%.



Suggested Approach

- ◆ Refer the patient to occupational therapy for the use of adaptive equipment to assist in functional activities.
- ◆ Perform static and dynamic activities in the bathroom to improve endurance and balance
- ◆ Initiate transfers to multiple surfaces to simulate different seating arrangements in the patient's home.



Conclusion



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