Definition of Cardiopulmonary Rehabilitation

- AARC Clinical Practice Guidelines States:
  - Rehab is a “multidisciplinary program of care for patients with chronic respiratory impairment that is individually tailored and designed to optimize physical and social performance and autonomy.”
  - Cardiopulmonary rehabilitation (CP) is a non-invasive, multidisciplinary process that influences multiple organ systems functionally with a goal to improve QOL and tolerate ADL’s.

Principal Goals of CP Rehab

- Decrease symptoms
- Decrease disability
- Decrease mortality
- Increase participation in physical and social activities
- Improve QOL

Factors That Disrupt Oxygen Transport

- Fever
- Cardiopulmonary diseases
- The healing process
- Thermo regulators
- Anxiety, stress and pain
- Loss of the gravitational stress of bed rest!
- #1 Lack of mobilization and exercise
**Negative Sequelae of Bed Rest**
- The negative impact of bed rest has been well known for over 60 years!
- No evidence exists in the literature that supports efficacy of bed rest.
- Bed rest adversely affects all major organ systems by decreasing efficiency of the oxygen transport system.
- Deconditioning associated with bed rest may be influenced by decreased oxygen delivery, and vice versa.
- Disuse atrophy at the cellular level begins within 4 hours of implementing bed rest.
- Inactivity causes muscle fibers to change their structure and nerve conductivity.
- Inactivity causes functional and cognitive deficits that can persist for years.

**What Are The Positive Effects of Mobilization and Exercise?**

**Cardiac Effects**
- Increase venous return
- Increase SV, HR, CO
- Increase contractility
- Increase coronary artery perfusion
- Increase circulatory blood volume

**Circulatory Effects**
- Decrease peripheral resistance
- Increase peripheral blood flow and tissue oxygenation
- Decrease venous stasis (emboli)
- Increase pulmonary sympathetic blood flow and drainage (effusion)
- Promote diuresis
- Increase platelet aggregation
- Increase WBC production

**Neurologic Effects**
- Increase arousal
- Fewer sleep disturbances
- Increase cerebral electric activity
- Increase sympathetic stimulation
- Increase postural reflexes

**Metabolic Effects**
- Increase growth hormone synthesis
- Increase glucose metabolism – decrease insulin resistance
- Speed drug metabolism/clearance
- Increase immunity/less infection

**Pulmonary Effects**
- Increase volumes and capacities
- Increase efficiency of respiratory mechanics
- Enhance cough
- Decrease thoracic blood volume
- Increase Cst and decreased Raw
- Increase immune factors
What Are The Positive Effects of Mobilization and Exercise?

- Nutrition/Digestive Effects
  - Increase gut function
  - Absorption
  - Motility

What Are The Positive Effects of Mobilization and Exercise?

- Musculoskeletal Effects
  - Engage the diaphragm, chest wall muscles, larynx, abdominal muscles (accessory)
  - Engage skeletal muscles
  - Move bones and joints
  - Increase strength and endurance

What Are The Main Components of a Rehabilitation Program?

- Exercise training
- Breathing techniques
- Respiratory muscle training
- Education
- Psychosocial/behavioral interventions
- Nutritional assessment and intervention

Exercise Training

- The primary “drugs” of rehabilitation are:
  - Mobilization
  - Exercise

Exercise Training

Breathing Techniques

- Pursed lip breathing
  - Coordinate breathing and activity
- Diaphragmatic breathing
- Lateral costal breathing
- Accessory muscle breathing
- Butterfly technique
- Glossopharyngeal breathing
- Abdominal binders
Alternative Airway Clearance Techniques

- Chest physical therapy
- Percussion and postural drainage
- Manual hyperventilation, NaCl instillation
- Active cycle breathing
- Autogenic drainage
- Huffing
- Assistive coughing
  - Abdominal thrust, costophrenic assist, anterior chest compression assist, side lying counter rotation assist
- Mobilization and exercise!!

Respiratory Muscle Training and Airway Clearance Devices

Airway Clearance Devices

CoughAssist Mechanical Insufflator-Exsufflator - Respironics
The #1 Airway Clearance Device Is....

Alternatives To Recumbent Bed Rest

- Bed rest exercises
- Moving in the bed for simple ADL’s
- Sitting on the side of the bed to dangle
- Progress to standing transfers to the chair
- Chair exercises
- Begin short walks

Posture and Positioning Matter

- Benefits of an upright position are:
  - Maximize ventilation and perfusion
  - Improve cough and secretion clearance
  - Decrease Raw Increase Cst
  - Promote bladder and bowel function
  - Promote fluid shifts

Why Is Body Position Important?

- Daily tasks that require trunk control:
  - Breathing
  - Coughing
  - Eating
  - Talking
  - Moving
  - Bowel and bladder emptying

Posture and Positioning Matter

- Primary Pressure Regulating Muscles
  - Intercostal (thoracic pressure)
  - Diaphragm (abdominal pressure)
  - Back muscles (stabilize spine and ribcage)
Posture and Positioning Matter

- COPD
  - Flattened diaphragm
  - Elongated cardiac shadow
  - Hyperlucent lung fields
  - Increased A-P diameter

Advantages of Using The Passy-Muir® Valve

- Closing the respiratory system and regulating intrathoracic and intrabdominal pressures will:
  - Allow graded exhalation
  - Improve internal pressure support for posture
  - Improve upper extremity force/strength
  - Improve bowel and bladder emptying
  - Improve swallowing mechanics
  - Improve coughing/secretion management
  - Restore voicing

CASE STUDY MR. G.

- Mr. G., age 57, was working on his house while on a ladder, fell, and was admitted to the hospital with multiple fractures, acute respiratory failure and acute change in mental status with confusion. When initially admitted to our hospital, he had a tracheostomy, required ventilator support, and required bilateral soft wrist restraints for safety.

CASE STUDY MR. G.

57 YEAR OLD MALE
S/P FALL
VDRF
FAILED ATTEMPTS TO WEAN AT PREVIOUS FACILITIES
EXHIBITS INABILITY TO PERFORM ANY FUNCTIONAL TASKS
NPO

CASE STUDY MR. G.

- RESPIRATORY EVALUATION
  - Vent settings
  - Breath sounds
  - CXR
  - ABGs
  - Sputum
  - Tracheostomy site

CASE STUDY MR. G.

- RESPIRATORY PLAN OF CARE
  - Protocol
  - Respiratory rehab communication
  - Out of bed program
  - Oral care
  - Trach care
  - Daily assessment
  - Spontaneous mechanics
CASE STUDY MR. G.

- PHYSICAL THERAPY EVALUATION
  - Bed Mobility
  - Transfers
  - Gait
  - Fall recovery

CASE STUDY MR. G.

- PHYSICAL THERAPY PLAN OF CARE
  - Balance
  - Standing
  - Weight shifting
  - Transfer training
  - Exercises
  - Gait

CASE STUDY MR. G.

- OCCUPATIONAL THERAPY EVALUATION
  - Dependent
  - Delayed response times
  - Decreased endurance
  - Poor balance for functional tasks
  - ADL'S dependent

CASE STUDY MR. G.

- OCCUPATIONAL THERAPY PLAN OF CARE
  - Evaluation
  - Safety Awareness
  - Cognition
  - Goals

CASE STUDY MR. G.

- SPEECH/SWALLOW EVALUATION
  - NPO
  - Peg tube
  - Ventilator Support
  - Moderate Cognitive Deficits Noted
CASE STUDY MR. G.

- PASSY-MUIR® VALVE
  - #10 Shiley
  - TC trials 30%
  - RT and SLP

CASE STUDY MR. G.

- SPEECH/SWALLOW PLAN OF CARE
  - Attention, memory, problem solving
  - Thermal stimulation
  - Oropharyngeal exercises
  - PO Trial with texture analysis
  - Speaking valve use with swallowing

CASE STUDY MR. G.

CASE STUDY MR. G.

CASE STUDY MR. G.

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THANK YOU!

Additional Educational Opportunities

- Self-study webinars available on demand
  - Getting Started
  - Ventilator Application
  - Swallowing
  - Pediatric
  - Special Populations
- Live group webinars
- www.passy-muir.com
- Passy-Muir Inc. is an approved provider of continuing education through ASHA, AARC, CMSA and California Board of Nursing Credit

Receiving CEU’s for this Course

- You will have 72 hours from the time this course ends to complete the evaluation, which is required to receive credit.
  - Look in your email for a reminder link, or type this into your Internet browser’s address bar:
    • ep.passy-muir.com

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