

# Pulmonary Rehabilitation

An Overview  
by  
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# Consequences of Respiratory Disease

- **Peripheral Muscle dysfunction**
- **Respiratory muscle dysfunction**
- **Nutritional abnormalities**
- **Cardiac impairment**
- **Skeletal disease**
- **Sensory defects**
- **Psychosocial dysfunction**

# Mechanisms for these morbidities

- Deconditioning
- Malnutrition
- Effects of hypoxemia
- Steroid myopathy or ICU neuropathy
- Hyperinflation
- Diaphragmatic fatigue
- Psychosocial dysfunction from anxiety, guilt, dependency and sleep disturbances.

# Definition of Pulmonary Rehabilitation

- “A multidisciplinary continuum of services directed to persons with pulmonary diseases and their families, usually by an interdisciplinary team of specialists, with the goal of achieving and maintaining the individual’s maximum level of independence and functioning in the community”
- Sat Sharma, MD, FRCPC, Professor of Pulmonary Medicine, U. of Manitoba

# Principle Goals of Pulmonary Rehabilitation

- Aims to reduce symptoms, decrease disability, increase participation in physical and social activities and improve overall quality of life.
- These goals are achieved through patient and family education, exercise training, psychosocial intervention and assessment of outcomes.
- The interventions are geared toward the individual problems of each patient and administered by the multidisciplinary team.

# Benefits of Pulmonary Rehab.

- The benefits are seen in irreversible pulmonary disorders because much of the disability is not from the lung disease but from the secondary morbidities.
- Evidence from the 2008 Pulmonary Rehabilitation Guidelines shows great benefit in the following areas:

# Benefits

- Improved Exercise Capacity
- Reduced perceived intensity of dyspnea
- Improve health-related QOL
- Reduced hospitalization and LOS
- Reduced anxiety and depression from COPD
- Improved upper limb function
- Benefits extend well beyond immediate period of training.

# Patient Selection

- **Obstructive Diseases**
  - **Restrictive Diseases**
    - **Interstitial**
    - **Chest Wall**
    - **Neuromuscular**
  - **Other Diseases**
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- **Reference**
    - **Pulmonary Rehabilitation; Guidelines To Success**
    - **John E. Hodgkin, MD; Bartolome Celli, MD; Gerilyn Connors, RRT**
    - **2009**

- “ Gains can be achieved from pulmonary rehabilitation regardless of age, gender, lung function or smoking status”.
- “ Severe nutritional depletion and low fat-free mass may be associated with an unsatisfactory response to rehab.
- Exclusions: Conditions that may interfere with the disease process of that could cause risk during exercise training.

# Objective Abnormalities

- FEV1 less than 80% predicted
- FEV1/FVC less than 70 %
- DLCO less than or equal to 65% of predicted
- Resting hypoxemia less than or equal to 90%
- Exercise Testing demonstrating hypoxemia less than 90%
  
- Enrolling active smokers is controversial but they may benefit significantly with a focus on smoking cessation.
- Patient Motivation is a necessary consideration.

# Setting for Pulmonary Rehabilitation

- **Outpatient**
- **Inpatient**
- **Home**
- **Community Based**
- **Choice varies depending on**
  - **Distance to program**
  - **Insurance payer coverage**
  - **Patient preference**
  - **Physical, functional, psychosocial status of patient**

# Components of a Comprehensive Program

- **Exercise Training**
- **Education**
- **Psychosocial/behavioral intervention**
- **Outcome Assessment**

# Exercise Training

- Does not alter underlying respiratory impairment
- Does improve dyspnea
- Targets endurance training of 60% max for 20-30 minutes, repeated 2-5 times a week
- Interval training of 2-3 minutes high intensity with equal periods of rest or low level exercise is tolerated well.
- Unsupported arm exercise aids ADLs and respiratory accessory muscle use.
- Respiratory muscle training benefits have not been well established.

# Education

- Encourages active participation in health care
- Better understanding of disease
- Improved compliance

# Energy Conservation

- **Energy conservation and work simplification assist in maintaining ADLS**
- **Methods include**
  - Paced Breathing
  - Body mechanics
  - Advanced planning
  - Prioritization of activities
  - Use of assistance devices – grabbers, etc.

# Medication and other therapies

- **Types of medication, action, adverse effects, dose and proper use of inhaled medications .**
- **Instructions in inhaler technique.**
- **Appropriate use of oxygen**

# End of Life Education

- **Poor prognosis and increased risks over time**
- **Decision to initiate life support bringing in patient's own values with physician's prognosis**
- **Provides patients with understanding of life sustaining interventions and the importance of advanced planning**

# Psychosocial Intervention

- **Anxiety, depression, difficulties coping with chronic disease**
- **Aided by regular patient education session or support groups**
- **Instruction in progressive muscle relaxation, stress reduction, panic control**

# Chest Physical Therapy

- **Pursed Lip Breathing** – shifts breathing pattern and inhibits dynamic airway collapse.
- **Posture techniques** – forward leaning reduces respiratory effort, elevating depressed diaphragm by shifting abdominal contents.
- **Diaphragm Breathing** – Some patients with extreme air trapping and hyperinflation have increased WOB with this technique
- **Postural Draining** – valuable in patients who produce more than 30cc/24 hours/ **Coughing techniques**

# Nutritional Assessment

- Diet history, BMI
- Over or Under weight.
- Classes in weight management and/or nutritional counseling to improve weight management

# Outcome Assessment

- An important component of pulmonary rehabilitation, being used to determine individual patient responses and evaluate overall effectiveness of program.
  - Dyspnea 10 pt scale, Borg scale, Visual Analog Scale
  - Exercise Ability – Borg Scale, 6MDW/Progressive exercise testing pre and post rehab.
  - Health Status – Respiratory-related QOL; CRDQ
  - Activity Levels –Respiratory-Specific functional Status, Duke Functional Status Scale.

# Future Directions of P.R.

- Impact of PR on Health Care Costs and survival
- Effectiveness of education, breathing strategies psychosocial support
- Best intensity, duration and optimum form of exercise training. Benefits of strength training and best UBE.
- Use of noninvasive positive pressure ventilation during exercise.
- Benefits of a maintenance program to slow progression.

# Future Directions

- **Optimal Frequency of a PR program leading to psychologic gains and decreased hospitalization rate.**
- **Simplifying or minimizing current assessment instruments without sacrificing their intent.**
- **Effectiveness of P.R. in diseases other than COPD.**

# Future of Pulmonary Rehabilitation

- **Medicare Improvements for Patient and Provider Act of 2008**
- **A specific benefit for Pulmonary Rehabilitation effective**
- **January 1, 2010**
- **CMS must write regulations – who is eligible, duration, services, etc.**