Pulmonary Rehabilitation in COPD

f.k.afshar.MD,sport medicine&traditional Persian medicine

COPD

respiratory disease with systemic manifestations.

- ✓ cardiovascular co-morbidities
- ✓ muscle wasting
- ✓ osteoporosis

that in turn lead to ***inactivity*** and ***physical deconditioning***

HRQOL

- Pharmacological therapy leads to improvement in shortness of breath and has ***limited effect on the physical deconditioning.***
- Latest research has shown an additive effect of pulmonary rehabilitation on improving the inactivity and overall HRQoL
- Over the past 30 to 40 years, pulmonary rehabilitation has evolved from an "art of medicine"(1981) to evidence-based therapy.(2006)

definition

- Pulmonary rehabilitation (PR) is a comprehensive multimodality program that includes strength and endurance training, nutritional education and psychosocial support and behavior change
- This leads to a **holistic approach** to management of COPD which results in :

- symptom improvement
- decreased utilization of heath care resources.
- to promote the long-term adherence to health-enhancing behaviors



- First World War. Winifred Linton, a British nurse, first felt the need for physical therapy while treating traumatic respiratory complications during the war. Following the war, she entered physical therapy training and began to teach localized breathing exercises to other physical therapists (PTs) and surgeons at the Royal Brompton Hospital in London.
- for patients with COPD have existed for more than three decades

- According to the World Health Organization's Global Initiative for Chronic Obstructive Lung Disease (GOLD) consensus document on the management of COPD, pulmonary rehabilitation should be considered in patients with an FEV1 below 80% of the predicted value

ACCP/AACVPR Evidence Based Guidelines on Pulmonary Rehabilitation

- Pulmonary rehabilitation improves the symptom of dyspnea in patients with COPD. *Grade of recommendation: 1A*

ACCP/AACVPR Evidence Based Guidelines on Pulmonary Rehabilitation

- Pulmonary rehabilitation improves health related quality of life in patients with COPD.
- *Grade of recommendation: 1A*

ACCP/AACVPR Evidence Based Guidelines on Pulmonary Rehabilitation

- Pulmonary rehabilitation reduces the number of hospital days and other measuresof health care utilization in patients with COPD.
- *Grade of recommendation: 2B*

ACCP/AACVPR Evidence Based Guidelines on Pulmonary Rehabilitation

- Six to 12 weeks of pulmonary rehabilitation produces benefits in several outcomes that decline gradually over 12 to 18 months.
- *Grade of recommendation: 1A*
- Some benefits, such as health-related quality of life, remain above control at 12 to 18 months.
- *Grade of recommendation: 1C*
- Longer pulmonary rehabilitation programs (12 weeks) produce greater sustained benefits than shorter programs.
- *Grade of recommendation: 2C*

ACCP/AACVPR Evidence Based Guidelines on Pulmonary Rehabilitation

- Lower-extremity exercise training at higher exercise intensity produces greater physiological benefits than lower-intensity training in patients with COPD.
- *Grade of recommendation: 1B*
- Both low- and high-intensity exercise training produce clinical benefits for patients with COPD.
- *Grade of recommendation: 1A*

ACCP/AACVPR Evidence Based Guidelines on Pulmonary Rehabilitation

- Supplemental oxygen should be used during rehabilitative exercise training in patients with severe exercise-induced hypoxemia.
- *Grade of recommendation: 1C*
- Administering supplemental oxygen during high-intensity exercise programs in patients without exercise-induced hypoxemia may improve gains in exercise endurance.
- *Grade of recommendation: 2C*

- Pulmonary rehabilitation is indicated for individuals with chronic respiratory disease who have persistent symptoms or disability despite standard medical therapy

pulmonary rehabilitation in clinical situations

- COPD
- chronic asthma
- airways remodeling
- bronchiectasis
- cystic fibrosis
- chest wall disease
- interstitial lung disease
- before and after lung transplantation
- lung volume reduction surgery

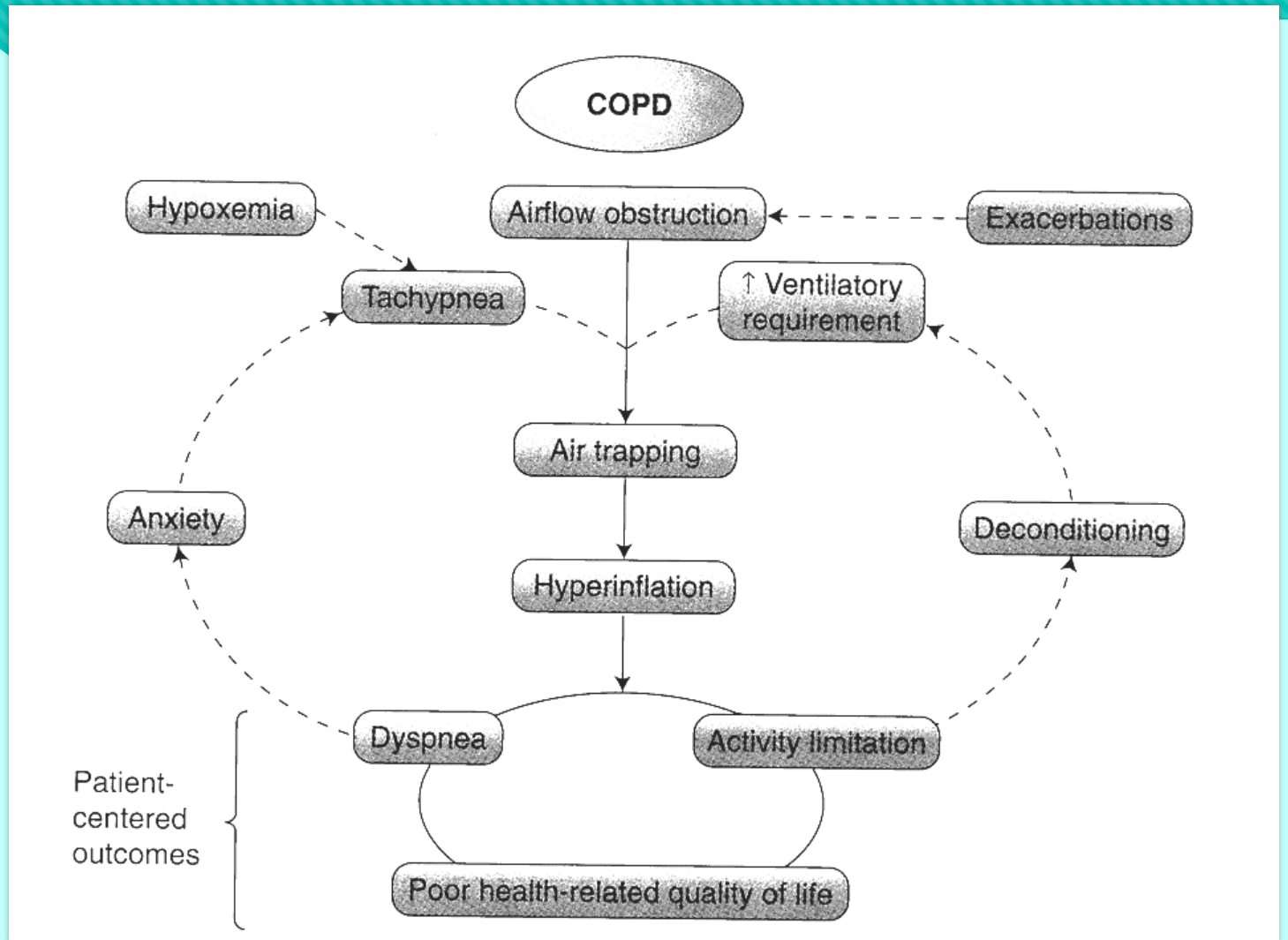
- Often the referral to pulmonary rehabilitation has been reserved for advanced lung disease.

- Although patients in this category can still benefit from the intervention, referral at an earlier stage would allow more emphasis on preventive strategies such as smoking cessation and would permit exercise training at higher levels of intensity.

exclusion criteria

- severe pulmonary hypertension
- unstable cardiovascular disease
- disabling arthritis and severe neurologic, cognitive, or psychiatric disease

Functional capacity in COPD



Exercise capacity reduced in patients with respiratory disease due to:

1-Physical deconditioning (premature anaerobiosis)

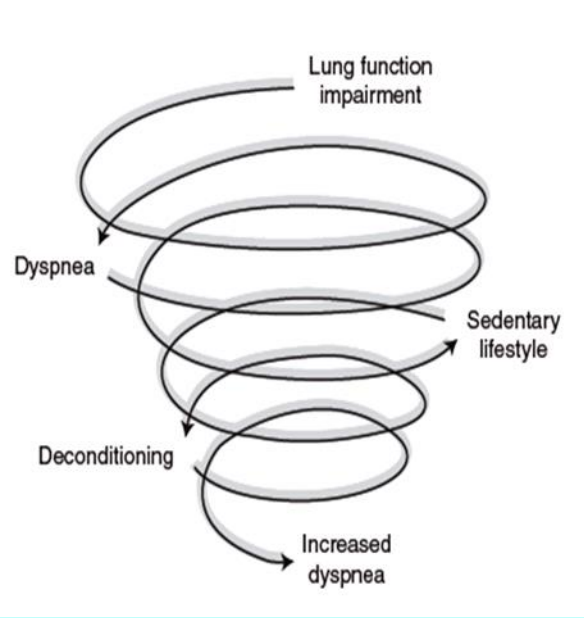
2- ventilatory limitation

3- ventilatory insuficiency

4- Gas exchange abnormalities

5- cardiovascular limitation

6- musculoskeletal dysfunction



Musculoskeletal abnormalities in COPD

- Skeletal muscle dysfunction, atrophy or weakness has been widely accepted in COPD with a negative prognostic factor
- reduced muscle strength, reduced muscle endurance, impaired muscle oxidative capacity
- In peripheral muscles, type I fibers (slow twitch) are decreased and type II (fast twitch) are increased
- These changes result in reduced skeletal muscle endurance, increased fatigability, a lowering of the lactate threshold, and increased ventilatory requirements during exercise

Mechanisms for Skeletal muscle dysfunction

- 1- sedentary lifestyle of patients with COPD
- 2- Acute or chronic treatment with high dose oral corticosteroids
- 3- systemic inflammation
- 4- increased levels of skeletal muscle apoptosis
- 5- oxidative stress
- 6- nutritional status

Inspiratory muscle weakness in COPD

- Many patients with COPD experience inspiratory muscle weakness that leads to increased breathlessness and decreased exercise tolerance

Fundamental of rehabilitation

1- Hx. and Ph/E
2- Secondary cardiac involvement
3- Exercise capacity assessment (ergospirometry or 6MWT)
4- Through demand assessment (ADL, occupation, sexual habit,..)
5- exercise desaturation confirmation
6- exe.prescription
7- psychological consultation
8-nutritional consultation

Breathing retraining techniques

1- Active cycle of breathing tech.
2- pursed lip + diaphragmatic breathing
3- accessory inspiratory muscle relaxation
4- sputum drainage techs. (Autogenic drainage-Positional drainage,…)

Exercise prescription



1- Aerobic exercise (60%-80% VO2 Max. ideally)

2- strength training (50%-60% 1RM)

3- Stretching exercise

4- Inspiratory muscle training (30% MIP-30 repetition)

Aerobic exercise

- Exercise training improves exercise tolerance and may also improve motivation to exercise as well as psychological and cognitive outcomes
- FITT aerobic order:

Frequency: 5 session /week (at least 2 session supervised)

Intensity: 60%-80% of peak work rate and titrated based on dyspnea

Time: 30 – 45 Min.



Supplemental Oxygen

- 02 Sat. should be more than 88% during exercise
- Periodic monitoring of Sa02 will help guide administration of supplemental oxygen therapy
- Supplemental oxygen administered during exercise training is recommended for patients with severe resting or exercise induced hypoxemia
- Although inconclusive, supplemental oxygen administered to patients who do not experience significant exercise-induced desaturation has been shown to allow higher training intensities and improved constant work rate performance

Inspiratory muscle training in COPD

- inspiratory muscle training should be considered in selected patients who have decreased inspiratory muscle strength and breathlessness despite receiving optimal medical therapy
- Inspiratory muscle training order according to AACVPR:
- • Frequency of 4-5 d . wk
- • Intensity of 30% MIP
- • Time of two 15-min sessions per day or one 30-min/da





Other assistive and complementary methods

- Neuromuscular Electrical stimulation
- NMES training has resulted in significant improvements in muscle function, exercise tolerance, and dyspnea during activities of daily living



Non invasive mechanical ventilation



Mechanical insufflator/exsufflator

Mechanical insufflator/exsufflator



High Frequency Chest Wall Oscillation



Elastic socks & walking aids





Integrative medicine



Persian medicine

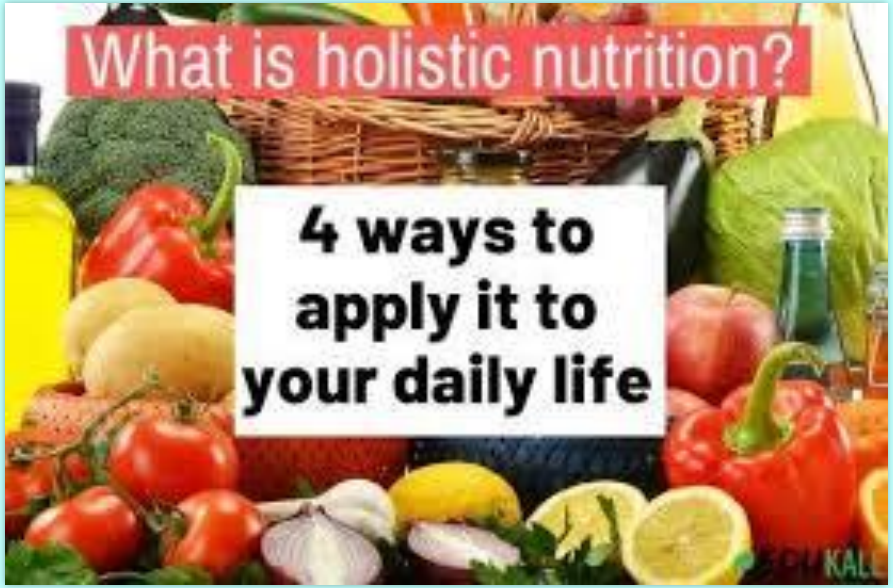
- "life environment(air)
- food and drink (holistic nutrition)
- spiritual status
- physical activity(movement&stillness)
- sleeping and awaking
- excretion and retention (sputum&defication)

  (gut lung axis / gut microbiota)

- **Six Essential Principles of health**

holistic nutrition

- eating healthy food as close to its natural state as possible
- Hallmarks of holistic nutrition include unrefined, unprocessed, organic and locally grown whole foods.
- It's an approach to eating that very consciously considers everything that's eaten and focuses on eating for health above all else.













Herbal medicine

- Essential plants
- expectorant
- Mucilage

















