The Art and Science of Pulmonary Rehab

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ATS/ERS Statement on PR

• “As defined by the 2013 ATS/ERS Statement on Pulmonary Rehabilitation, PR is a comprehensive intervention based on a thorough patient assessment followed by patient tailored therapies that include, but are not limited to, exercise training, education, and behavior change, designed to improve the physical and psychological condition of people with chronic respiratory disease and to promote the long-term adherence to health-enhancing behaviors.”
ATS NEWS
ONLINE THE FIRST BUSINESS DAY OF EACH MONTH http://www.thoracic.org/news

ATS/ERS PUBLISH NEW STATEMENT ON PULMONARY REHABILITATION

In light of numerous scientific advances and the growth of evidence-based medicine over the last decade, the American Thoracic Society (ATS) and European Respiratory Society (ERS) have published a new statement on pulmonary rehabilitation.


Developed by an international writing committee of 24 ATS and ERS members from across North America and Europe, the statement is available at the ATS website.

Exercise therapy, shown above, is the “cornerstone” of pulmonary rehabilitation. (Courtesy of Presbyterian Healthcare Services.)
History of Pulmonary Rehab

- Mid 20th century - patients with COPD were advised to avoid dyspnea
- 1952 – Dr. Alvan Barach published first data on benefits of PR
- 1969 – Dr. Petty established out-patient ‘PR’ program at Univ. of Colo.
- 1980’s – some studies doubted the value of PR
  - AACVPR founded in 1985
- 1990’s – importance of PR re-emerged
- 1997 – ACCP and AACVPR provide evidence-based guidelines
- 1998 – GOLD formed
  - PR is recommended at the moderate stage
- 2010 – PR becomes a specific Medicare benefit for patients with COPD GOLD grades II-IV
  - COPD vs. Non-COPD
    - Pulmonary Rehab vs. Respiratory Therapy Rehab (a billing designation)
Program Basics

• An outpatient service of a hospital or physician office

• Requires physician referral
  • NPP’s ordering/referring PR must have physician co-signature

• (Typically) insurance based

• 36 sessions (insurance dependent)
  • 1-3 sessions/week
Program Basics

• CMS requires a Medical Director (program oversight) and supervising physician - can be same person

• CMS requires the supervising physician to be “immediately available at all times”
  • NPP’s not allowed to provide Medical Direction and at this time not allowed to provide ‘supervision’

• Our Rehab Team
  • Medical Director, Physicians, Nurses, Paramedic, Registered Dietitian/CDE, Respiratory Therapist, Exercise Physiologists, Administrative Support
Patient Selection

• FEV₁ best selection criteria?
  • ACP recommends patients with FEV₁ ≤ 50% of predicted
  • ATS-ERS/NICE recommend patients chosen due to symptom burden regardless of their FEV₁

• Insurance determination
  • COPD patients: CMS allows moderate to very severe stages
  • Non-COPD patients: LCD retired - coverage allowed by MAC’s on a region to region basis

1 Garvey, C.MSN, Bayles, PhD, Hamm, PhD (2016). PRExercise Prescription in COPD. JCRP 75-83
Barriers to Attendance

- Retrospective analysis of 711 patients invited to attend PR¹:
  - 31.8% of patients did not attend
  - 29.1% were non-adherent
    - Predictors of non-attendance were female gender, current smoker, and living alone.
    - Predictors of non-adherence were extremes of age, current smoking, LTOT use, FEV(1), CRQ score and traveling distance (access)

- Utilization in Older Adults with COPD
  - In the study period (2003-2012), utilization increased only 1.1% in Medicare beneficiaries²

² Nishi,S.MD, Zhang,W,MS, Kuo,Y.,PhD,Gulshan,S.,MD (2016). PR Utilization in Older Adults with COPD, 2003-2012. JCRP 36(5) 375-382
Patient Assessment

- CMS has required components for assessment, intervention and re-assessment
  - Oxygen
  - Exercise
  - Nutrition
  - Psychosocial
  - Other core components (Tobacco cessation, medications, management of exacerbations, etc.)
- ITP (including each of these components) must be reviewed/signed every 30 days by a Medical Director (MD/DO) who has had “direct contact” with that patient.
Patient Assessment

• Patients individually assessed for:
  • Severity of respiratory impairment
  • Presence of comorbidities
  • Cognitive/language/psychosocial issues
    • Exercise tolerance (6 MWT)
    • HHQ, PHQ-9, DASI, Dartmouth-COOP, MMRC
    • Balance testing (TUG, Single-Leg Stance, etc.)
    • 30 second arm curl
    • 30 second sit to stand

• Patient specific goal setting
  • SMART goals
  • Patients often have unrealistic goals (get off of oxygen)
Exercise Training - General Principles

- Upper and lower extremity endurance/strength training essential

- Duration, frequency, mode and intensity
  - Individualized and based on disease severity, level of conditioning, functional evaluation and exercise test data

- End Program goal…45-60 minutes of cardiovascular exercise + muscle toning/weight training
Exercise Training

• Lower extremity exercise
  • Increase endurance
  • Improve functional status
  • Physiologic improvement tend to be demonstrated with most intense exercise prescription…
  • However, patients with most severe COPD can undergo exercise training:
    - In severe & very severe COPD patients:
      - significant improvements were found in dyspnea, exercise capacity, QOL & BODE index

• Upper extremity muscles serve a dual purpose (respiratory and postural)
  • Arm training results in task specific improvement
  • Unsupported upper extremity exercise better to ↓ dyspnea in ADL’s (decreases $O_2$ uptake more than arm cranking)

1 Costi, S. MS, PT; Crisafulli, E. MD, FCCP; Antoni, F. BS, PT; Beneventi, C. BS, PT; Fabbri, L. MD, FCCP; Clini, E. MD, FCCP. Effects of Unsupported Upper Extremity Exercise Training in Patients With COPD. August 2009 136, (2) 387–395

Exercise Training

• Endurance exercise
  • High intensity of 60-80% of peak work rate
  • Performed for 20-60 minutes or in short intervals (produce lower symptom scores)
  • RPE range moderate – severe

• Resistance exercise
  • Optimal prescription not yet determined
  • Principal of overload emphasized (40-50% of 1RM).
    • 1-4 sets, 10-15 reps
    • Strength training improves muscular strength but does not seem to improve health status or exercise tolerance

1 Garvey, C.MSN, Bayles, PhD, Hamm, PhD, et al. (2016) PR Exercise Prescription in COPD. JCRP 75-83
Exercise Training – Precautions/Contraindications

Precautions
• In patients with PAH…
  • Clinical studies support low-moderate intensity exercise in stable PAH (receiving optimal disease medical therapy)
  • These patients should be closely supervised 1
• Potential Adverse Effects
  • Musculoskeletal injury
  • Exercise induced bronchospasm
  • Cardiovascular event

Contraindications
• Ischemic cardiac disease
• Acute cor pulmonale
• Severe pulmonary hypertension
• Metastatic cancer
• Renal failure
• Severe cognitive deficit
• Substance abuse without the desire to cease use might interfere with successful PR.
• Poor eyesight, impaired hearing or orthopedic impairment may require modification of the PR setting but should not interfere with participation in a PR program.

1 Zafrir, B., MD (2013) Exercise Training in PAH. JCRP 33(5) 263-273
Self-Management Education

• Nutrition & Lung Disease
• Making Sense of Food Labels
• Achieving a Healthy Weight
• Traveling with Oxygen
• Activities of Daily Living
• Pulmonary Meds & Inhalers
• Relaxation
• Breath & Body Awareness
• Medical Director Q & A
• Lungs & Lung Disease
• Oxygen Therapy
Benefits of PR in COPD (from GOLD)

- Improves exercise capacity  
  Evidence A
- Reduces perceived intensity of breathlessness  
  Evidence A
- Improves health-related quality of life  
  Evidence A
- Reduces hospitalizations and hospital days  
  Evidence A
- Reduces anxiety and depression in COPD  
  Evidence A
- Benefits extend well beyond the immediate period of training  
  Evidence B
- Improves survival  
  Evidence B
- Improves recovery after a hospitalization for an exacerbation  
  Evidence B
- Enhances the effect of long acting bronchodilators  
  Evidence B
- Strength and endurance training of the upper limbs improves arm function  
  Evidence B
- Respiratory muscle training can be beneficial, especially when combined with general exercise training  
  Evidence C

Effectiveness of Pulmonary Rehab

• Exercise training in patients with COPD showed:¹
  • Statistically significant improvement in 6 MWD
  • Statistically significant improvement in BODE score
  • Statistically significant improvement in FEV1/FVC%
  • Improvement in baseline MRC dyspnea score
  • No statistically significant improvement in BMI

• COPD (FIRST Study)²
  • PR group = FEV₁ ↑ from 57.3% of pred at baseline to 60.8% after 3 years
  • Control group = 55% of pred ↓ to 51% respectively

• ILD’s
  • Significant improvement seen in…
  • Dyspnea score, 6 MWD , % predicted FVC and HRQL
  • No significant improvement in ABG’s or DLco³

Effectiveness of Pulmonary Rehab

Quality of Life

COPD patients...at program entry:

• 25% had abnormal anxiety scores
• 17% had abnormal depression scores
  • These dropped to 9% and 6% respectively\(^1\)

IPF patients:

• Data from 5 RCT’s analyzed (PR group vs. control group)
  • Meta-analyses showed significant improvement in symptoms, impact and total score (95%CI)\(^2\)

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1 Bhandari,N.MD, Jain,T.MD, Marolda,C.RN, ZuWallack,R.,MD (2013) Effect of Baseline Anxiety and Depression on Selected Outcomes in PR. *JCRP* 33(2) 123-127
2 Gomes-Neto,M.PT PhD, Silva,C.PT. Impact of PR on Exercise Tolerance and Quality of Life in Patients with IPF. *JCRP*. Scientific Review
Effectiveness of Pulmonary Rehab

Economics

• In a multi-center, observational evaluation of patient reported measures, over the 18 months after rehabilitation, the average per patient reported health-care utilization was reduced 60% for hospital days, 40% for urgent care visits, 25% for physician office visits and 30% for telephone calls. ¹

• In severe & very severe COPD patients ²
  • Significant reductions in exacerbations (3.4 vs. 1.9), hospitalizations (2.4 vs. 0.9) and days of hospitalization (36.1 vs. 16.1)…
    • A reduction of 44%, 63% and 55% respectively

• Reimbursement: Hospital OP vs. Physician Office
  • Physician office are reimbursed on the PFS (not OPPS)
  • Approx. 50% of the rate paid to physician office vs. hospital OP
  • New HOP PR programs (not established prior to 11/2/15) will be reimbursed at the PFS rates

¹ ACCP/AACVPR Evidence-Based Clinical Practice Guidelines - Chest June 2007
Cardiovascular Equipment
Our Super-Hero Team