Rehab of patients with COPD

The following treatment suggestions are general guidelines only. Follow physician recommendations for activity and exercise programming based on individual patient medical status.

Typical Clinical Goals for Rehab:
- Decrease signs and symptoms (of dyspnea, SOB, feeling excessively fatigued)
- Improve ADL performance for time it takes to dress, walk, etc.

Treatment Information:
What is the typical content of a treatment program for COPD?
- Breathing exercises – NOTE: not the biggest problem for COPD usually
- UE & LE strengthening – NOTE: biggest problem is LE strength limitations
- Flexibility program – especially related to breathing and walking needs
- General aerobic conditioning done at patient’s tolerance level (treadmill, bicycle ergometers, walking)
- Task simplification and energy conservation training
- VERY CLOSE MONITORING OF THE EFFECTS OF THE INTERVENTIONS IS IMPORTANT: HR, B/P, Pulse, O2 SATs, RR

Breathing Exercises
- Breathing exercise for diaphragmatic breathing, pursed lip breathing, paced breathing
  - Diaphragmatic (deep) breathing reduces Respiration Rate
  - Pursed lip breathing helps eliminate dyspnea symptoms
  - Paced breathing helps reduce work of breathing and eliminates dyspnea
- Facilitate postures and positions that improve breathing by
  - Chest expansion by correcting head position in static supine
  - Chest expansion by placing hands behind head
  - Place towel rolls behind elbows of person with limited shoulder rotation
  - Place towel roll horizontally under thoracic spine to increase chest expansion
  - In sitting, facilitate appropriate pelvic alignment to neutral and then anteriorly tilt and expand chest
- Learn the breathing and the postures separate first and then incorporate them into the ADL and walking patterns
  - Utilize breathing exercises while extending trunk, flexing, abducting and externally rotating the shoulder during inspiration
  - Utilize breathing exercises while flexing trunk, extending, adducting and internally rotating the shoulder during expiration
  - Practice breathing during rolling, coming to sitting, reaching, etc.
  - Sometimes can breathe easier with UE supported on table

Specific Breathing Exercises provided on the following pages:
PURSED LIP BREATHING
- Inhaling through nose for a count “1,2”
- Position lips in a whistle or kiss, then exhale through lips for a count of “1,2,3,4”

PRACTICING CONTROLLED BREATHING:
Position supine or sidelying. Progress to sitting and standing.
1. For inspiration: have patient do trunk extension, shoulder flexion, abduction and external rotation and use an upward eye gaze while breathing in
2. For expiration: have patient do trunk flexion, shoulder extension, adduction, and internal rotation movements with a downward eye gaze while breathing out
3. Do ROM with the shoulder and have patient practice trunk actions, eye gazing and breathing in/out appropriately to the movement of the shoulder
4. To go from sit to stand: initiate the forward trunk lean with exhalation and initiate the standing phase; best football prediction website with inhalation and neck extension
5. To go from stand to sit: return to sit by using slow controlled exhalation during the process; can use pursed lips, blowing, or counting out loud

DIAPHRAGMATIC CONTROLLED BREATHING – to decrease work of breathing, improve coughing, increase strength & coordination of respiratory muscles, to aid in relaxation, to mobilize thorax, to increase patient’s feeling of self-control over breathing

Teach breathing in sidelying, then supine, then sitting, standing, walking, stair climbing, and other activities

Step 1: position supine in Fowler’s position; neutral or slightly posteriorly tilted pelvis
Step 2: relax upper chest and shoulders (can place your hands on patient’s shoulders, tell them “don’t let me push your shoulders down”, then after they resist, say “relax”.
Step 3: Place your hand on patient’s abdomen at umbilicus; have patient check his own breathing for a few cycles and let your hand follow their breathing movement
Step 4: At the end of the patient’s exhalation, give a slow stretch and scoop your hand under the rib cage a little (gentle)
Step 5: Tell the patient to “breathe into my hand” during inspiration.
Step 6: At the end of each of exhalation, repeat the scoop action.
Step 7: Increase patient awareness by having them notice how their abdomen rises with each breathe taken in.
Step 8: When the patient has control over several breathes then progress the position and repeat the instructions.

LATERAL COSTAL BREATHING: facilitates diaphragmatic and intercostal breathing;
- place hands on front lower lobe, rib area and follow the rib cage out during inspiration
- place hands on posterior chest area, lower ribs below scapula and help chest area expand during inspiration

PACED BREATHING:
This technique combines pursed-lip breathing & diaphragmatic breathing

Purpose of this technique:
- Prolong the expiratory phase
- Slow the respiration rate
- Delay small airway closure
- Will also decrease dyspnea & calm anxiety

INHIBITION OF UPPER CHEST: use this if diaphragmatic and lateral costal breathing approaches do not work to facility diaphragmatic breathing

Do the scoop technique mentioned in diaphragmatic breathing; place your other arm across the upper chest about the level of the sternal angle; eave it there lightly (do not apply any pressure) to feel the upper chest movement. After several breathes, follow the upper chest back to its resting position during exhaling; then during the next inspiration attempt do not move your arm from the position. This will apply gentle pressure and resist upper chest expansion. When you get increased diaphragmatic breathing, let the patient know.

TRUNK/THORAX MOBILIZATION – do the following steps
1. Use towel or pillow rolls to mechanically open up the anterior or lateral chest wall while patient is supine  
   a. Ask patient to bring arms up over head (shoulder flexion) as far as possible while watching his/her hands and inhale at the same time  
   b. Can use butterfly technique (later)  
   c. Add in counter-rotation of the trunk  
   d. Add in Myofascial release to free up restrictions with connective tissue on/around thorax
2. In sidelying, place a towel roll or pillow under the lower chest (rib 8-10) on the weight-bearing side. Be sure the shoulder and pelvis are in direct contact with the surface yet. Repeat the exercises a-d from #1.
3. Muscles that are often tight are pectoralis group, intercostals, quadratus lumborum muscles; can also have problems with neck and back tightness.

ACCESSORY MUSCLE FACILITATION – position pelvis slightly anteriorly
1. pectoralis muscles – facilitate/stretch pectoralis minor: heel of hand near sternum, fingers aligned toward shoulder (place hand over muscle); patient breathe’s into therapist hands while therapist applies a quick manual stretch
2. sternocleidomastoid and scalene muscles – repeat same process as with pect stretch.

BUTTERFLY TECHNIQUE: sitting or supine: patient inhales, raises arms and places hands behind neck; therapist helps bring arms out into flexion, abduction and external rotation; then brings arms in so elbows touch in front of belly area. The action could be called “flapping your wings”. A third action of trunk counter-rotation can be added in by touching 1 elbow to opposite knee and then reversing action to point elbow 30 degrees+ to the rear on the ipsilateral side
Exercise programs considerations:

- General strengthening of UE and LE motions done at low intensity; aerobic activity done at low intensity also
- Exercise below the level at which signs and symptoms begin (critical training intensity needs to be kept very low!!!)
- Use multiple 1-2 minute rest times during exercise programs, especially in the beginning; increase exercise time by minute intervals over 1 day or even 1 week for severe cases; goal is usually 20 minutes of sustained activity before looking at increasing exercise intensity; consider doing exercise in very short periods of time 2-3x/day and interspersed throughout the day at first so the patient can eventually sustain 15-20 minutes of activity
- When patient is resting, do forward leaning and UE support on a table to reduce the work of breathing
- If 20 minutes of sustained activity achieved, can increase exercise intensity and set goals for as long as 45-60 minutes (this is usually for the less involved cases)
- Exercise intensity by HR (heart rate) information
  - Try for 20-30 bpm above resting level for 1-2 minutes and build up to 3-5 minutes
  - Try for 20-30% maximum heart rate (MHR which is 220-age), progress up to 40% MHR, Maximum for healthy person: generally is 85% MHR
- Stop exercise if
  - Systolic BP decreases greater than 10 mmHg (in general SBP increases with increased exercise intensity)
  - Diastolic BP increases above 110 mmHg
  - Respiration Rate exceeds 14-15/min
  - Pulse becomes irregular
  - Monitor O2 SATS but cessation at below 90 is currently being questioned – instead measure dizziness and orientation and stop exercise if these symptoms occur; stop until symptoms resolve; do not continue if symptoms progress over time
- Exercise intensity determined by report of fatigue
  - Use very light weights and do repetitions to very light fatigue
  - Lower extremity exercise better than upper extremity exercise; may want to avoid UE strengthening exercises in later stages if they cause breathing difficulty; acceptable weekly progressions are 2-4# for LE and 1# for UE
- Inhale against resistance
  - Sit to stand repetitions – emphasize LE strengthening necessary for functional balance and walking (count # of reps patient can do without hand help; be sure the sit to stand exercise is strengthening the LE’s; greatest strength gain achieved by working with eccentric control {control to lower self slowly} so use a raised seat or wedge at first and build to 10 reps; then lower the seat by 1” every 2 days until patient can do sit to stand at chair height; if knee problems interfere be sure to stretch the gastroc and hip flexors!
  - Treadmill program 1-4 days/week for 1-2 short periods in a day; after maximum achieved set up a maintenance program if possible; If higher level patient can do 2.5% increments of increasing the grade every 2 minutes at a constant speed of 3 mph. Many patients start at a much lower mph rate however, so be sure to establish beginning baseline (could be ½ mph for 2 minutes at flat grade).
  - What if there is accompanying CHF? Consider the following and adapt to the level of the patient (from General Exercise Program for Elderly with Cardiac Disease (1996 PT Journal and 2005 Scheurmann)
o Warm up: 5-10 min stretching and light activity to large muscle groups
o Aerobic exercise at 50-80% peak oxygen uptake 3-5x/wk; Start with 2-3 minutes of exercise followed by 1-2 minutes of rest; build up to 20-40 minutes of exercise; can do treadmill, leg and arm ergometry, walking, general UE and LE exercises
o Cool-down 5-10 min with stretching
o Can do resistive training building up to 12-15 reps of modest workload; do 4-8 stations for all the muscle groups

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Adapted from: MARY MASSERY: IF YOU CAN'T BREATHE, YOU CANT FUNCTION