### Energy Conservation Techniques

**Pulmonary Rehabilitation Educational Booklet**

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### Foreword

This booklet is complied by Occupational Therapists with the aim to guide patients with chronic respiratory conditions to deal with their problems in activities of daily living with the application of energy conserving techniques to improve their quality of life.
Energy Conservation Techniques for Patients with Chronic Respiratory Problems

The following problems are commonly experienced by patients with chronic respiratory conditions:

1. Reduced lung function limits energy expenditure and functional capacity for meeting daily exertional demands.

2. Dyspnea may induce fear which will further aggravate shortness of breath even when patients attempt the slightest exertion. Patients may become progressively dependent as their activity tolerance deteriorates in time.

The use of energy conservation techniques with coordinated breathing and proper body mechanics will help to relieve dyspnea and in turn enhance patients’ ability to cope with daily activities.

Principles of Energy Conservation Techniques

The rationale behind energy conservation is to reduce unnecessary oxygen expenditure in the body. There are five major principles which can be incorporated into daily activities. These principles are meant to be internalized into daily habits.

1. **Organize your daily routine and activities**

   - Plan daily activity schedule alternating with light and heavy tasks. Also, avoid unnecessary steps of a task when possible.
   
   - Gather and arrange supplies or tools for daily activities before start.
   
   - Have sufficient rest after completing a task and before moving onto the next one.
2. **Use appropriate tools to simplify activities**
   - Use modern household utensils or electric appliances to save energy, e.g. non-stick kitchen wares, electric can opener, microwave oven etc.
   - Use assistive devices such as long handled reachers to minimize the need to stoop or bend over when retrieving objects from the floor.
   - Use wheeled trolleys to assist pushing and carrying heavy objects.

3. **Work with proper pacing**
   - Allow ample time to finish an activity, keep a slow and steady pace and not to rush.
   - Listen to your body messages. Rest before you are exhausted.

4. **Avoid tiring and awkward posture that may impair breathing**
   - Sit down for your activities whenever possible. Avoid tasks that require prolonged standing, squatting or stooping.
   - Avoid raising your arms too high above shoulder level.
5. **Use of proper body mechanics**

- Keep your body straight while performing a task. Poor posture consumes more energy.

- Keep your arms straight and close to your body while carrying objects and spread the load between both arms at the same time.

- Support your elbows on a table or a firm surface while performing a task to avoid positions that make you tired, e.g. during shaving, peeling potato skin.

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**Proper Posture**

1. When sitting down to rest, lean your body forward slightly. Relax your shoulders while keeping your hands on both thighs and rest your feet comfortably on floor. This posture facilitates diaphragmatic breathing.

2. Raising your arms too high for a prolonged period of time at work is energy consuming. Avoid this posture by lowering the height of the working table to an appropriate level.

3. Stooping or crouching will impede breathing. Avoid this posture by raising the working table to an appropriate height.

4. Avoid bending over while retrieving objects from the floor. Before lifting, try keeping your body straight by bending your hips and knees, then straightening your legs to assist lifting up objects.

5. Keep the heavy objects close to your body while lifting and carrying.
Incorporating Coordinated Breathing Techniques in Body Movements

1. **Basic technique**
   Control the breathing rhythm. Slowly inhale through your nose and exhale through your mouth. The duration of exhalation should be doubled that of inhalation, e.g. for 2 seconds of inhalation, allow 4 to 6 seconds for exhalation.

2. **Adjust speed and posture of your body to get into the rhythm of breathing**
   Breathe in when stretching out your arms and expanding your chest, e.g. straightening up the trunk or reaching up with the arms. Breathe out when moving in opposite direction, e.g. crouching or moving arms back towards the body.

3. **Coordinate breathing with body movements**
   Learn to coordinate the exhalation phase of breathing for the exertional movements of the activity. Breathe in when preparing for exertion, breathe out when delivering a force.

Application of Energy Conservation Techniques—Basic Self-care Activities

1. **Feeding**
   - Good posture should be ensured and avoid stooping or semi-inclined positions.
   - Elbows should be supported on a table and all dishes should be placed at the nearest position within reach.
   - Light and more frequent meals can ensure enough time for enjoyment so as to minimize shortness of breath.

2. **Grooming**
   - Sit in front of water basin for cleaning face, brushing teeth, shaving and combing hair.
   - Elbows should be supported on the rim of water basin while grooming.
   - Small towel should be used and coordinated breathing should be applied when wringing a towel. Never cover nose and mouth together while cleaning face.
   - Electric tooth brushes and razors should be used to minimize upper limbs exertion.
3. **Dressing** (include upper garments, pants, socks and shoes)
   - Avoid wearing tight clothing and clothing with zips or buttons at the back.
   - Wear shoes without shoe-laces to avoid bending trunk.
   - Sit where possible when putting on and taking off clothing.

4. **Toileting**
   - Install an exhaust fan and ensure good ventilation in toilet.
   - Keep coordinated breathing during bowel opening to minimize shortness of breath. Regular intake of vegetables and fruits will promote bowel movements.
   - Adjust height of the sitting toilet or install raised toilet device to ensure appropriate height of toilet bowl.

5. **Bathing**

   **Preparation:**
   1. Arrange bathing time when you have the stamina and energy.
   2. Take a bath after using bronchodilators and use home oxygen for those who are indicated after assessment.
   3. Prepare and setup as appropriate before bathing e.g. the towels, soap and clothing should be ready.
   4. Sit down if you can. You may sit on a shower chair, bath-board, or the toilet. Place shower and bathing utensils nearby.
   5. For those using basin to hold water for bathing and washing hair, the basin should be elevated to a suitable height to avoid excessive trunk bending or squatting. Using a water heater for generating hot shower to eliminate the inconvenience. Bathing in the bath-tub is also comfortable and less energy-consuming.

   **Bathroom environment:**
   1. Ensure good ventilation in the bathroom by switching on exhaust fan or keeping windows open.
   2. Avoid too much water vapor or steam. Turn on cold water first then hot water to minimize steam production.

   **Bathing time:**
   1. Take off clothing first and wrap body with a large towel. Adjust water temperature at this time if a water heater is used for showering.
   2. Use a long handle sponge and a long towel for washing back and apply coordinated breathing while washing body, e.g. breathe in for upward movement and breathe out for downward movement.
   3. If intermittent rests are required, cover your body with a large towel to keep warm. After washing the upper body, cover it with a large towel to rest and continue to wash the lower body.
   4. After completion of bathing, wrap body with a large towel to dry water up. Keep relaxed and alleviate shortness of breath with appropriate breathing techniques. Put on clothing after rest if required.
1. **Location of daily necessities**
   - Seasonal clothing and underwear should be kept in drawers or wardrobes which are easy to reach.
   - Kitchen utensils should be placed in a rack for drying to save energy from drying and tidying up.

2. **Cooking**
   - Install an exhaust fan and a range hood to ensure good ventilation in kitchen during cooking time.
   - Minimize multi-tasking during cooking, e.g. frying vegetables and steaming fish at the same time. It will make you tense.
   - Frying and stir-frying trigger fumes and smoke leading to shortness of breath.
   - Sit down for the preparation work, e.g. sitting down for cutting vegetables, peeling and marinating food.
   - Place a chair inside or outside kitchen for intermittent rests.

3. **Laundry**
   - Use the washing machine and drying machine.
   - Avoid squatting down to do hand laundry. Sit whenever possible.
   - If the laundry is too heavy, handle a part of the load at one time.
   - When adjusting clothing on hangers, sit down and perform the actions slowly. Coordinate breathing when hanging clothing.

4. **Home cleansing**
   - Seek help for heavy household tasks.
   - Sit in front of the cupboard when cleaning the bottom part of the cupboard. Use coordinated breathing technique when bending the trunk.
   - Schedule housework evenly with one task every day in order to avoid exhausting yourself, e.g. laundry on Mondays, sweeping floor on Tuesdays, cleaning on Wednesdays, etc.
   - Wear masks and use a vacuum cleaner for dusting at home.
Application of Energy Conservation Techniques — Outdoor and Leisure

1. **Eating out**
   - Plan the route, the time involved with consideration of the location (any stairs or slope) beforehand. Match the demand with your own physical abilities and tolerance.

2. **Garden Strolling in the morning**:
   - In summertime, it will be more comfortable to arrange strolling in the garden at about five to six o’clock in the morning to avoid the heat. During winter, arrange to have walks at around eight to nine o’clock in the morning with sunny and warm temperature. Put on clothing with higher collar or use a scarf to keep yourself warm.

3. **Shopping**
   - Plan the route for shopping to avoid getting exhausted.
   - Seek help from relatives/friends for heavy groceries or buy only one heavy load at one time.
   - Arrange delivery service for heavy groceries.
   - Use shopping bags to carry over shoulders or use trolley for shopping.
4. **Attending medical follow-up**
   - Arrive at the location of medical follow-up in time.
   - Apply for Non-Emergency Ambulance Transportation Services via nurses whenever necessary.
   - Seek for assistance from oxygen supplier or Occupational Therapists for arrangement/information of transportation for oxygen users.
   - Buy or loan a wheelchair if one feels difficult to manage the trip.

5. **Long tour trip:**
   - Bring along sufficient medication with additional dosage for emergency situations.
   - Avoid getting exhausted by planning intermittent rests for the trip.
   - Prepare medical reports and medication lists for emergency use.
   - Use a trolley to carry luggage or ask relatives to help.

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**Conclusion**

This booklet introduces some general techniques and principles of energy conservation for patients with chronic obstructive pulmonary disease. It only serves as a general reference for application in activities of daily living. For those who have enquires or change of medical conditions, they should contact relevant occupational therapists for assistance.

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