Incentive spirometers measure the flow of air inhaled through the mouthpiece. They therefore offer an incentive to improve inhalation (Figure 24-15). The client should be assisted to a fully upright position. Box 24-6 lists instructions for clients in the use of incentive spirometers.

**Box 24-5 CLIENT TEACHING**

**Breathing and Coughing Techniques**

**Abdominal (Diaphragmatic) and Pursed-Lip Breathing**

Teach client to:
- Assume a comfortable semi-sitting position in bed or a chair or a lying position in bed with one pillow.
- Flex the knees to relax the muscles of the abdomen.
- Place one or both hands on the abdomen, just below the ribs.
- Breathe in deeply through the nose, keeping the mouth closed.
- Concentrate on feeling the abdomen rise as far as possible; stay relaxed, and avoid arching the back. If it is difficult to raise the abdomen, take a quick, forceful breath through the nose.
- Then purse lips as if about to whistle, and breathe out slowly and gently, making a slow whooshing sound without puffing out the cheeks. This pursed-lip breathing creates a resistance to air flowing out of the lungs, increases pressure within the bronchi (main air passages), and minimizes collapse of smaller airways, a common problem for people with chronic obstructive pulmonary disease.
- Concentrate on feeling the abdomen fall or sink, and tighten (contract) the abdominal muscles while breathing out to enhance effective exhalation. Count to 7 during exhalation.
- Use this exercise whenever feeling short of breath, and increase gradually to 5 to 10 minutes four times a day. Regular practice will help you do this type of breathing without conscious effort. The exercise, once learned, can be performed when sitting upright, standing, and walking.

**Controlled and Huff Coughing**

- After using a bronchodilator treatment (if prescribed), inhale deeply and hold your breath for a few seconds.
- Cough twice. The first cough loosens the mucus; the second expels secretions.
- For huff coughing, lean forward and exhale sharply with a huff sound. This technique helps keep airways open while moving secretions up and out of the lungs.
- Inhale by taking rapid short breaths in succession (sniffing) to prevent mucus from moving back into smaller airways.
- Rest.
- Try to avoid prolonged episodes of coughing because they may cause fatigue and hypoxia.

**Hydration of Inspired Air**

Adequate hydration maintains the moisture of the respiratory mucus membranes. Normally, respiratory tract secretions are thin and therefore moved readily by ciliary action. However, when the client is dehydrated or when the environment has a low humidity, the respiratory secretions can become thick and tenacious. Fluid intake should be as great as the client can tolerate.

**Humidifiers** are devices that add water vapor to inspired air. Room humidifiers provide cool mist to room air. **Nebulizers** (atomizers, devices for throwing spray) are used to deliver humidity and medications. They also are used with oxygen delivery systems to provide moistened air directly to the client (Figure 24-16).

**Percussion, Vibration, and Postural Drainage**

Percussion, vibration, and postural drainage (PVD) are dependent nursing functions performed according to a physician’s order. These procedures help loosen thick, tenacious secretions. The positions in postural drainage assist removal of secretions (Figure 24-17). Nurses who work in areas where they are expected to assist with these procedures will receive additional training in PVD functions.

**Suctioning Equipment**

Suctioning means aspirating secretions, usually through a catheter connected to a suction machine or wall suction outlet. Suction catheters may be either open tipped or whistle tipped.

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**Figure 24-15** Client using a plastic disposable volume-oriented incentive spirometer, or SMI.