

promoting airway expansion. Thus, inspiratory airflow limitation seldom occurs due to diffuse pulmonary airway disease. Conversely, extrathoracic airway narrowing (e.g., due to a tracheal adenoma or post-tracheostomy stricture) can lead to inspiratory airflow limitation ([Fig. 285-4](#)).

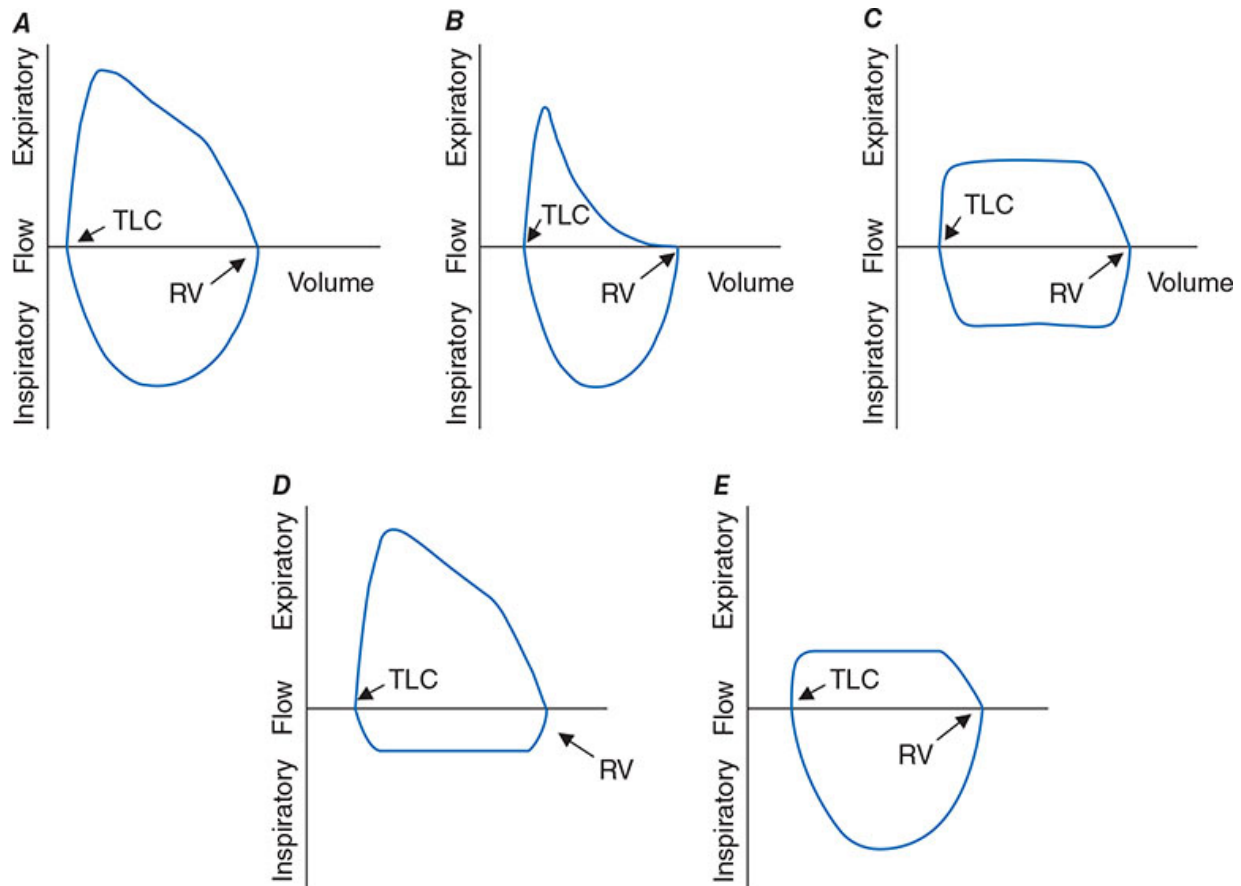


FIGURE 285-4 Flow-volume loops. A. Normal. **B.** Airflow obstruction. **C.** Fixed central airway obstruction (either above or below the thoracic inlet). **D.** Variable upper airway obstruction (above the thoracic inlet) **E.** Variable lower airway obstruction (below the thoracic inlet). RV, residual volume; TLC, total lung capacity.

The Work of Breathing In health, the elastic (volume change-related) and dynamic (flow-related) loads that must be overcome to ventilate the lungs at rest are small, and the work required of the respiratory muscles is minimal. However, the work of breathing can increase considerably due to a metabolic requirement for substantially increased ventilation, an abnormally increased mechanical load, or both. As discussed below, the rate of ventilation