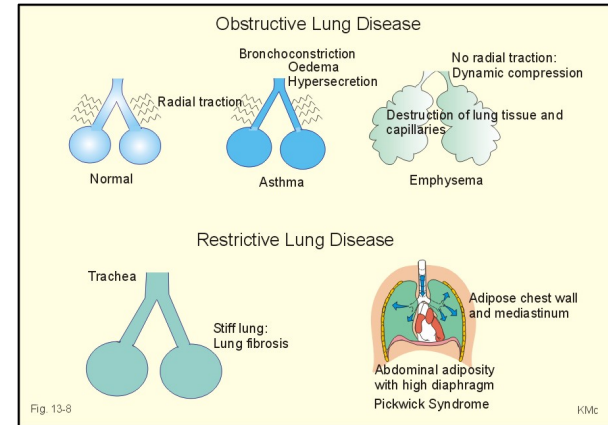


Obstructive & Restrictive Pulmonary Disease: PFT's

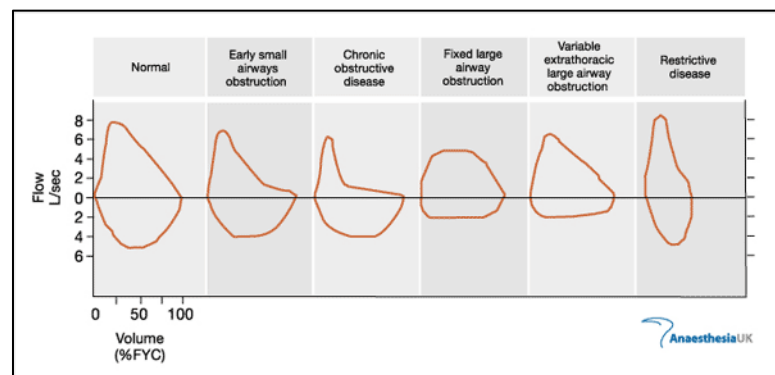
Anesthetic Pearls: Anesthetic Implications of Obstructive & Restrictive Pulmonary Disease

Pulmonary Function Tests in Restrictive & Obstructive Lung Disease		
Value	Restrictive Disease	Obstructive Disease
Definition	Proportional decreases in ALL lung volumes	Small airway obstruction to expiratory flow
FVC	↓↓↓↓	Normal or slightly ↓
FEV-1	↓↓↓↓	Moderately ↓
FEV-1 / FVC	Normal ratio (↓ total vol)	↓↓↓↓
FEF 25-75%	Normal	↓↓↓↓
FRC	↓↓↓↓	Normal or ↑ if gas trapping
TLC	↓↓↓↓	Normal or ↑ if gas trapping



Restrictive Lung Diseases

are characterized by reduced lung volume, either because of an alteration in lung parenchyma or because of a disease of the pleura, chest wall, or neuromuscular apparatus. In physiological terms, restrictive lung diseases are characterized by reduced total lung capacity (TLC), vital capacity, or resting lung volume. Accompanying characteristics are preserved airflow and normal airway resistance, which are measured as the functional residual capacity (FRC). If caused by parenchymal lung disease, restrictive lung disorders are accompanied by reduced gas transfer, which may be marked clinically by desaturation after exercise. The many disorders that cause reduction or restriction of lung volumes may be divided into 2 groups based on anatomical structures. The first is intrinsic lung diseases or diseases of the lung parenchyma. The diseases cause inflammation or scarring of the lung tissue (interstitial lung disease) or result in filling of the air spaces with exudate and debris (pneumonitis). These diseases can be characterized according to etiological factors. They include idiopathic fibrotic diseases, connective-tissue diseases, drug-induced lung disease, and primary diseases of the lungs (including sarcoidosis). The second is extrinsic disorders or extraparenchymal diseases. The chest wall, pleura, and respiratory muscles are the components of the respiratory pump, and they need to function normally for effective ventilation. Diseases of these structures result in lung restriction, impaired ventilatory function, and respiratory failure (eg, nonmuscular diseases of the chest wall, neuromuscular disorders).



Chronic Obstructive Pulmonary Disease (COPD) is estimated to affect 32 million persons in the United States and is the fourth leading cause of death in the USA. Patients typically have symptoms of both chronic bronchitis and emphysema, but the classic triad also includes asthma. Most of the time COPD is secondary to tobacco abuse, although cystic fibrosis, alpha-1 antitrypsin deficiency, bronchiectasis, and some rare forms of bullous lung diseases may also be causes of the disease. The defining feature of COPD is irreversible airflow limitation during forced expiration. This may be a result of a loss of elastic recoil due to lung tissue destruction or an increase in the resistance of the conducting airways. The standard measure of COPD is the measure of forced expiratory volume in 1 second (FEV-1) and its ratio to forced vital capacity (FVC), FEV-1 / FVC. Patients with COPD are susceptible to many insults that can lead rapidly to an acute deterioration superimposed on chronic disease. An exacerbation of COPD is an important but occasionally overlooked parameter. COPD exacerbations are very common, affecting about 20% of patients with moderate-to-severe COPD (1.3 events per year in patients with 40-45% predicted FEV₁). Quick and accurate recognition of these patients along with aggressive and prompt intervention may be the only action that prevents frank respiratory failure.