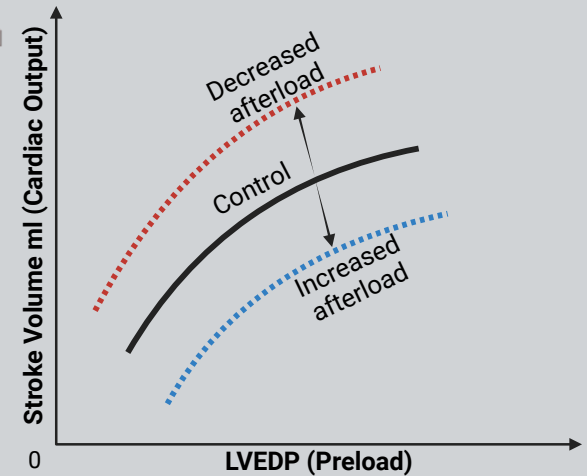
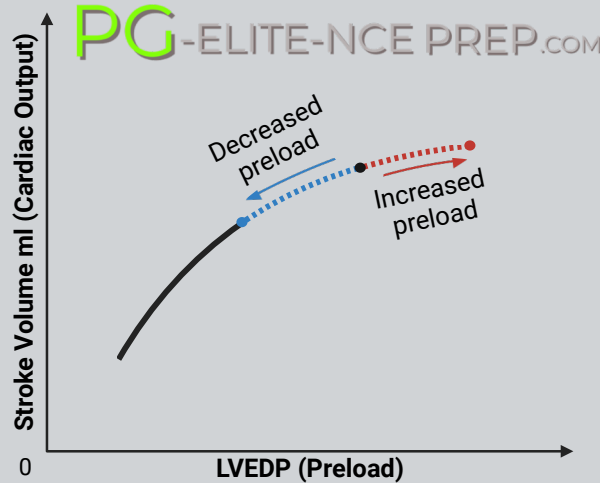
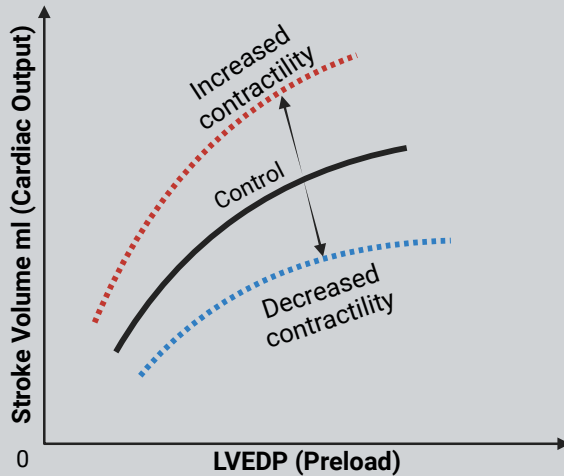


Ventricular Function Curves

Frank-Starling Relationship



Cardiac contractility is determined by the tension developed and velocity of shortening of myocardial muscle fibers at a given end-diastolic volume and systemic vascular resistance.

Factors that may increase contractility

- SNS activation
- Circulating catecholamines
- Inotropic agents
- Digoxin
- Calcium
- Metabolic changes
- Hyperthermia
- Hypercalcemia
- Increased heart rate during exercise

Factors that may decrease contractility

- Decrease in sympathetic activity
- Beta adrenergic antagonists
- Atenolol
- Propranolol
- Calcium channel blockers
- Barbituates
- Opioids
- Some anesthetic agents
- Propofol
- Heart failure resulting from:
- CAD
- Myocardial ischemia
- Myocardial infarction
- Myocarditis
- Toxins
- Electrolyte imbalance
- Valvular disease

Preload is the volume of blood in the ventricle (end-diastolic volume) immediately preceding ventricular contraction (systole).

Factors that may increase preload

- Increase in central venous pressure
- IV fluid administration
- Increased blood volume
- Decrease in venous compliance
- sympathetic activation
- Increased LV compliance
- Increase in atrial contractility
- Decrease in heart rate (increase in LV filling time)
- Increase in SVR
- Valvular disease
- Mitral insufficiency

Factors that may decrease preload

- Decrease in central venous pressure
- Hypovolemia
- Hemorrhage
- Impaired atrial contraction
- Arrhythmias
- Tachycardia (decreased LV filling time)
- Decreased afterload
- Mitral valve stenosis

Afterload is the amount of pressure the LVt must exert during systole to overcome systemic vascular resistance and eject blood.

Factors that may increase afterload

- Increased SVR
- Aortic pressure increases
- Aortic stenosis
- Systemic HTN
- Vasopressors
- Phenylephrine
- Norepinephrine
- Epinephrine

Factors that may decrease afterload

- Vasodilators
- ACE inhibitors
- NTG
- Hydralazine
- Sympatholytics
- Calcium channel blockers
- Mitral valve regurgitation