

Absolute Contraindications of Exercise Testing

- **Acute febrile illness:** A nonspecific term for an illness of sudden onset accompanied by fever.
 - Following intense exercise, there is a brief period of immunosuppression (immunological open window) leaving patients susceptible to infection.
 - Fever affects the body's ability to regulate body temp & fluid losses, ↑ fatigue & ↓ mm strength/endurance & ex tolerance
- **Acute ECG changes suggestive of MI:** ST segment elevation
 - Exercise will further deteriorate myocardial supply & demand balance; worsening ischemia/infarction
- **Unstable Angina:** unpredictable onset of angina
 - Exercise will further deteriorate myocardial supply & demand balance; potentially resulting in ischemia/infarction
- **Uncontrolled ventricular arrhythmias:** Typical ventricular dysrhythmia: frequent PVCs, either unifocal or multifocal, couplets & Ventricular tachycardia.
 - This dysrhythmia compromise cardiac function because abnormal beat often produces little/no SV. CO may ↓ at rest & may not ↑ with exercise→ thus the body does not have enough oxygen to support exercise.
- **Uncontrolled atrial arrhythmias:** Common atrial dysrhythmia includes atrial flutter, atrial fibrillation & paroxysmal atrial tachycardia.
 - In these dysrhythmia, the atria may not be contracting normally & the ventricles may not get the signal from atria to contract at a rate appropriate for exercise. CO may not ↑ with exercise in the presence of these rhythms→ thus the body does not have enough oxygen to support exercise.
- **Third degree Atrioventricular block:** complete dissociation b/w beating of the atria & ventricles. The atria & ventricles are contracting at their own rate & the atria do not communicate the impulse to beat to the ventricles. The atria usually contract faster at a rate of 70-80 per/min; & ventricles contract around 30 per/min.
 - The slow ventricular rate is associated with a ↓ CO & thus compromised blood flow→ thus the body does not have enough oxygen to support exercise.
- **Uncontrolled CHF:** heart unable to pump blood to the body (unable to maintain SV). Uncontrolled can lead to ↓ renal function & anaemia (due to ischemia). Excess fluid blacks up into ventricle, atria & eventually pulmonary system. Pulmonary/peripheral oedema results. Pulmonary oedema leads to cough & SOB (detected at rest or during exercise). ↑ venous return & ↑ preload (due to ↑ sympathetic response, ↓ renal perfusion causing fluid retention & ↑ total peripheral resistance) → ↑ afterload (due to diastolic dysfunction & fluid retention). Medications needed to ↓ cardiac workload.
 - CO is compromised at rest in CHF. Exercise will ↑ the need of blood around the body to provide RBC's (haemoglobin) to provide O₂ to tissues – ↓ HR/SV from CHF→ ↓ O₂ delivery + muscle lactate buildup = fatigue + hyperventilation -

patients will likely desaturate quickly & exacerbate condition. ↓ Exercise tolerance due to ↓ Oxidative phosphorylation → ↑ anaero. glycolysis → ↑ metabolic acidosis. ↓ vasodilation of muscle vessels, eventual muscle atrophy & poor redistribution of blood flow during exercise

- Prolong warm up/cool down. Use RPE – start at low score. Low intensity.

- **History Taking prior to testing: Par-Q**

- Age: men >45 & women >45 at higher risk
- Family History: MI, vascular disease, stroke, sudden death before the ages of 55 (men) & 65 (women) who are first degree relatives are at higher risk
- Cigarette smoking: current & past status
- HTN: controlled/uncontrolled
- Medications: e.g. HTN medications
- Hypercholesterolemia: Total cholesterol > 200 mg/dl (5.2 mmol/L) HDL < 35 mg/dl (0.9 mmol/L) LDL >130 mg/dl (3.4 mmol/L) or taking lipid lowering agents
- Impaired Fasting Glucose: >100 mg/dL (5.6 mmol/L)
- Obesity: Body Mass Index $\geq 30 \text{ kg/m}^2$ **or** Waist Circumference > 100 cm (39 inches)
- Sedentary Lifestyle: higher risk group
- High HDL Cholesterol: HDL >60 mg/dL (1.6 mmol/L)
- Symptoms:
 - Pain, discomfort (or other anginal equivalent) in the chest, neck, jaw, arms, or other areas that may be due to ischemia
 - Shortness of Breath at rest or with mild exertion
 - Dizziness or syncope
 - Orthopnea or paroxysmal nocturnal dyspnea
 - Ankle oedema
 - Palpitations or tachycardia
 - Intermittent claudication
 - Known heart murmur
 - Unusual fatigue or shortness of breath with usual activities

- **Physical Examination prior to testing:**

- HR
- BP
- MAP
- Oxygen Saturation
- Haemoglobin
- Troponin Levels
- FVC/FEV1
- ECG
- mVO2 – myocardial oxygen consumption
- MET
- Blood Glucose (for diabetes)
- INR (for thromboembolic disorders)
- Potassium levels (for hypokalaemia) & magnesium levels (for hypomagnesium)
- Pain score (for musculoskeletal or rheumatoid disorders)