Executive Certificate in Cardiopulmonary Exercise Testing for Cardiovascular Health (United Kingdom)

Physiological Basis of Cardiovascular Response to Exercise

Aerobic Capacity refers to the body's ability to use oxygen to generate energy during prolonged periods of moderate-intensity exercise, and it is a key component of cardiovascular fitness. Related terms include anaerobic capacity, muscular endurance, and cardiorespiratory fitness. Aerobic capacity is an important factor in determining an individual's overall fitness level and is often measured using maximal oxygen uptake (VO2 max) tests.

Anaerobic Threshold is the intensity of exercise at which the body's energy production switches from aerobic to anaerobic metabolism, resulting in the accumulation of lactic acid in the muscles. Related terms include lactate threshold, ventilatory threshold, and aerobic capacity. Anaerobic threshold is an important concept in exercise physiology, as it determines the intensity of exercise that can be sustained for a prolonged period without excessive fatigue.

Arterial Pressure refers to the pressure exerted by blood on the walls of arteries, and it is a key factor in determining cardiovascular function. Related terms include blood pressure, systolic pressure, diastolic pressure, and vascular resistance. Arterial pressure is measured using a sphygmomanometer and is expressed in millimeters of mercury (mmHg).

Atrial Fibrillation is a type of irregular heartbeat characterized by rapid and irregular contractions of the atria, which can increase the risk of cardiovascular complications. Related terms include arrhythmia, tachycardia, and electrocardiogram. Atrial fibrillation is often diagnosed using electrocardiography (ECG) and can be treated using medications, cardioversion, or catheter ablation.

Blood Flow refers to the volume of blood that flows through a blood vessel per unit time, and it is a key factor in determining oxygen delivery to the muscles. Related terms include cardiac output, systemic vascular resistance, and perfusion pressure. Blood flow is measured using Doppler ultrasound or plethysmography and is expressed in liters per minute (L/min).

Blood Pressure is the pressure exerted by blood on the walls of blood vessels, and it is a key factor in determining cardiovascular function. Related terms include arterial pressure, systolic pressure, diastolic pressure, and vascular resistance. Blood pressure is measured using a sphygmomanometer and is expressed in millimeters of mercury (mmHg).

Bradycardia is a type of slow heartbeat characterized by a heart rate of less than 60 beats per minute, which can be a sign of cardiovascular disease. Related terms include tachycardia, arrhythmia, and electrocardiogram. Bradycardia is often diagnosed using electrocardiography (ECG) and can be treated using medications or a pacemaker.

Cardiac Cycle refers to the sequence of events that occurs in the heart from the start of one heartbeat to the start of the next, and it is a key factor in determining cardiovascular function. Related terms include systole, diastole, and electrocardiogram. Cardiac cycle is measured using electrocardiography (ECG) and is expressed in seconds (s).

Cardiac Output is the volume of blood pumped by the heart per unit time, and it is a key factor in determining oxygen delivery to the muscles. Related terms include stroke volume, heart rate, and systemic vascular resistance. Cardiac output is measured using echocardiography or thermodilution and is expressed in liters per minute (L/min).

Cardiorespiratory Fitness refers to the ability of the cardiovascular and respiratory systems to supply oxygen to the muscles during exercise, and it is a key component of overall fitness. Related terms include aerobic capacity, anaerobic capacity, and muscular endurance. Cardiorespiratory fitness is measured using maximal oxygen uptake (VO2 max) tests and is expressed in milliliters per kilogram per minute (mL/kg/min).

Cardiovascular Disease refers to any condition that affects the heart or blood vessels, and it is a major cause of morbidity and mortality worldwide. Related terms include coronary artery disease, hypertension, and atherosclerosis. Cardiovascular disease is often diagnosed using electrocardiography (ECG), echocardiography, or angiography, and can be treated using medications, surgery, or lifestyle modifications.

Diastole is the period of the cardiac cycle when the heart muscle relaxes and the heart fills with blood, and it is a key factor in determining cardiovascular function. Related terms include systole, cardiac cycle, and electrocardiogram. Diastole is measured using electrocardiography (ECG) and is expressed in seconds (s).

Echocardiography is a non-invasive imaging technique used to visualize the heart and blood vessels, and it is a key tool in diagnosing cardiovascular disease. Related terms include electrocardiogram, cardiac catheterization, and angiography. Echocardiography is used to measure cardiac output, ejection fraction, and valvular function, and is expressed in millimeters (mm) or liters per minute (L/min).

Electrocardiogram is a non-invasive test used to measure the electrical activity of the heart, and it is a key tool in diagnosing cardiovascular disease. Related terms include echocardiography, cardiac catheterization, and angiography. Electrocardiogram is used to measure heart rate, rhythm, and conduction velocity, and is expressed in milliseconds (ms) or beats per minute (bpm).

Endurance refers to the ability of the muscles to sustain activity over a prolonged period, and it is a key component of overall fitness. Related terms include aerobic capacity, anaerobic capacity, and muscular strength. Endurance is measured using maximal oxygen uptake (VO2 max) tests or time-to-exhaustion tests, and is expressed in minutes (min) or hours (h).

Exercise Intensity refers to the level of physical activity, and it is a key factor in determining the physiological response to exercise. Related terms include exercise duration, exercise frequency, and exercise volume. Exercise intensity is measured using heart rate, blood lactate, or perceived exertion, and is expressed in watts (W) or metabolic equivalents (METs).

Heart Rate is the number of heartbeats per unit time, and it is a key factor in determining cardiovascular

function. Related terms include cardiac output, stroke volume, and systemic vascular resistance. Heart rate is measured using electrocardiography (ECG) or pulse palpation, and is expressed in beats per minute (bpm).

Heart Rate Variability refers to the variation in time between heartbeats, and it is a key factor in determining autonomic function. Related terms include sympathetic nervous system, parasympathetic nervous system, and baroreflex sensitivity. Heart rate variability is measured using electrocardiography (ECG) or Holter monitoring, and is expressed in milliseconds (ms) or beats per minute (bpm).

Hypertension is a type of high blood pressure characterized by a systolic pressure of 140 mmHg or higher, and it is a major risk factor for cardiovascular disease. Related terms include hypotension, blood pressure, and vascular resistance. Hypertension is often diagnosed using sphygmomanometry and can be treated using medications, lifestyle modifications, or surgery.

Lactate Threshold is the intensity of exercise at which the body's energy production switches from aerobic to anaerobic metabolism, resulting in the accumulation of lactic acid in the muscles. Related terms include anaerobic threshold, ventilatory threshold, and aerobic capacity. Lactate threshold is an important concept in exercise physiology, as it determines the intensity of exercise that can be sustained for a prolonged period without excessive fatigue.

Maximal Oxygen Uptake is the maximum amount of oxygen that the body can use during exercise, and it is a key component of aerobic capacity. Related terms include aerobic capacity, anaerobic capacity, and cardiorespiratory fitness. Maximal oxygen uptake is measured using a VO2 max test and is expressed in milliliters per kilogram per minute (mL/kg/min).

Mitral Regurgitation is a type of heart valve disorder characterized by the backflow of blood from the left ventricle to the left atrium, and it is a common cause of cardiovascular disease. Related terms include mitral stenosis, aortic regurgitation, and heart failure. Mitral regurgitation is often diagnosed using echocardiography or cardiac catheterization, and can be treated using medications, surgery, or valve replacement.

Muscular Endurance refers to the ability of the muscles to sustain activity over a prolonged period, and it is a key component of overall fitness. Muscular endurance is measured using time-to-exhaustion tests or repetition maximum tests, and is expressed in minutes (min) or hours (h).

Myocardial Infarction is a type of heart attack characterized by the death of heart muscle tissue due to a lack of blood flow, and it is a major cause of morbidity and mortality worldwide. Myocardial infarction is often diagnosed using electrocardiography (ECG), echocardiography, or biomarkers, and can be treated using medications, surgery, or percutaneous coronary intervention (PCI).

Oxygen Delivery refers to the amount of oxygen that is transported to the muscles during exercise, and it is a key factor in determining cardiovascular function. Oxygen delivery is measured using arterial blood gases or near-infrared spectroscopy, and is expressed in milliliters per minute (mL/min).

Perfusion Pressure refers to the pressure exerted by blood on the walls of blood vessels, and it is a key factor in determining oxygen delivery to the muscles. Related terms include blood flow, cardiac output, and

systemic vascular resistance. Perfusion pressure is measured using Doppler ultrasound or plethysmography, and is expressed in millimeters of mercury (mmHg).

Physical Activity refers to any bodily movement that requires energy expenditure, and it is a key component of overall fitness. Related terms include exercise intensity, exercise duration, and exercise frequency. Physical activity is measured using accelerometry, heart rate monitoring, or self-reported questionnaires, and is expressed in minutes (min) or hours (h).

Pulmonary Embolism is a type of blockage of the pulmonary artery characterized by the presence of a blood clot, and it is a major cause of morbidity and mortality worldwide. Related terms include deep vein thrombosis, pulmonary hypertension, and thrombosis. Pulmonary embolism is often diagnosed using computed tomography (CT) or ventilation-perfusion scanning, and can be treated using anticoagulation, thrombolysis, or surgery.

Respiratory Rate is the number of breaths per unit time, and it is a key factor in determining cardiovascular function. Related terms include heart rate, blood pressure, and oxygen saturation. Respiratory rate is measured using spirometry or pulse oximetry, and is expressed in breaths per minute (bpm).

Stroke Volume is the amount of blood pumped by the heart per beat, and it is a key factor in determining cardiovascular function. Related terms include cardiac output, heart rate, and systemic vascular resistance. Stroke volume is measured using echocardiography or thermodilution, and is expressed in milliliters (mL).

Systole is the period of the cardiac cycle when the heart muscle contracts and pumps blood into the blood vessels, and it is a key factor in determining cardiovascular function. Related terms include diastole, cardiac cycle, and electrocardiogram. Systole is measured using electrocardiography (ECG) and is expressed in seconds (s).

Systemic Vascular Resistance refers to the resistance to blood flow in the blood vessels, and it is a key factor in determining cardiovascular function. Related terms include cardiac output, blood pressure, and perfusion pressure. Systemic vascular resistance is measured using Doppler ultrasound or plethysmography, and is expressed in millimeters of mercury (mmHg).

Tachycardia is a type of fast heartbeat characterized by a heart rate of more than 100 beats per minute, and it is a common cause of cardiovascular disease. Related terms include bradycardia, arrhythmia, and electrocardiogram. Tachycardia is often diagnosed using electrocardiography (ECG) and can be treated using medications, cardioversion, or catheter ablation.

Vascular Resistance refers to the resistance to blood flow in the blood vessels, and it is a key factor in determining cardiovascular function. Vascular resistance is measured using Doppler ultrasound or plethysmography, and is expressed in millimeters of mercury (mmHg).

Vasodilation is the widening of blood vessels, and it is a key factor in determining cardiovascular function. Related terms include vasoconstriction, blood pressure, and perfusion pressure. Vasodilation is measured using Doppler ultrasound or plethysmography, and is expressed in millimeters of mercury (mmHg).

Ventricular Fibrillation is a type of irregular heartbeat characterized by rapid and irregular contractions of the ventricles, and it is a major cause of morbidity and mortality worldwide. Related terms include ventricular tachycardia, arrhythmia, and electrocardiogram. Ventricular fibrillation is often diagnosed using electrocardiography (ECG) and can be treated using defibrillation, cardioversion, or catheter ablation.

VO2 Max is the maximum amount of oxygen that the body can use during exercise, and it is a key component of aerobic capacity. VO2 max is measured using a VO2 max test and is expressed in milliliters per kilogram per minute (mL/kg/min).

Wattage is a unit of measurement of power, and it is a key factor in determining exercise intensity. Wattage is measured using a cycle ergometer or treadmill, and is expressed in watts (W).