

RESPIRATORY

CYANOSIS

Cyanosis is the abnormal blue discolouration of the skin and mucous membranes caused by an increased concentration of deoxygenated haemoglobin in the capillary bed.

Central Cyanosis

In central cyanosis there is systemic hypoxia and therefore cyanosis is visible throughout the body including the tongue, lips and mucous membranes. Central cyanosis usually develops when SpO₂ is less than 85%.



Peripheral Cyanosis

In peripheral cyanosis systemic arterial oxygen saturation is normal but there is slow movement of blood through the capillary bed resulting in increased extraction of oxygen from the blood. Vasoconstriction, venous obstruction and low cardiac output are all causes. Cyanosis will be seen in the affected regions only and will not be seen in the tongue, lips and mucous membranes.



Causes of Cyanosis

Central Cyanosis	Peripheral Cyanosis
Severe respiratory illness	Reduced cardiac output (shock/heart failure)
Congenital cyanotic heart disease	Peripheral arterial disease
Eisenmenger's syndrome	Cold exposure
Airway obstruction	Raynaud's phenomenon
High altitude	Venous obstruction
Methaemoglobinaemia	Acrocyanosis

Acrocyanosis: a cause of peripheral cyanosis affecting the hands, feet and circumoral region due to benign vasomotor changes. It does not affect the mucous membranes and this differentiates it from central cyanosis.

Methaemoglobinaemia



Methaemoglobin is an altered state of haemoglobin in which Fe^{2+} in haem is oxidised to Fe^{3+} . Fe^{3+} is unable to bind to oxygen and the oxygen carrying-capacity of the blood is reduced. It is caused by congenital genetic abnormalities or acquired through oxidative stress from drugs or toxins.

Symptoms become more severe with the degree of methaemoglobinaemia and result from reduced oxygen delivery to the tissues. Headache, fatigue, SOB and lethargy may progress to altered consciousness, end-organ damage and seizure.

Suspect methaemoglobinaemia when central cyanosis is present but normal PaO_2 is seen on arterial blood gas (PaO_2 represents dissolved O_2 in the plasma rather than O_2 bound to haemoglobin). Methaemoglobin is also measured by the blood gas machine and will be elevated. SpO_2 may be low but rarely to the level required to cause central cyanosis.

Treat symptomatic patients with high-flow oxygen and methylene blue 1-2mg/kg IV. Methylene blue encourages reduction of iron in methaemoglobin by providing an artificial electron receptor.

