perbola. This changes the release of oxygen to the tissues appreciably: the oxygen content of the blood is not only lowered during exposure to CO, but the shift of the oxyhemoglobin dissociation curve to the left decreases the amount of remaining oxygen that is made available to the tissues. Both mechanisms serve to effectively lower the tissue partial pressure of oxygen and hence can create a generalized tissue hypoxia. Because the shift occurs over a critical saturation range for release of oxygen to tissues, a reduction in oxyhemoglobin by CO poisoning will have more severe effects on the release of oxygen than the equivalent reduction of hemoglobin due to anemia.

Although the brain has a higher requirement for oxygen than the heart, the coronary circulation, in contrast to the cerebral circulation, must supply an even increased amount of oxygen during periods of generalized tissue hypoxia because under these circumstances, the heart is forced to increase both its rate and its output to meet the normal oxygen demands of the body. This increase in myocardial activity demands an increased oxygen supply to the myocardium, which must be met by the coronary circulation. Under hypoxic conditions, increased oxygen supply to the peripheral tissues can be accommodated by increased blood flow (via vascular dilatation) and increased oxygen extraction by the tissues. The myocardium under these circumstances appears only to increase the flow of blood rather than to extract an additional amount of oxygen from the coronary circulation. The peripheral tissues normally extract only 25% of the oxygen content of the perfusing arterial blood during resting conditions, and the myocardium extracts 75%, thus leaving the mixed venous blood only 25% saturated. This mechanism has the overall effect of maintaining the myocardial oxygen tension at a higher level than would be present in other muscle tissue and thus ensures a continual aerobic metabolism, even under hypoxic duress. In terms of oxygen partial pressure, the mixed venous blood of the peripheral tissues is approximately 40 mm Hg, and the mixed venous blood of the coronary circulation is only 20 mm Hg. In the presence of COHb (and the shift to the left of the oxyhemoglobin dissociation curve), however, the arterio-venous difference can only be maintained by an increased flow in the coronary circulation. In an individual with diminished coronary circulation because of coronary heart disease, however, this situation may result in a decrease in the venous oxygen partial pressure of the myocardium precipitated by an inability to maintain the normal arterio-venous gradient. Studies in dogs suggest that exercise plus an increased COHb, in addition to the global myocardial hypoxia, leads especially to areas of relative hypoxia in the left ventricle secondary to redistributive changes in subendocardial blood flow (Einzig et al. 1980). This hypoxic effect is further enhanced, as mentioned above, by an increase in cardiac rate and output as a general response to peripheral tissue hypoxemia. A person with diminished coronary circulation caused by coronary heart disease may consequently be constantly near the point of myocardial tissue hypoxia, which can ultimately lead to myocardial infarction.