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The Effect of Hyperbaric Oxygen Therapy on Blood Vessel Function in Diabetes Mellitus.

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Prolonged untreated diabetes mellitus leads to microangiopathy, tissue hypoxia and ischemic lesions; it increases the risk for stroke and exacerbates brain tissue damage following ischemia. Patients exhibit advanced atherosclerosis in coronary and cerebral arteries as well as enhanced vascular responsiveness to vasoconstrictors, an attenuated response to vasodilators and impaired autoregulation of cerebral blood flow. Altered endothelial function of arterioles and an impaired vasomotor function of resistance vessels could contribute to altered regulation of regional blood flow and insufficient tissue perfusion in diabetes mellitus. Hyperbaric oxygen therapy is shown to contribute to the healing of ischemic ulcerations in diabetic patients and to improvement of several other pathologic conditions. However, information about the mechanism of how this therapy works is still very limited. We postulate that hyperbaric oxygen therapy has an effect on vascular function by modulating mechanisms of vascular responses to various dilator and constrictor agonists in cerebral resistance vessels, leading to restored vascular reactivity. In accordance to this, the therapy affects production of vasodilators and vasoconstrictors, as well as the vessel-sensitivity to these factors. Furthermore, we hypothesize that hyperbaric oxygen therapy would restore cerebral blood flow regulation that is impaired in diabetics, whereas in contrast to that, chronic intermittent hypoxia would lead to impaired cerebral blood flow. These proposed mechanisms would, if confirmed, represent a valuable advancement in the understanding of this subject.

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