CARDIOVASCULAR RESPONSES TO STATIC AND DYNAMIC EXERCISE

A systematic examination of the blood flow through the forearm during sustained hand-grip contractions showed that even in contractions leading to early fatigue of the muscles, there was an increase in forearm blood flow. These flows could be substantial but were smaller at higher tensions, presumably due to the throttling effect of an increasing intramuscular tension. It was estimated that the intramuscular pressure prevented blood flowing through the muscles when the hand grip tension was of the order of 80% maximal voluntary contraction. The increased flows at lower tensions were demonstrated to occur primarily or entirely through the muscles participating in the contractions, while there was little if any increase in flow through the inactive muscles of the forearm. Large increases in blood pressure during the contractions meant that there must be vaso-constriction in inactive muscles. Blood pressure was increased by dramatic rises in heart rate and cardiac output and subsided to control levels shortly after the end of the sustained contraction.

Further experiments have shown the existence of these responses to sustained contractions even during moderate or heavy treadmill exercise.