

## Exercise and Nutrition

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It is often stated that the sedentary worker, in the above-40 age groups, is a likely victim of heart disease. Why does lack of exercise have this profound effect? How does this physical deficiency reflect itself in an insufficiency of the circulatory system?

We must first understand that the blood does not flow through the circulatory system in equally distributed amounts, but rather that it is contained in well-defined compartments, the purpose of which is to supply varying quantities of blood according to the needs of various parts of the body. Therefore, there is a constant interchange of the total amount of fluids present between these compartments. When one of these “segments” becomes engorged, overloaded or depleted of the normal blood or fluid supply, we may find fluid balance disorders. When this fluid balance disorder is such that the heart is embarrassed and cannot meet the added stress, we have heart disease.

### *Influencing factors*

We may liken the flow of blood to the rush of a mountain stream down into a desert area. The flow is first strong, vigorous and forceful, but as it reaches the sands of the desert it is widely dispersed and becomes dissipated. In a similar manner, the blood flows from the heart, through the arteries and distributes into the capillary network. Then, to continue our analogy, the water in the desert sands collects again in an underground river, which, of course, we liken to the veins, which return the blood to the heart. Naturally, our analogy stops when we consider that all of these forces occur in the body in dynamic equilibrium independent of the simple influence of gravity as we have illustrated — a vast oversimplification.

Briefly then we may divide the circulatory system into three principle compartments: the out-going arteries, the intermediate capillaries and the venous return system. The proper balance of fluids in these areas is indispensable to health. The heart fills during the resting interval (“between beats”) and its return is indispensable to the “work force” which provides the outgoing blood for the arterial system. The capillaries supply varying demands to the tissues according to the activity present and their needs.

### *Some known effects*

The veins contain small valves that operate just like an old-fashioned water pump, preventing the blood from slipping back once it has obtained a certain level. It is

muscular activity that assists in promoting the venous return, referred to as “the pumping action of the muscles.” Exercise of the legs is an important factor in assisting this venous return. The movement of the lungs in breathing is also another important factor in assisting the venous flow. Nutritionally, the integrity of the muscles comes largely under the influence of protein metabolism — a good reason for the use of raw foods in the diet since cooking tends to depreciate the amino acid pattern.

In the capillary network we find another interesting phenomenon. We now know that lactic acid opens the capillaries and that oxygen constricts them. Analysis shows the logic behind this arrangement of nature. When we exercise a given part, we know that lactic acid is produced as a result of the effort. This opens the capillaries in that given area allowing the red blood cells to enter. The red blood cells carrying oxygen then enter and release the oxygen to the tissues and the capillaries then close. By this means, the increased or decreased demands of specific tissues are supplied. Exercise then, as we have outlined, acts to open the capillary network and allows the oxygen to enter and supply the localized demands.

### ***B and E vitamins***

But we must not forget that we cannot make something out of nothing and that if the nutritional factors in the blood stream are not present, the tissue is still unsatisfied and again an insufficiency may occur. It is known that vitamin B complex assists in the oxidation of lactic acid, a definite factor in capillary integrity. Also, that vitamin E, as found in wheat germ oil, acts as an antioxidant, or oxygen conserving factor.

The classical symptoms of beriberi, a vitamin B-1 deficiency disease, are tachycardia (fast pulse) and edema (called “wet beriberi”). We can now see how these come about since we have capillary engorgement and the “reservoir” is full; but the “water supply” to the heart-pump is diminished. Does this same logic also make sense when applied to the reputed effects of vitamin E in heart disease?

### ***Prominent sign***

There is a difference between capillary fragility and capillary engorgements. Capillary fragility is attended with tissue breakdown, whereas capillary engorgement has to do with the distribution of fluids. Fragility is best recognized by the well-known “pink toothbrush” in gums, requiring the natural vitamin C complex factors; whereas engorgement is best recognized by bruising easily, “black and blue spots,” requiring the oxygen conserving factors of the vitamin E complex (vitamin E2).

We may never know what we prevent by following nature’s laws, but when we break with the natural law, the evidence is obvious — circulatory disturbances are one of the consequences.