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Short Communication

Relationship Between Heart, Blood and Gravitational Force

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Abstract

While treating heart ailments no body considers gravitational force acting on it. In Ancient Indian science Yoga probably people knew about it and therefore they suggested Shishasan to keep heart healthy. The effect of gravity on the body is constantly pulling the body down, toward the center of the earth. Over time, this causes wear and degeneration on the bones and body systems resulting changes in the posture during the old age. One of the reasons for age-related bone and joint degeneration is because of gravity and posture.

Key words: relationship; heart; blood; gravitational force; death; blood pressure; disease

Summary

While treating heart ailments no body considers gravitational force acting on it. In Ancient Indian Science Yoga probably people knew about it and therefore they suggested Shishasan to keep heart healthy [1]. The effect of gravity on the body is constantly pulling the body down, toward the center of the earth. Over time, this causes wear and degeneration on the bones and body systems resulting changes in the posture during the old age. One of the reasons for age-related bone and joint degeneration is because of gravity and posture.

The development of the heart begins as early as the third week and the 4-chambered fetal heart is formed by 7th week of gestation. From this time onwards till death it constantly beats about 100,000 times per day [2]. The heart is a key part of the cardiovascular system, which also includes all your blood vessels that carry blood from the heart to the body and then back to the heart. It pumps oxygen and nutrient-rich blood throughout the body for and against the gravity by expands and contracts of heart muscles 100,000 times per day, pumping five or six quarts of blood each minute, or about 2,000 gallons per day Many parts of the heart and the cardiovascular system are influenced by gravity in addition to gravity, the flow the factors that affect blood flow through the cardiovascular system blood pressure, blood volume, resistance, disease and exercise.

The blood has to continuously complete two different flow circuits in each heartbeat irrespective of body position like sitting, sleeping, walking, standing or exercising. The two different flow circuits are:

1. above the heart level (against gravity)
2. below the heart level for gravity)

and during different postures such as, sleeping position, sitting, standing or walking, the body will be in upright position, and it automatically counteracts the pull of gravity. So, the flow circuit above the heart level consumes more energy to transport the blood to upper part of the body as it has to work against the pull of gravity. The heart must work against gravity to pump the blood up to the brain, which is the body's largest consumer of oxygen. Although it is only 3% of the body by total weight, the brain consumes nearly 25% of the body's total oxygen intake.

The flow circuit below the heart level has difficulty in allowing the blood to return from lower limb (especially the veins) to heart as there is a continuous downward pull on the blood stream due to gravity. Further, by the time, the blood reaches the veins in legs; the force of the heartbeat becomes weak and may not be sufficient enough to pump back the blood back to the heart. So, the veins in legs have most of the uphill part of the flow circuit, moving against the pull of gravity. But still the blood has to reach heart for next cardiac cycle overcoming gravity [3].

Therefore, the heart needs extra pumping help from the muscles in the feet and calves, which surround the deep veins. The rhythmical contraction and relaxation of these muscles, squeezes and releases the veins, which helps to move blood upwards in the leg [4]. Also, this process is backed by one-way valves within the veins (Figure 1).

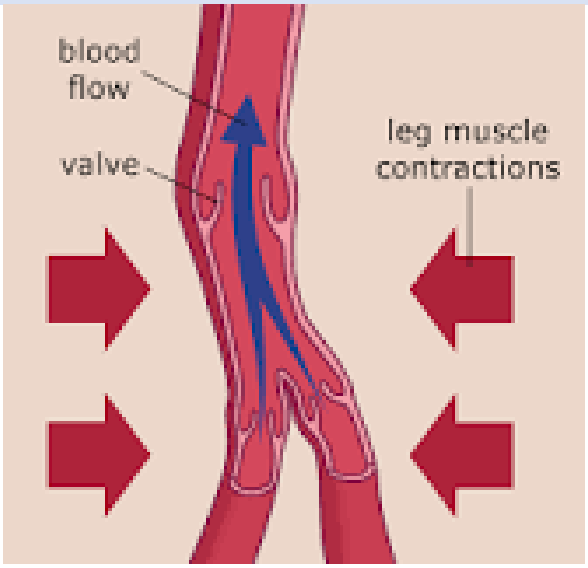

Figure 1: one-way valves within the veins

Without gravity, however, the heart and blood vessels change – and the longer the flight, the more severe the changes. Increases in G force produced increases in spectral power of systolic blood pressure and diastolic blood pressure at the respiratory frequency (0.2 Hz) and less conspicuous but significant increases in spectral power at lower frequencies [5].

Gravitational force influences musculoskeletal systems, fluid distribution, and hydrodynamics of the circulation. Gravity also affects the flow of blood through the brain; at accelerations beyond 5g, this begins to affect the brain's electrical activity, producing patterns that resemble epileptic seizures. Every time we stand up, gravity pulls blood into parts of the body that are below the heart.

Because of the valves, the blood can only move in one direction as it gets squeezed along. So it is a combination of blood pressure from the heart's pumping action, the valves, and muscle movement that gets the blood up the legs against gravity.

When the person suddenly stands upright, gravity acts on the vascular volume, causing blood to accumulate in the lower extremities

After several days in space, the heart gets used to doing less work and it starts to shrink because it doesn't have to pump blood up against the force of gravity. While on Earth having a weak heart can be bad, a weaker heart in space works just as well as a stronger heart on Earth.

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