

Physiology

[Science](#), [Biology](#)



Insert Cardiac cycle The pressure in the heart determines the breathing capacity of an individual. However, proper breathing needs some science in order to have an efficient breathing system in the heart. For instance, there needs to be contraction and relaxation of the muscles in the heart in order to ease the pressure in the heart (Philbrick). Therefore, in this case, the study is going to analyze the functionality of the cardiac cycle to enable proper breathing.

Functionality of a cardiac cycle

Cardiac activity has two major divisions that are the diastole and the systole. Diastole stands for the situation when ventricles are relaxing. During the period referred to as the relaxation time, blood flows into the atrioventricular valves that in design make a separation between the left and right atrium. In this case, the blood flows via the atrioventricular valves that separate the ventricles from atria. Blood is received from the right auricle that comes from the rest of the body parts and is transmitted via the inferior and superior vena cava (Philbrick). Therefore, in the cardiac cycle, the blood will be flowing through the heart during the complete heartbeat process. In this case, the systole stands for contraction and the diastole stands for the relaxation. Considering cases where pressure on the valves varies from that set on the other side of the valve results into an opening of the valve.

Source: Book by Philbrick

The illustration on the diagram represents a cardiac cycle within the cardiac left ventricle. However, in the atrial pressure plot: wave "a" corresponding to atrial contraction. Wave "c" represents an increase in pressure emanating from the closed mitral valve. That is the wave going into the atrium in ventricular systole, as well as "v" standing for ventricular filling. In the

electrocardiogram: wave " P" resembles the inception of atrial depolarization, waves " QRS" match to the onset of ventricular depolarization, as well as " T" tallies to ventricular repolarization. Therefore, the pressure in the cardiac system forces for relaxation and contraction of the muscles in the heart therefore causing the flow of blood to various parts of the heart and the entire body.

Regulation of the stroke volume

One of the reliable mechanisms of stroke volume control is the preload mechanism. Preload mechanism is the point of stretching in cardiac muscle cells before contraction. That has a clear explanation of Franks' Starling law of the heart (Philbrick). Another most important factor in cardiac stretching is venous return. It considers the amount of blood coming from the rest of the body parts. In this case, slow exercise as well as heartbeat will eventually increase venous return.

Regulation of the heart rate

Chronotropic factors are the ones that influence the control of the heart rate. However, the chronotropic regulate the heart rate depending whether it is positive or negative. For instance, Chronotropic in the negative cycle factors will decrease the pulse. On the other hand, the increase in the heart rate will be as a result of positive chronotropic factors. Therefore, chronotropic factors have a greater role to play in the increasing the rate of the heart at any particular moment.

Qn2 The concept of up-regulation

Yes; the notion of up-regulation engages receptors in that, when a cell receives a weaker signal, that is a without much pressure. It will have to up-

regulate through pumping out more receptors like boosting the sensitivity to the more ineffective message. Therefore, increase in the quantity of receptors to the particular message posted on the cell membrane will raise the sensitivity of the cell to the message. In addition, it is flexible and changeable environment in that; the cell always monitoring anything coming to its receptors, the adjusting to their quantities accordingly.

Works Cited

Philbrick, Nathaniel. In *The Heart of the Sea*. New York: Viking, 2000. Print.