The cardiac cycle

At rest, the healthy adult heart is likely to beat at a rate of 60–80 bpm. During each heartbeat, or *cardiac cycle* the heart contracts and then relaxes. The period of contraction is called *systole* and that of relaxation, *diastole*.

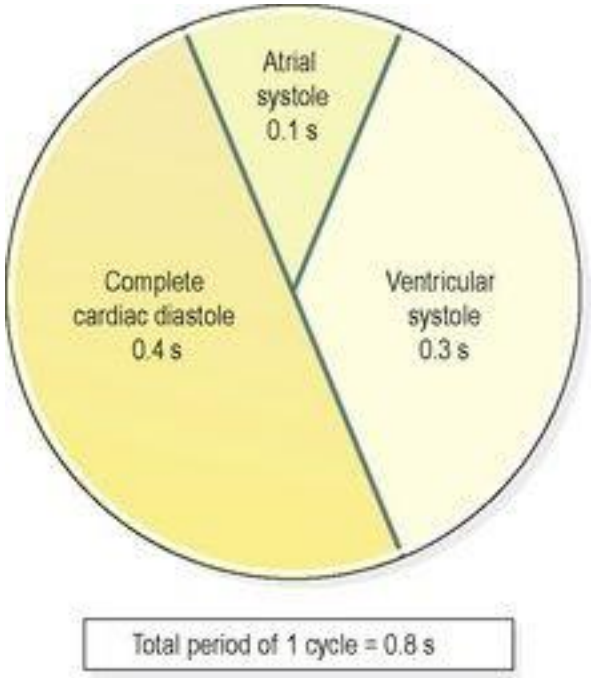

Fig:The stages of the cardiac cycle.

Taking 74 bpm as an example, each cycle lasts about 0.8 of a second and consists of:
atrial systole – contraction of the atria
ventricular systole – contraction of the ventricles
complete cardiac diastole – relaxation of the atria and ventricles

Atrial systole (0.1 s)-The superior vena cava and the inferior vena cava transport deoxygenated blood into the right atrium *at the same time* as the four pulmonary veins bring oxygenated blood into the left atrium. The atrioventricular valves are open and blood flows passively through to the ventricles. The SA node triggers a wave of contraction that spreads over the myocardium of both atria, emptying the atria and completing ventricular filling.

ventricular systole (0.3 s)- When the electrical impulse reaches the AV node it is slowed down, delaying atrioventricular transmission. This delay means that the mechanical result of atrial stimulation, atrial contraction, lags behind the electrical activity by a fraction of a second. This allows the atria to finish emptying into the ventricles before the ventricles begin to contract.

After this brief delay, the AV node triggers its own electrical impulse, which quickly spreads to the ventricular muscle via the AV bundle, the bundle branches and Purkinje fibres. This results in a wave of contraction which sweeps upwards from the apex of the heart and across the walls of both ventricles pumping the blood into the pulmonary artery and the aorta.

Complete cardiac diastole- After contraction of the ventricles there is *complete cardiac diastole*, a period of *0.4 seconds*, when atria and ventricles are relaxed. During this time the myocardium recovers in preparation for the next heartbeat, and the atria refill in preparation for the next cycle.