

# Exercise and the Heart: A Review

By

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Health is of paramount importance and physical exertion a valuable way of preserving it. Mankind has always cherished good health. One of my patients who had stroke put it aptly- "Ask the value of health from him who does not have it." George Cheyne, three centuries ago stated in his essay on health and long life that "nothing conditions more to health and long life than abstinence and plain food with due labour, " without due labour and exercise the juices will thicken, the joints will stiffen, the nerves will relax and on these disorders a crazy old age must ensue.(1) Another two centuries later, W. Stokes remarked, "The therapy by muscular exercise is obviously more proper in younger persons. The patient with incipient fatty degeneration of the heart must pursue a system of graduated muscular exercise, thus symptoms of debility of the heart are often removed by regulated course of gymnastics or by pedestrian exercises".(2)

At present the role of physical exercise becomes a pertinent question regards its relationship vis a vis coronary heart disease (CHD).

Previously it was thought that coronary atherosclerosis was an inevitable consequence of "physiological" aging. But not any more. Certainly there is enough evidence to prove that coronary is not a natural accompaniment of age.

Paul D. White stated that "your heart will not wear out if you do not let it rust". Indeed

hard work not only does not cause heart disease in healthy subjects but probably protects the myocardium from such diseases through various mechanisms.

When one compares the incidence of heart disease in the urban and rural population of Pakistan one is convinced beyond a shadow of doubt that habitual physical exertion is a factor which definitely helps to keep the heart in good condition and that physical fitness is very valuable in preventing the development of early coronary heart disease.

Lack of physical activity constitutes one of the basic biological changes of modern life and parallels other changes mainly in food habits. With the advent of modern mechanisation leisure-time has been dangerously extended. Lack of activity which typified the post war prosperity has certainly increased the morbidity and mortality from heart disease. What has been achieved from a drastic reduction in physical exertion in work, transportation and leisure is what Raab has defined as the "Loader's heart"(3). The change in living habits is affecting men more than women.

In the past man was used to being physically active in order to move, to work, to find his food and to avoid or fight his enemies. But today his desk at office and T.V. at home and the use of a variety of electric gadgets have made him loose his fitness for "fight or flight". Indeed lack of

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\* Presently in Japan (Previously in Islamabad).

physical activity and too much leisure has not only reduced the quality of life but also has decreased life expectancy—indeed one has too much time but cannot live long enough to enjoy it. In United States where there has been tremendous advance in medical research and practice. A lot of money is spent on public health, life expectancy for the male population ranks 37th. among counterparts in other civilised nations of the world.

In the past the study of C.D. was based on clinical observation, animal experimentation, morbid anatomy and electro-cardiography. The beneficial effect of physical activity has been spotted by experimental findings and by observation of cardiologists. It was shown that activity favours the development of collaterals. in the coronary system of various animals(4). Although similar studies are lacking in man during life, the development of collateral anastomosis has been demonstrated by demonstrated by coronary angiography in subjects suffering from CD(5).

In the last two decades research in this area has involved biochemistry and epidemiology, and relationship between various environmental factors and CD has been sought(6-9). These epidemiological studies have confirmed the importance of physical activity.

Important differences in the frequency of CD among population and among different classes within these populations have been ascertained(10). Men of middle age in physically active occupations present fewer diseases and fatalities from CD than those whose occupations are sedentary(11-20). Master(21) was among the first to observe that "Coronary thrombosis

was found less in labourers than in sedentary workers".

How is that physical exertion helps the heart and the cardiovascular function. Perhaps by improving the economy of circulatory regulation, helping to mobilise potassium for cardiac muscle and thus preventing myocardial disturbances and finally altering the behaviour of the myocardium regarding oxygen and coronary flow requirements(22,23). After exercise sympathetic overactivity decreases and parasympathetic tone increases.

A physically active man can save his heart thousands of beats a day, reduce cardiac load and lower his blood pressure due to reduction of total peripheral resistance. A physically conditioned athlete always shows a low resting pulse, this in turn saves the heart from a lot of wear and tear by reducing the total amount of work it has to do.

Longitudinal studies on the complete circulatory effects of training are scanty and the data conflicting(22-26). Katz(27) summarises the effect of training on the heart as follows: "The heart increases in size and there is evidence that it hypertrophies, thus helping to supply the energy needed by the greater effort, stroke output increases at expense of systolic residue. The heart spends more of its time in diastole due to a slower rate and the shortening of the ejection period, the velocity of contraction increases. All these factors ensure that the oxygen cost to the heart for any given level of work is reduced". In a recent report by Seigel and co-workers(28) on the effect of quantitated physical training programme on middle-aged sedentary men, it was found that after the training period heart



rate decreased, maximal oxygen uptake increased, total heart volume decreased and physical outlook improved.

Great philosophical ideas have struck men while walking. The open air the morning softness, eases nervous tensions. Certainly exercise improves mental attitude and promotes a sense of well being. The caption jog your way to health should indeed be remembered by young and old. Drugs in depression are crutches and sometimes very shaky ones. Not only does exercise lower cholesterol it reduces the magnitude of depression too.

It must be remembered physical activity and hard work are not synonymous with "stress". Exertion is recognised as being good for most people and it must be a part of a life long formula for the best heart health.

Some studies(4,29-31) indicate that physical activity lowers the blood lipids and cholesterol levels(32-34). A protective role against higher levels of cholesterol is also possible. It perhaps happens because of a reduction in weight(35-39). It has been shown experimentally that exertion has a profound lowering effect on post-prandial lipemia and hypertriglyceridemia(40-42). Physical fitness also lessens the incidence of thrombosis and atheromatous ulcerations and facilitates fibrinolytic activity(43).

Coronary artery disease is a multidimensional disorder and a multifactorial disease(44-46). A number of epidemiological studies have been carried out to assess the relation of activity to C.D. Now sufficient documentation exists regarding its value. Stocks(47) provided the first insight into the problem of physical activity in relation to physical activity. He noticed that the

disease was less common among agricultural and general laborers than in the population as a whole. As a result of cross-sectional surveys and follow-up important differences were found in the prevalence and incidence of the disease between populations with different activity classes and the importance of physical activity as a cardiovascular risk factor was ascertained(12-16, 48-50).

Fox and Haskell(29) stated after studying existing literature that "physically active groups present fewer manifestations of coronary disease than those who are not". Epstein(51) felt the same when he said "physical inactivity and coronary diseases are inversely related." Data from the Framingham study(52) support the view that most sedentary people present the worst outlook; not only was there an association between sedentary living and increased mortality from coronary artery disease but also the risk of death was three times more common in the "less active" group than in the "most active." A large number of authors conclude that "physical activity of work is a protection against coronary artery disease; men in physically active jobs have less coronary heart disease during middle age and they develop it later than in men in physically inactive jobs.

The beneficial cardiac effects of habitual physical activity has given rise during recent years to organised programmes of physical rehabilitation for cardiac patients in various countries(53). While results remain conjectural, favourable conclusions have been reported regarding improvement of angina pectoris and decrease of mortality among patients with CD. Whether or not such reconditioning programmes by systematically graded exertion will lessen further development of atherosclerotic lesions remain at

present unsettled, but favourable conclusions have been reported regarding improvement of angina pectoris and decrease of mortality among patients with CD(54-58).

### SUMMARY:

From the available epidemiological, clinical and experimental data it appears that one must accept that habitual physical activity plays a protective role in human atherosclerosis, mainly coronary heart disease.

Habitual physical activity may be a decelerating factor in atherosclerosis and atherogenesis and would help these people to remain relatively immune to this epidemic disease of our modern civilisation.

Physical activity should be advised to all as man is athero-sclerotic by nature, and available data is certainly convincing regards its protective nature. Certainly it would be expected to play a protective role against the development of coronary atherosclerosis. Physical activity also forms an important aspect for better rehabilitation of patients suffering from CD. If we change our way of modern life and among other factors maintain physical fitness by more muscular labour or exercise, we may be able to save our coronary arteries and thus our heart.

In the end let us remember an age old advice, you must use more exercise, eat less or be sick.

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