Dynamic Chiropractic

Exercise and the Healthy Heart

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There is overwhelming evidence to show that regular exercise helps to protect against coronary heart disease, as well as improve the quality of life in patients with certain pre-existing heart problems.[1-6] Gibbons, et al.,[7] reviewed the computer logs of amount and intensity of exercise performed by 2,935 adults (mean age: 37 years) during a 65-month period to estimate acute cardiac risk of strenuous exercise. The computer logs represented 374,798 person-hours of exercise, which included 2,726,272 km of running and walking.

While the study was in progress, there were two cardiovascular complications. Both subjects survived and resumed regular exercise. Based on age-specific categories, the maximum risk estimates (MRE) consistent with the upper 95-percent confidence limits for the data range from 0.3 to 2.7 cardiac events per 10,000 person-hours of exercise for men and 0.6 to 6.0 events per 10,000 person-hours for women. The higher MRE for women is attributable to the relatively low number of women in the study. It is calculated that if exercise were performed three times a week for 30 minutes per session for 52 weeks, the MRE would be .002 to .027 events per person-year for men and .005 to .05 events for women.

The combination of exercise and pre-existent coronary disease, rather than exercise alone, appears to pose the major risk factor. Factors that may increase the risk of cardiac episodes occurring as a result of exercise are smoking, the element of competition, and lack of regular exercise.

Gibbons[7] confirms earlier evidence that the risk of a cardiac attack during exercise is greater than that of sitting in a chair reading a book. However, this is not an argument against exercising, because risks for the active person seem lower between exercise bouts.

Helping the Heart: What Works?

Coordination, or the standard of functioning of the central nervous system and the skeletal muscles during a given movement, can be improved by training. This will improve the performance of patients with peripheral arterial diseases or coronary insufficiency by lowering the oxygen requirement of the muscles for a given submaximal performance.[8]

Flexibility, or the maximum amount of movement voluntarily attainable in joints, can be increased through appropriate exercise. In this way, patients with degenerative joint changes can regain greater flexibility and the elderly can maintain sufficient flexibility to cope with everyday life.

Strength is the muscle tension that can be voluntarily developed against a fixed resistance in a given position. Static and dynamic strength can be increased by training. This may prevent postural anomalies from developing, reduce the effects of existing degenerative joint changes, and enable even the elderly to maintain muscle efficiency. Strength training does not stimulate the cardiopulmonary system.

Speed refers to the degree of quickness in any cyclic movement. Speed training has no significant

effect on the cardiopulmonary system. In the elderly or in persons with organic lesions, speed training may be hazardous.

Endurance is the ability to maintain a given level of work for a long time. Of its eight different forms, general aerobic endurance is of particular importance to health. This can be increased by carrying out dynamic work by large groups of muscles for at least 10, and preferably 30-45, uninterrupted minutes. In healthy men and women under 50, work intensity should be high enough to produce a pulse rate of 130-150 beats per minute: in those over 50, a pulse rate during training of 180 minus the age in years should be reached. Exercise at these levels should be carried out daily, or at least 3-4 times per week.

Exercise-induced improvement of general aerobic endurance comes about via an increase in cardiopulmonary and metabolic efficiency and economization of all circulatory and respiratory processes. Resting cardiac frequency is reduced. Exercised muscles show better capillarization and improved oxygen diffusion. Peripheral metabolic adaptations include increased myoglobin level, increased activity of aerobic enzymes, increased intramuscular glycogen levels, and nearly unchanged cardiac output. In this way, it may be possible to obtain relative protection against the effects of existing degenerative cardiovascular changes.

Most authorities believe that the maximum cardiac output increases roughly in proportion with the gain of maximum oxygen intake during training. It is in submaximal work that the cardiac output shows little change.

Heart-Healthy Training

Exercise training, or conditioning, is a dynamic process involving primarily groups of muscles, which provokes a change in muscle length and moderate increases in tension. The cardiovascular response results in an increase in the potential for oxygen used over an extended period, in contrast to isometric exercise. Much evidence has been gathered in support of dynamic exercise conditioning as a moderator of risk factors for coronary artery disease.[9] Most evidence favors the view that regular vigorous exercise reduces morbidity and mortality from coronary artery disease in middle-aged men. Although some studies appear not to show any favorable effects of this sort, no studies in human subjects have shown that exercise aggravates coronary disease or hastens the development of clinical symptoms and findings.[10-11]

The best-documented cardiac effect of exercise training is a negative chronotropism at rest or at any submaximal workload. Functional bradycardia is associated with an increase in stroke volume, especially at heightened workloads. Myocardial perfusion is also improved. Exercise conditioning appears to reduce basal serum triglyceride levels temporarily. The mechanism of this effect is unclear. Very-low-density lipoprotein cholesterol values are reduced, and high-density lipoproteins cholesterol values are increased. Hormonal responses may mediate many of the metabolic effects of exercise. Plasma growth hormone concentrations are increased with heavy exercise. Cortisol levels are also increased, and catecholamines are secreted. Plasma insulin concentrations are reduced despite transient hyperglycemia. Exercise augments fibrinolytic activity.

It is increasingly difficult to postpone acceptance of the hypothesis that mild to moderate regular exercise can appreciably reduce morbidity and mortality from coronary artery disease.

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