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Effects of Exercise and Diet on Chronic Disease
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Your Life Your Health
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In the November, 2005 issue of *Journal of Applied Physiclogy* a review article was published entitled, "Effects of exercise and diet on chronic disease." In case you run out of time or interest here are the *Cliffs Notes*. For those of you who are too young to remember, these were the brief summaries of classic works which students used to avoid reading.

Summary:

- Modern chronic diseases, including cardiovascular diseases, Type 2 diabetes, metabolic syndrome, and cancer, are the leading killers in Westernized society and are increasing rampantly in developing nations.
- Obesity, diabetes, and hypertension are now even commonplace in children.
- Overwhelming evidence from a variety of sources, including epidemiological, prospective cohort, and intervention studies, links most chronic diseases seen in the world today to physical inactivity and inappropriate diet consumption.
- Modifying the lifestyle of children is paramount to reducing chronic disease risk.
- The evidence is overwhelming that physical activity and diet can reduce the risk of developing numerous chronic diseases, including CAD, hypertension, diabetes, metabolic syndrome, and several forms of cancer, and in many cases in fact reverse existing disease.

There you have it; you don't have to be the victim of bad habits. You not only can prevent developing most chronic diseases, if you have already developed one or more, you can definitely improve your health and you can often reverse the process to where you no longer have the illness.

CHRONIC DISEASES ARE EPIDEMIC IN MODERN WESTERN SOCIETY

Chronic diseases develop over one's lifetime, with clinical effects occurring many years after the underlying process of the disease has occurred. As we move ahead in the 21st century, cardiovascular diseases, that is coronary artery disease (CAD), hypertension, stroke, and heart failure, Type 2 diabetes (diabetes), metabolic syndrome, and cancer are the leading killers in Westernized society and are increasing dramatically in developing nations

Recent data from the Centers for Disease Control document that cardiovascular diseases, various forms of cancer, and diabetes combine to make up 70% of all deaths in the United States. Additionally, overweight and obesity [as defined by a body mass index (BMI) of >25] has been estimated to be present in 60% of the adult US population, and obesity, diabetes, and metabolic syndrome are now common in children.

Recent data estimate that physical inactivity and poor diet caused 400,000 deaths in 2000, ranking second only to tobacco, and that it is likely that inactivity and diet will soon rank as the leading cause of death in the United States. Although these health problems (CAD, diabetes, etc.) have been virtually nonexistent in underdeveloped countries, they are on the rise as these people change their diets and become more sedentary. Physical activity and diet are effective interventions, for what has been called "the war on chronic disease." Clearly, there is overwhelming evidence linking most chronic diseases seen in the world today to physical inactivity and inappropriate diet consumption.

GENE-ENVIRONMENT INTERACTION

Humans living today inherited a genome that was programmed for daily physical activity and a high-fiber diet. The onset and progression of chronic diseases are mediated in the vast majority of cases by an interaction between genetic factors and their interaction with environmental factors. These environmental factors are largely lifestyle factors, namely physical activity and dietary patterns, but also include other factors, such as smoking, alcohol consumption, stress, and hazardous environmental compounds. These factors are modifiable, and, as such, disease manifestations from these factors are largely preventable. In fact, it has been estimated that 50% of all deaths in the United States are due to preventable causes.

Most have the perception that genes cause chronic disease. A more appropriate interpretation is that genetic factors predispose the individual, but the environmental factors determine whether the disease occurs. 100% of the increase in the prevalence of Type 2 diabetes and obesity in the United States during the latter half of the 20th century must be attributed to a changing environment interacting with genes, because 0% of the human genome has changed during this time period.

LIFESTYLE MODIFICATION CAN MITIGATE DISEASE PROGRESSION AND REVERSE EXISTING DISEASE

The question of what are the causes of chronic diseases such as CAD is not novel, and research has investigated these issues for over 100 years. Consequently the search for therapies that can prevent and reverse existing disease has been investigated over this same time period. Early studies focused on cholesterol and saturated fat and their relation to CAD, whereas more recent studies have progressed to investigate diabetes, hypertension, cancer, and metabolic syndrome.

Diet has been known for years to play a key role as a risk factor for chronic diseases. — Traditional, largely plant-based diets have been replaced by high-fat, energy-dense diets

with a substantial content of animal foods. But diet, although critical to prevention, is just one risk factor. Physical inactivity, now recognized as an increasingly important determinant of health, is the result of a progressive shift of lifestyle toward more sedentary pattern, in developing countries as much as in industrialized ones.

There is overwhelming evidence that diet, smoking, alcohol, and physical inactivity are important determinants of CAD and other chronic disorders and that modifying these environmental influences can significantly impact the incidence of chronic disease. Evidence over the past 20 years from a variety of sources, including epidemiological, prospective cohort, and intervention studies, has documented that physical activity, diet, and combined activity and diet interventions can slow or stop progression of chronic disease and in fact reverse existing disease.

Studies highlight the value of diets consisting primarily of whole grains (rich in fiber, antioxidants, minerals, and phytochemicals), fruits, vegetables, and omega-3-containing fish, with limited intake of saturated fats, trans-fatty acids, cholesterol, and refined carbohydrates, which falls in line with the American Heart Association's newer dietary guidelines

With respect to physical activity, recent studies have highlighted the importance of regular physical activity in decreasing the risk of chronic disease. Humans were designed to be active, and, in 2002, the Institute of Medicine recommended one hour of moderate physical activity daily, a recommendation in agreement with the WHO report, which is to include both aerobic (walking, swimming, running, cycling, etc.) and resistance exercise (weight training.).

Given the ineffectiveness of popular weight-loss diets, adoption of a healthy lifestyle is more appropriate for winning the war against chronic disease. The scientific evidence supporting the value of daily exercise and a diet focusing on the consumption of whole grains, fruits, and vegetables for the prevention and treatment of the major diseases seen in the industrialized countries today is overwhelming.

When daily physical activity of one hour is performed in combination with a natural food diet, high in fiber-containing fruits, vegetables, and whole grains, and naturally low in fat, containing abundant amounts of vitamins, minerals, and phytochemicals, the vast majority of chronic disease may be prevented.

Next week, we will continue discussing the evidence for the prevention or improving of chronic conditions with physical exercise and diet. Remember, it is your life and it is your health.