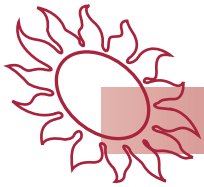

CHAPTER 47

Physical Activity Counselling

By Marie-Dominique Beaulieu

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Physical Activity Counselling

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There is fair evidence to support the effectiveness of regular physical activity for the primary prevention of cardiovascular heart disease and hypertension. Physical activity can also contribute to the prevention of obesity, non-insulin dependent diabetes and osteoporosis. There is insufficient direct evidence to indicate whether physician counselling of patients to incorporate regular physical activity into their daily routines will have a positive effect on their behavior. However, qualifying considerations suggest that such counselling may be clinically prudent, especially for patients who are sedentary.

Burden of Suffering

Research on the relationships between physical activity and health are complex due to the variety of maneuvers and target outcomes considered. It is important to distinguish between physical activity and physical fitness. Physical activity or exercise are behaviors and physical fitness is a set of attributes that represents the capacity to perform the physical activities. Hence, physical activity, and its opposite, sedentariness, are usually defined in terms of the amount of time during the day devoted to certain types of physical activity or exercise, either during work and/or leisure time. This review focuses on the effects of physical activity levels on the primary prevention of various health conditions, rather than on cardiorespiratory fitness or specific training activities as primary or secondary prevention measures.

Physical inactivity increases the risk of CHD nearly two-fold which is comparable to other major CHD risk factors

The total burden of suffering attributable to a sedentary lifestyle in Canada and the United States is difficult to ascertain. However, sedentary lifestyle appears to be an independent risk factor for all-cause mortality<1-3> and of developing certain chronic diseases, particularly, coronary heart diseases (CHD)<4>, hypertension<5,6> and obesity.<7,8> Sedentariness has also been associated with the risk of developing non-insulin dependent diabetes mellitus (NIDDM)<9-11> and osteoporosis. Physical inactivity increases the risk of CHD nearly twofold and is comparable to other major CHD

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risk factors.<4,12> In terms of attributable CHD risk, a sedentary lifestyle may carry a burden similar to that of smoking.<2,4>

In 1985, a review of eight national studies conducted in Canada and the United States showed that about 20% of the adult Canadian population exercised at a level recommended for cardiopulmonary fitness, 40% exercised at a level below that recommended for cardiopulmonary fitness but sufficient for other health benefits, and 40% were sedentary. The Canada Health Promotion Survey conducted in 1990 showed a slight decrease in the proportion of Canadians who qualified as regular exercisers, from 54% to 48%.

The relationship between the level of physical activity and socioeconomic variables is unclear. Although individuals from higher socioeconomic classes report performing vigorous physical activity during leisure time more frequently than those from lower classes, the level of daily physical activity is higher in lower socio-economic classes for both males and females. However, for most working people, physical activity on the job does not make up for sedentary leisure time. Women are as active as, or more active than, men between the ages of 25 and 64. However Canadians most likely to engage in daily exercise during their leisure time are men aged 65 and older.

Maneuver

Current knowledge suggests that the preferred prevention maneuver of moderate-level physical activity be performed consistently to accumulate 30 minutes or more over the course of most days of the week

The form of physical activity that is best suited to a given individual depends on that individual's needs, limitations, and goals. Current scientific knowledge suggests that the preferred general primary prevention maneuver is moderate-level physical activity performed consistently to accumulate 30 minutes or more over the course of most days of the week.<13> The following are considered moderate intensity physical activities (above 4.5 Mets): normal walking, golfing on foot, slow biking, raking leaves, cleaning windows, slow dancing, light restaurant work. Activities such as slow jogging, brisk walking, shovelling snow, heavy house repairing and gardening, racquet sports, to name a few, are considered vigorous activities. To improve cardiovascular fitness, exercise cannot be performed occasionally or seasonally, nor can one expect protection from CAD simply by having exercised regularly in the past.

Moderate physical activities have higher compliance rates than vigorous exercise activities, mesh better with daily lifestyles, and are well maintained over time.<3>

Potential Adverse Effects of Physical Activity

The benefits of exercise must be weighed against potential adverse effects, which include injury, osteoarthritis, myocardial infarction, and rarely, sudden death.

Data on the incidence of injury during non-competitive physical activity are scarce. One study randomly assigned 70-79 year-old men and women to strength training, walk/jog, or control groups. Injury rates were 8.7% for the strength training group during the full 26 weeks of the study, 4.8% for the walk group during weeks 1-13, and 57% for those who jogged during weeks 14-26 and had walked during their first 14 weeks. The risk of injury does not seem to be associated with age or sex. Most exercise-induced injuries are preventable. They often occur as a result of excessive levels of physical activity, and improper exercise techniques or equipment.

The concern that long-term physical activity may accelerate the development of osteoarthritis in major weight-bearing joints is not supported by case-control data. Reasonable recreational exercise performed within the limits of comfort while putting joints without underlying abnormality through normal motion does not inevitably lead to joint injury.

Adverse cardiovascular events are perhaps of greatest concern. Two recent large studies have confirmed that heavy physical activity increases the risk of acute myocardial infarction by a factor of 2.1 (95% confidence interval: 1.6-3.1)<14> to 5.9 (4.6-7.7)<15> However, a protective effect of regular physical activity was observed in both studies. As the weekly frequency of exercise increased, the relative risk of infarction during vigorous activity dropped consistently.<14,15> Studies suggest that sedentary individuals who engage in vigorous activity are at greater risk for sudden death than those who exercise regularly.<16>

Effectiveness of Prevention and Treatment

There is evidence that increasing the level of physical activity reduces morbidity and mortality for at least the following five chronic conditions: CHD, hypertension, obesity, NIDDM, and osteoporosis. Effectiveness of exercise counselling by primary care providers has not been studied as thoroughly and must be considered separately.

Primary Prevention of Coronary Artery Disease

Evidence from cohort studies has shown a consistent association between physical activity and reduced incidence of CHD.<3,4,12> Physical activity prevents the occurrence of major cardiovascular events, although there is no evidence that it reduces the severity of the events that do occur.<4> Similar benefits from exercise have been reported in older men (up to age 75). Although the physiological response to physical activity appears similar in men and women, epidemiologic data sufficient to confirm a primary preventive role of physical activity for CHD in women is not yet available.<3> The practice of regular exercise in men protects both from the risk of

CHD and the risk that strenuous physical activity triggers a myocardial infarction.<14,15>

All studies about the beneficial effects of exercise on all-cause and CHD mortality are subject to the "healthy volunteer" bias, even if care is taken in sampling and follow-up. In the above mentioned studies, the effects of exercise were independent of other CHD risk factors. In some studies, the cardiovascular benefits were augmented in the presence of other risk factors for CHD.<2,3> The observation that the protective effect of exercise disappears in individuals who discontinue the practice of regular physical activity supports the presence of a dose-effect relationship.

These data do not prove causal associations. Nonetheless, the consistency, strength, and suggestion of a graded response for the highest levels of fitness and physical activity being associated with decreased CHD is clear.<4>

Primary Prevention of Hypertension

Cohort studies suggest that physically inactive individuals have a 35-52% greater risk of developing hypertension than those who exercise. This effect appears to be independent of other risk factors for hypertension.<5,6> A graded inverse relationship between increasing fitness quartiles and blood pressure was noted in a large cohort.<17> However, randomized controlled trials of primary prevention have been either nonspecific or limited in sample size.

Primary Prevention of Obesity

Data from prospective population studies have shown an elevation in relative risk for the development of significant weight gain across leisure time physical activity categories.<7,8> Experimental data on secondary prevention of obesity show such a relationship. Although data confirms a significant effect of exercise alone on weight loss, the combination of regular exercise and balanced caloric consumption appears to be the most effective means of preventing obesity and maintaining ideal body weight.<18,19> Morbidity and mortality have been lower in overweight individuals who are physically active even if they remained overweight.<3>

Primary Prevention of Non-Insulin Dependent Diabetes Mellitus

Cohort data reveal an inverse relationship between the level of physical activity and the risk of developing NIDDM.<9-11> This effect is more pronounced among overweight men.<9> The age-adjusted risk of NIDDM is reduced by 6% for each 500-kcal increment in energy expenditure per week. The protective effect is especially pronounced

in persons at highest risk for NIDDM (i.e., family history, obesity, hypertension).<11>

Primary Prevention of Osteoporosis

Recent non-randomized controlled trials have shown that postmenopausal women can retard bone loss through physical activity.<20-22> Cross-sectional studies suggest that physical activity can also reduce the rate of bone loss in pre-menopausal women.<23>

Direct evidence that physical activity reduces the incidence of hip fractures is limited to one case-control study and one cross-sectional study. The relationships between type and extent of physical activity and osteoporosis as well as postmenopausal fractures have recently been reviewed. Some studies have suggested that skeletal loads generating muscle pull, rather than gravity, may provide benefit.

However, the variation in bone mineral density attributable to differences in activity is thought to be modest (20%) compared to the genetic contribution. Experience in intervention trials suggests the following possible limitations of exercise as a prevention and treatment modality: 1) the training regimen is not feasible over the long-term even at moderate intensity, for many people; 2) the effect is not sustained upon detraining; 3) the amount gained is modest; 4) generic programs lacking individualization may result in high rates of musculoskeletal complications and noncompliance; and 5) optimal exercise prescription in terms of type, duration, intensity, and frequency is unclear at present. Screening for osteoporosis, hormone replacement therapy, and diet are addressed in Chapters 52 and 49.

Effectiveness of Counselling

The rationale and evidence for effectiveness of physical activity counselling was published in 1989 by the U.S. Preventive Services Task Force and is currently under review.<24> Studies that have demonstrated benefits from counselling provide little information about long-term compliance and are of limited generalizability, because they have not been representative of typical primary care physician counselling of healthy patients.

The latest version of *Canada's Health Promotion Survey* showed that of 42% of the adults who reported increasing their level of leisure time physical activity in the year prior to the survey, a majority (59%) did so because of increased knowledge of the risks of remaining sedentary. The example of others (46%), support from friends and family (43%), changes in social values (31%), and new life situations (30%) were also important factors in helping people become more active.

Recommendations of Others

Health Canada, Canada Fitness and most Canadian Provinces have developed community intervention programs to foster increased physical activity. The objectives of these initiatives are to encourage sedentary individuals to engage in moderately intense physical activities. The message of the federal government's "Green Plan" on "Active Living Environment Program" (ALEP) is "to encourage both individually and collectively, behavioral changes that support and encourage Canadians to engage in more responsible, active and healthier outdoor physical activities that are environmentally friendly".

In 1989, the U.S. Preventive Services Task Force recommended that clinicians should counsel all patients to engage in a program of regular physical activity, tailored to their health status and personal lifestyle.<24>

The American College of Sports Medicine (ACSM) has also issued guidelines for developing and maintaining cardiorespiratory fitness, body composition, and muscular strength and endurance, which are different objectives. A concise methodology for risk stratification prior to exercise testing based on age, coronary risk factors, signs and symptoms, and anticipated level of training has been published, along with guidelines for exercise prescription, including contraindications. Exercise stress testing to evaluate for CAD is not considered necessary, provided that the individual is contemplating initiation of low level physical activity and does not meet the criteria for high risk.

Conclusions and Recommendations

The regular practice of moderate intensity physical activity is independently associated with a reduction in all-cause mortality

There is fair evidence that the regular practice of moderate intensity physical activity is an independent risk factor associated with a reduction in: all-cause and CHD mortality, incidence of CHD, hypertension and NIDDM, and the maintenance of a healthy body weight.<1-12> Considering the high prevalence of CHD, the benefits of regular physical activity in terms of decrease in CHD attributable risk is estimated to be comparable to that of smoking cessation. Recent data have also shown that individuals who practice moderate intensity physical activity regularly are less likely to be victims of myocardial infarction during strenuous exercise. The effectiveness of regular exercise on the primary prevention of osteoporosis is also supported by fair evidence. However, the attributable impact of exercising on the prevention of osteoporosis may be modest, considering the important contribution of genetic factors to bone mineral density.

High intensity physical activity by unfit people is associated with greater cardiovascular risk and increased risk of orthopedic injury.

There is no scientific evidence that any general or specific counselling intervention by family physicians will influence sedentary individuals to practice regular physical activity. However, one must not forget that knowledge of the risk of sedentariness was the first reason to increase one's level of physical activity given by adults interviewed in *Canada's Health Promotion Survey*. Physicians, as part of the health care system, are a major source of health information and should be able to reinforce public health initiatives. They must also inform patients about the risks of excessively intensive physical activity under certain circumstances. Emphasis should be on encouraging a variety of self-directed, moderate-level physical activities (e.g., gardening, raking leaves, walking to work, taking the stairs) which can be more easily incorporated into an individual's daily routine. Sporadic exercise, especially if extremely vigorous in an otherwise sedentary individual, should be discouraged. If an individual requires additional direction or supervision, clinicians may wish to refer patients to an accredited fitness center or exercise specialist.

Unanswered Questions (Research Agenda)

The effectiveness of a short duration counselling intervention by the family physician in affecting long-term behavior patterns in sedentary individuals needs further investigation.

Evidence

The literature was identified by a MEDLINE search for the English language from 1988 to 1993 using the key words exertion, exercise, leisure activities, mortality, coronary disease, cardiovascular system, osteoarthritis, and obesity. This review was initiated in October 1993 and recommendations finalized by the Task Force in March 1994.

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Physical Activity Counselling

MANEUVER	EFFECTIVENESS	LEVEL OF EVIDENCE <REF>	RECOMMENDATION
Moderate-level physical activity* performed consistently to accumulate 30 minutes or more over the course of most days of the week	Regular practice of moderate intensity physical activity* has been associated with a reduction in all-cause mortality, incidence of coronary heart disease (CHD), high blood pressure (HBP) and non-insulin dependent diabetes mellitus (NIDDM) and protects against the risk that vigorous exercise triggers myocardial infarction.	Cohort studies: All-cause mortality<1,2>, CHD<3,4,12>, Risk of MI<14,15>, HBP<5,6,16>,Obesity <7,8,18,19>, NIDDM<9-11> (II-2)	There is fair evidence to recommend that individuals engage in the regular practice of moderate intensity physical activity (B)
Regular weight-bearing exercise by pre-menopausal and post-menopausal women	Weight-bearing exercise stimulates bone deposition. The specific type and duration of exercise necessary is still unknown.	Non-randomized trial<20-22> (II-1)	Evidence for or against a recommendation for women to engage in a specific type of exercise to reduce osteoporosis risk is lacking (C)
Inquiry on physical activity level and information on the health benefits of regular moderate activity and on the dangers of vigorous activity for unfit individuals	No studies on the effectiveness of counselling by physicians. Physicians are an important source of health advice. Important reduction of CHD risk attributable to physical activity.	Expert opinion<24> (III)	Evidence for or against a recommendation to include physical activity counselling in the periodic health exam is lacking (C)

* **The following are considered moderate intensity physical activities (above 4.5 Mets): normal walking, golfing on foot, slow biking, raking leaves, cleaning windows, slow dancing, light restaurant work, etc.**