The Role of Exercise in Obesity Management

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Purpose of this talk

- Outline recommendations for safe and effective weight loss

- Outline recommendations for prevention of weight regain - body weight maintenance
Will not address issues:

- Weight loss related to sport and athletic performance
- Weight loss interventions specifically targeting children and adolescents
- Non exercise-related weight loss interventions
Definitions

- **Overweight** and **obesity** are defined by the WHO as abnormal or excessive fat accumulation that may impair health.

- **Body mass index (BMI):** index of weight-for-height that is commonly used in classifying overweight and obesity in adult populations and individuals. It is defined as the weight in kilograms divided by the square of the height in meters (kg/m²).

- **Underweight**  <18.5
- **Normal**  18.5 - 24.9
- **Overweight**  25.0 - 29.9
- **Obesity Class I**  30.0 - 34.9
- **Obesity Class II**  35.0 - 39.9
- **Obesity Class III**  40+
BMI

- BMI provides the most useful population-level measure of overweight and obesity as it is the same for both sexes and for all ages of adults.

- However, it should be considered as a *rough guide* because it may not correspond to the same degree of fatness in different individuals.
WHO’s latest projections indicate that globally in 2005:

- approximately 1.6 billion adults (age 15+) were overweight;
- at least 400 million adults were obese.
- At least 20 million children under the age of 5 years are overweight

WHO further projects that by 2015, approximately 2.3 billion adults will be overweight and more than 700 million will be obese.
What causes obesity and overweight?

- An energy imbalance between calories consumed on one hand, and calories expended on the other hand.

- Global increases in overweight and obesity are attributable to a number of factors including:
  
  - a *global shift in diet* towards increased intake of energy-dense foods that are high in fat and sugars but low in vitamins, minerals and other micronutrients; and
  
  - a trend towards *decreased physical activity* due to the increasingly sedentary nature of many forms of work, changing modes of transportation, and increasing urbanization.
What’s the fuss?

- Basically being obese has adverse health implications
  - Diabetes, hypertension, hypercholesterolaemia, musculoskeletal problems, depression, certain cancers etc.
- Abdominal fatness is associated with an even larger health risk
Magnitude of weight loss recommendations

- Even modest reductions in body weight (5–10%) will significantly improve health.
- Thus, an initial weight loss goal should be to decrease body weight by 5–10% and to sustain this magnitude of weight loss long-term. *Wing* 1998
- However, even though a weight loss of <10% is associated with initial improvements in risk factors, the maintenance of a weight loss that is <10% may not result in the improvements in these risk factors being sustained long-term. *Sjostrom* 1998
- Therefore, long-term health benefits may be maximized with sustained weight loss of >10% of initial body weight.
Justification for inclusion of exercise for weight loss.

- Combination of dietary modification and exercise is the most effective behavioral approach for weight loss. *NHLBI*


- Little evidence that suggests that exercise alone produces magnitudes of weight loss that are similar to what can be achieved with dietary modification alone.

- “responders” Vs “non-responders” *Bouchard 1994*

- Effectiveness of exercise for weight management may also be influenced by gender. *Wood 1991*
Components of a comprehensive health evaluation

- Questionnaires screening forms
  - PAR-Q
  - Signs & Symptoms of disease
  - Coronary risk factor analysis
  - Disease risk classification
  - Medical history
  - Lifestyle evaluation
  - Informed consent

- Clinical Tests
  - Physical examination
  - Blood chemistry profile
  - Blood pressure assessment
  - 12-lead ECG
  - Graded exercise test
  - Additional lab tests
Classification of disease risk

- **Low Risk**
  - Younger individuals (men <45, women <55) who are asymptomatic and have no more than one risk factor.

- **Moderate Risk**
  - Older individuals (men >45, women >55) or individuals of any age having two or more risk factors.
Classification of disease risk

- **High Risk**
  - Individuals with one or more signs/symptoms for CV and/or pulmonary disease or Individuals with known cardiac, pulmonary, or metabolic disease
Various public health recommendation for physical activity is for individuals to participate in at least 30 min to 1 hour of moderate intensity physical activity on most, preferably all, days of the week (WHO/FAO, ACSM, NHLBI, CDC).

This recommendation has typically been interpreted as a minimum of 150 min of physical activity per week and is based primarily on the effects of exercise on cardiovascular disease and other chronic conditions such as diabetes mellitus.

However, close examination of the scientific evidence suggests that levels of exercise greater than this minimum recommended amount may be important for initial and long term weight loss weight loss. *Schoeller 1997, Jakicic 1999.*
Exercise intensity and weight loss.

- There have been few studies that have adequately examined the impact of various intensities of exercise on weight loss.
- Thus, it appears that a sufficient amount of moderate-intensity (55–69% of maximal heart rate) exercise can be beneficial for management of body weight. *Duncan 1991*
- N.B. weight loss not fitness!
Intermittent exercise and weight loss.

- There have been a few studies that have examined the effectiveness of intermittent exercise in weight loss programs. Donnelly 2000, Jakicic 1995, 1999.
- Intermittent exercise has typically been defined as accumulation of 30–40 min of exercise per day through participation in multiple 10- to 15-min exercise sessions daily.
- There has been interest in this form of exercise because early studies showed that intermittent exercise effectively increased cardiorespiratory fitness and favorably impacts coronary heart disease risk factors. Debusk 1990, Ebisu 1985.
This resulted in the CDC and ACSM recommending the “accumulation” of at least 30 min of moderate intensity activity per day.

The use of intermittent exercise may be advantageous for individuals that dislike continuous exercise or perceive barriers to continuous exercise.
Lifestyle activity and weight loss.

- Lifestyle activity may be an effective option for increasing fitness and modifying body weight in overweight adults. *Andersen 1999, Dunn 1999.*
- Lifestyle activity appears to be a promising alternative to structured forms of exercise.
- Therefore, overweight adults should be encouraged to engage in activities that are at least moderate in intensity as part of physically active lifestyle.
Resistance exercise & weight loss.

- Although most research studies have examined the effect of endurance exercise on weight loss, the inclusion of resistance training in weight loss programs has clear advantages.

- Resistance training is a potent stimulus to increase fat-free mass (FFM), muscular strength, and power and thus may be an important component of a successful weight loss program by helping to preserve FFM while maximizing fat loss. Ballor 1988, Pavlou 1989, Garrow 1995, Marks 1995, Ross 1995, Geliebter 1997, Kraemer 1999,

- However, when resistance exercise is combined with dietary energy restriction, there appears to be little benefit in terms of absolute weight loss. Sweeney 1993, Krauss 2000.
No scientific evidence to suggest that resistance exercise is superior to more commonly used forms of endurance exercise for weight loss.

However, the ability of resistance exercise to improve muscular strength and endurance may be especially beneficial because of the impact on functional tasks (e.g., getting out of a chair, lifting one’s own body weight), which may facilitate the adoption of a more active lifestyle in sedentary overweight and obese individuals.
Exercise to Improve Health and Extend Life

- Harvard Alumni Study (Classes of 1920 - 1954)
  - Exercise improved health and reduced mortality
  - Hypertensives: Reduced death rate by 50%
  - Individuals with parents who died prior to age 65: Reduced death rate by 25%
Harvard Alumni Study

% Death Risk Reduction

Miles Walked / Run per Week

- 5
- 5 to 10
- 10 to 15
- 15 to 20
- 20 to 25
- 25 to 30
- 30 to 35

5 to 10
10 to 15
15 to 20
20 to 25
25 to 30
30 to 35
Exercise to Improve Health and Extend Life

Epidemiological evidence:

- Studies have shown a cause - effect relationship between physical inactivity and CHD (sedentary person = 2X’s risk)
- Protective association just as strong as hypertension, smoking, and high cholesterol.
- Physical inactivity is the **GREATEST** risk factor for heart disease...more people are physically inactive than possess **ALL** other CHD risk factors!
The Figure shows the relative risks associated with the different categories of fitness measured.

- Healthy adults who are the least fit have a mortality risk that is 4.5 times that of the most fit.
- Surprisingly, an individual’s fitness level was a more important predictor of death than established risk factors such as smoking, high blood pressure, high cholesterol, and diabetes.
What Are the Risks of Exercise?

- During exercise, there is a transient increase in the risk of having a cardiac-related complication.
- Risk is extremely small.
- For adults without existing heart disease, the risk of a cardiac event or complication ranges between 1 in 400,000–800,000 hours of exercise.
- For patients with existing heart disease, an event can occur an average of once in 62,000 hours.
Importantly, the risk of a cardiac event is significantly lower among regular exercisers.

Evidence suggests that a sedentary person’s risk is nearly 50 times higher than the risk for a person who exercises about 5 times per week.

Stated simply, individuals who exercise regularly are much less likely to experience a problem during exercise.

Moreover, contrary to popular view, the majority of cardiac events (approximately 90%) occur in the resting state, not during physical activity.
Starting an Exercise Programme

- Motivation – why?
  - Weight Loss
  - Social Affiliation
  - Physical Appearance
  - Competition
  - Health Benefits
  - Stress Relief
Factors in Choosing Workouts

- **Time of Day**
  - Choose the most convenient time of day

- **Available Facilities**
  - Fitness Centre
  - Home
  - Outdoors
• Mode of Workout
  ➢ Enjoyable activities
  ➢ Conducive to goals

• Social Setting
  ➢ With a partner
  ➢ In a group
  ➢ Alone
Components of Health Related Physical Fitness

- **Body Composition**
  - Refers to the proportion of body fat to lean body tissue
  - % Fat vs. total body weight
  - Male vs. female - % fat recommendation

- **Flexibility**
  - Extent and range of motion around a joint
  - Injury prevention
  - Static stretching
• **Strength and Endurance**
  - Strength- amount of force exerted by a group of muscles
  - Endurance- ability to maintain a contraction over a period of time

• **Cardiorespiratory Fitness**
  - Body's ability to consume and process O2
  - Aerobic activities
  - Components of a workout
    - Frequency - 3-5 days/wk
      - <3 days less improvement in VO2 max (fitness)
      - >5 days subject to injury
    - Intensity- 50-80% VO2 max/MHR :
      - < 70 WMP, >70 increase fitness
    - Duration - goal 20-30 min continuous activity
Elements of a Cardiovascular Program:

- Warm-up 5-10 min
- Conditioning 20-60 min
- Cool-down 5-10 min
Principles of Training

- **Specificity**
  - Specific activities elicit specific adaptations creating specific training effects

- **Reversibility**
  - If training ceases, strength and endurance diminishes

- **Progression**
  - Gradual increase in "work" over a period of training

- **Overload**
  - Strength and endurance will increase only if muscles and the cardiovascular system are systematically subjected to workloads greater than those to which they are accustomed
**Workout Equipment**

**Shoes**

- **Qualities**
  - Shock absorption
  - Cushion
  - Support

- **Function**
  - Cross training
  - Running
  - Walking
  - Aerobic
  - Court
Clothing

- **warm weather**
  - Thin, light
  - Loose fitting
  - Porous
  - Allow for heat evaporation

- **cold weather**
  - Layers
  - Gortex
    - water proof
    - heat escapes
  - Head, hand protection
Most important factors:

- Patient must understand that weight loss is not only goal
- Enjoyability
- Safety
- Persistance
Thank you
REFERENCES

- AVANELL A, BROWN T, McGEE M, CAMPBELL M, GRANT A, BROOM J. What interventions should we add to weight reducing diets in adults with obesity? A systematic review of randomized controlled trials of adding drug therapy, exercise, behaviour therapy or combinations of these interventions. J Hum Nutr Dietet, 17.2004, pp. 293–316