Factors to be considered in Prescribing Exercise

Interventions for Obese Individuals.

INTRODUCTION

The epidemic of obesity is worldwide, with more than 1.6 billion people currently overweight and 400 million obese. Overweight and obesity affects more than 66% of the adult population in USA, with more than 77 million adults suffering the disease of obesity and is associated with a variety of chronic diseases. The cost of weight reduction programs is now estimated to exceed annually US$194 billion and the Americans themselves are spending US$59 billion on all the options offered to fight fatness (Wang, 2008). Obesity levels are also rapidly increasing in both developed and developing countries, making it a global health crisis. At the tenth International Congress on Obesity in 2006, the conference chairs announced that for the first time in history, the population of overweight (more than 1 billion) outnumbered the hungry (600–700 million).

In addition, obese individuals suffer from discrimination at work place and professional settings when employers show reluctance in hiring them. Obese individuals are generally considered to have low efficiency, tend to fatigue easily and are more prone to illness (Buchowski, 1996). They experience difficulties in activities of daily living such as picking things from floor, squatting or kneeling, rising from low chair heights, going up and down stairs. Obese women experience flexibility problems, e.g. reaching their back and feet.
Management of obesity is considered an important public health initiative because numerous studies have shown the beneficial effects of diminished weight and body fat. Obesity presents significant public health concerns because of the link with numerous chronic health conditions. Increase in body weight occurs due to an imbalance between energy intake and energy expenditure. Physical activity has been shown to promote long term weight loss and therefore is an important component on long-term weight management.

Walking, in combination with changes in diet, is commonly recommended for the treatment of obesity because it is a convenient physical activity that can be used to expend a significant amount of metabolic energy. Walking programs typically recommend walking for at least 30 minutes per session to comply with the current recommendations from the American College of Sports Medicine. It could be argued that these recommendations are sometimes ‘too daunting’ as only a small percentage of obese women have been reported to reach the recommended levels. Compliance with walking programs can be problematic; with subjects dropping out at early stages or being lost at follow up visits. Musculoskeletal issues are thought to be one of the precipitating factors that cause attrition and non-compliance in weight reduction programs that recommended physical activity.

The purpose of this paper is to identify problems faced by obese individuals during adult weight loss programs, exploring factors beyond just the walking programs. A better understanding of the issues related to exercise prescription in obese subjects and of the degree in which they differ from normal weight individuals can be used to design optimal therapeutic
exercise programs for these individuals, which would help retain more subjects in the weight loss programs.

**REVIEW OF THE RESEARCH LITERATURE**

**Combination of Diet And Exercise:**

Given the health impacts of the obesity epidemic and the research suggesting that weight loss can ameliorate these problems, there have been numerous calls for optimal obesity treatment strategies. The NIH Obesity Education Initiative Expert Panel suggested a caloric deficit of 500–1,000 kcal/day using an individualized dietary strategy, along with 45 min of moderate-intensity physical activity 5 days/week. The Institute of Medicine recommended at least 1 h/day of moderately intense physical activity coupled with a caloric deficit whereas the US Department of Agriculture similarly suggests individuals engage in close to 1 h of moderate-to-vigorous intensity exercise on most days of the week, without exceeding caloric intake requirements (Witham, 2010).

**Physical Activity Recommendations:**

Physical activity (PA) is recommended for weight management and for weight loss, and even for prevention of weight regain after initial weight loss. In 2001, the American College of Sports Medicine (ACSM) published a Position Stand that recommended a minimum of 150 min per week of moderate intensity PA for overweight and obese adults to improve health; however, 200–300 min/ week was recommended for long-term weight loss. Several studies that targeted 150 min/week of PA showed no significant change in body weight. One study
(Donnelly, 2000) targeted 90 min of continuous moderate-intensity physical activity (30 min, 3 days a week) and compared to 150 min of moderate-intensity intermittent PA (30 min, 5 days a week) in women for 18 months. The results showed that the continuous group lost greater weight than the intermittent group, which underscores the value for continuous training efforts to lose weight.

**Adherence to Weight Management Programs:**

Non-adherence to long-term treatment programs is one of major concerns in obesity management. In obesity trials, the attrition rates range from 10 to 80% (Farley, 2003) and vary according to clinical setting, study design and treatment. Very few studies have been done to explore or investigate the reasons for attrition. Attrition was negatively associated with binge eating, previous dieting and weight loss expectations (Teixeira, 2004). The other reasons reported for attrition are personal problems, lack of motivation and family issues.

**Obesity and Musculoskeletal Disorders:**

Obesity in adults lead to alterations of the musculoskeletal system that could put obese individual at higher risk of musculoskeletal pain (Messier, 2005). Obese individuals have also been shown to modify the force alignment and consequently the distribution of forces at the knee during weight bearing, particularly those associated with varus malalignment (the load-bearing axis is shifted inward, causing more stress and force on the medial compartment of the knee), leading to the development of OA in obese adults. In adults, an increased body weight leads to major modifications in the gait pattern. Overweight and obese individuals have been shown to walk with a shorter step length and a lower velocity (DeVita 2003). These changes
have been associated with an increased stress at the knee joint leading to development of knee OA (Browning 2007). In addition to the possible long-term limitations, gait pattern adaptations in obese children can reduce the dynamic stability due to the large body mass.

**Limitations in Joint Range Of Motion:**

Joint range of motion (RoM) is the measure of motion available at a body joint for a certain inter-segmental rotational movement. Obesity has been seen to reduce joint RoM as the adipose tissues around body joints obstruct inter-segmental rotations. This has important implications at workplaces involving obese individuals as the design of products, workplaces and living environments should be conformed or adjusted to their needs. These restrictions in the range of motion cause hindrance in activities like bending down picking things from the floor and tying shoes due to excess fat, possible contribute to lower levels of physical activity during daily life.

**RESULTS AND DISCUSSION:**

The results of this paper are based on the review of relevant articles and clinical studies.

**Causes of Attrition in Weight Loss Programs:**

They can be broadly divided into Pretreatment and treatment variables along with some examples.

**Patients’ pretreatment variables**

1) Demographic variables a. Age b. Age at onset of obesity c. gender

2) Anthropometric variables a. Body Mass Index, waist circumference.
3) Dieting and other behavioral variables a. Dietary habits b. Smoking and sedentary habits.


5) Medical variables and quality of life

**Treatment variables**

1) Practical difficulties a. Travel distance b. interference with working activities

2) Unsatisfactory results a. Lack of encouragement b. Unsatisfied with weight loss.

3) Type and setting of treatment a. behavioral vs. commercial weight loss treatment.

Psychological variables play an important role in predicting attrition. Some of the factors are lack of motivation, self-confidence, often over confidence in ability to lose additional weight without professional help, and sense of abandonment from therapists. These variables are rarely considered during weight loss treatment and this could attribute to treatment failure in a few individuals.

**Unique Challenges in Obese Population:**

The interaction between physical activity and excess body weight would create some unique challenges. The reasons why overweight individuals seem even less willing than normal-weight ones to participate in and adhere to physical activity remain largely unknown. In the general population, the problem of adherence and dropout is typically approached from the perspective of traditional psychology and health behavior models, but they often fail to account for the unique challenges faced by this population. In particular, the element of affect seems to have been neglected in most interventional studies. Affect is a key component of the
exercise experience and, as recent studies have shown, it may also be related to PA participation. Affect also broadly classified as mood or emotion stems directly from bodily sensations (e.g., feeling energy or pain and discomfort) or follows certain patterns of cognitive appraisals (e.g., perceptions of achievement or failure. Although not yet a widely recognized determinant of exercise behavior, affect is viewed in psychology and behavioral economics as one of the major factors driving human decision-making.

**Exercise Doesn’t Feel the Same to the Obese:**

P Ekkekakis and E Lind, 2006 studied the psychological reactions of overweight and obese individuals during and after exercise. The overweight group reported higher exertion ratings. Most important and interesting result was that, both the normal weight and the overweight group maintained steady and not significantly different ratings of pleasure–displeasure during the exercise at self-selected intensity, but the pattern changed when a faster and higher intensity regimen was imposed (Ekkekakis, 2006). The normal-weight women were able to again maintain stable ratings of pleasure–displeasure, but the overweight women responded with a gradual decrease in pleasure over time. Given the fact that the intensity is imposed in most studies or obesity management clinics, it is reasonable to speculate that the lower adherence might be attributed, at least in part, to the decline in pleasure.

On the other hand, a higher intensity can exacerbate the risk of musculoskeletal injury and, just as importantly, Overweight and obese individuals report higher levels of pain, discomfort, displeasure, and perceived exertion during PA than their normal- weight (NW) counterparts.
INTERPRETATION and IMPLICATIONS:

Adjustment in Exercise prescription for Overweight and Obese Individuals

The findings of the above mentioned studies do have some intriguing practical implications for exercise interventions involving overweight and obese adults. It is clear that overweight adults have lower aerobic capacity, relative to their body weight, than their normal weight counterparts. Therefore, exercise practitioners while planning exercise interventions should make adjustments to what they consider a mild or moderate exercise program. In some case, this adjustment might have to be substantial. Furthermore, Overweight and obese women were shown to respond differently to the exercise in terms of pleasure and affect, so consideration should be given to have separate regimens for overweight and obese.

Cognitive-Behavioral Strategies to Prevent Attrition

The study covered both Pretreatment and Treatment variables, augmented by relevant clinical data. Future studies should explore the best ways to induce change in the behavior during exercise in overweight and obese individuals and to quantify what goals appear to be realistic; whether changes from unrealistic to more realistic weight loss goals may be obtained by a simple educational approach based on the clinical benefits of a modest weight loss or it is necessary to adopt more complex cognitive-behavioral strategies. Such interventions are needed to change the stereotypical attitudes for weight reduction. Given that obesity is an epidemic and physical activity still promises to be a potential avenue for maintaining or losing excess weight, all necessary efforts should be made to reduce the attrition rate, which remains the crucial issue in the management of obesity.
Special Population: Try to Explore what They Like.

The data presented here suggest that obese individuals represent a highly challenging “special population” not only from a physiological and biomechanical perspective but also from a psychological one. Although obese individuals make more than 30 percent of the population in western societies, the unique challenges faced by this population in the context of exercise have not been adequately studied. Besides focusing on safety (i.e., injury avoidance) and effectiveness (i.e., maximization of energy expenditure), future investigations should also consider the subjective experience of exercise for obese individuals and further research should be tailored to what they like or might like.

For exercise prescription, not all activities present the same difficulties at different intensities. Cycling is more demanding at low intensity for overweight and obese individuals while ambulatory activities are more difficult at high intensities. Strategies like slowing the self-selected walking pace, shortening step length, or reducing resistance should be considered in exercise prescription for individuals with excess body weight, and this includes children. A good understanding of biomechanical and physiological profile is mandatory for safe testing and effective prescription of physical activity in overweight and obese. Future researches should look at the effect of varying biomechanical constraints (cadence) and physiological demands (various intensities) on energetic expenditure to optimize training effect.

Focus on the Children Population: We Cannot Afford to Wait

Interventions that modify school policies and the physical environment in ways that support improved dietary practices and regular physical activity, but do not provide behavioral programs, are largely absent from the literature. School policies and programs going forward
should be informed, but not limited, by the evidence available to date. The threats to childhood obesity and unsatisfactory health resulting from poor dietary habits and lack of activity clearly constitute such a danger. Responding to such exigencies on the basis of sense, intuition, and judgment informed by experience is far from unprecedented. Obesity trends will not change appreciably until the aggregation of obesity control strategies is commensurate with and opposite to the aggregation of obesigenic elements in modern society. This means that even when actions against epidemic obesity are robust, evidence of success will initially be sparse.

Evidence of success is a potent stimulus to policy reform, whereas its absence is a potential impediment for failing to reward investment of effort or resources. Thus we need to focus on intermediate outcomes, such as changes in attitudes, knowledge, dietary patterns, or activity levels, as early measures of success in obesity control. Effects on population weight patterns will be discernible only after a delay that allows for the gradual accumulation of necessary, but independently insufficient, contributions to a comprehensive array of obesity control programs, policies, and practices. We simply cannot afford to wait for the world to change but rather must trust in both the evidence we have to date and informed judgment to intervene in schools with the urgency a crisis demands. We should evaluate as we go, with judicious selection of realistic outcome measures, to verify that our trust is well placed.
REFERENCES:


Ekkekakis P. Exercise does not feel the same when you are overweight: the impact of self-selected and imposed intensity on affect and exertion. Int J Obes., 2006, 30, 652–660.


