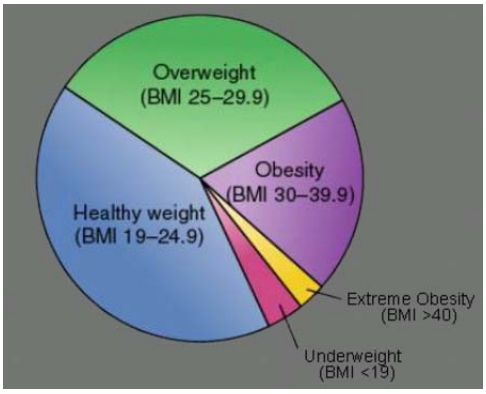
We've been discussing some of the health risks associated with inappropriate weight, be it overweight or underweight. Managing weight for health reasons is difficult for many, if not most of us. In this section we will look at some of the reasons why we gain excess weight – or fail to weigh enough for health reasons. We will also briefly address issues associated with the inability to manage weight and eating disorders.

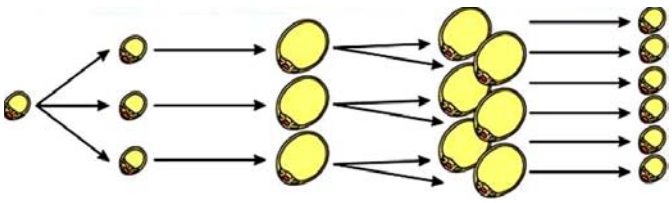
Currently, close to half of the United States population is overweight or medically obese, with the associated health risks. In the past decade, obesity has increased in all states, and by greater that 15% in over half of the states. The increasing rate of obesity in children is particularly worrisome. It is a serious health concern.



Storing Fat and Fat Cell Production

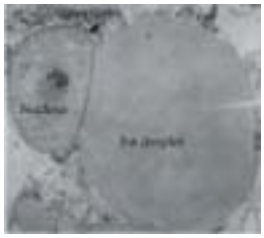
To understand factors that contribute to weight gain it's helpful to review how we manage fat and fuel reserves. As we know, when we eat more calories than we need, the excess calories are converted to adipose and are stored in fat cells developed when we were children. For most of us, fat cell production takes place during late childhood and puberty.

Over-consumption of calories during childhood promotes fat cell production. Children who are obese have more fat cells than those of normal weight. Moreover, fat cell volume has a "near-infinite" ability to increase, and when fat cells do reach a maximum size, they can divide. The reverse is not true, so once a fat cell is produced, it can gain or lose volume, but the number doesn't decrease. One significant difference in fat cell number is that fat cells refill readily. Those who have more fat cells and lose weight generally regain weight more easily than those who have "normal" numbers of fat cells. One of the concerns of childhood obesity is the greater risk of life-long obesity because of the number of fat cells.



Fat Cell Growth

Adipose Cells



SEM of Fat Cell

Metabolic Stimulants of Fat Cell Storage

The enzyme, **lipoprotein lipase (LPL) found in the membranes of fat cells,** promotes fat storage in both fat cells and in muscle tissue. The more LPL one produces, the more efficiently one stores fat.

- Those who have more fat cells have more LPL, and that may contribute to the ease of re-filling fat cells with weight gain. LPL is produced by "empty" fat cells as a stimulus to produce more fat.
- LPL is stimulated by estrogen and testosterone. LPL is most active in women's breast, hips and thighs – areas where adipose cells are abundant. In men, LPL is most active in abdominal tissues, again where fat cells are abundant.

Release of fat from adipose is also enzyme-activity dependent. During weight loss, lower body fat reserves are less active, and hold fat longer than fat stored elsewhere. The role of enzymes in fat cell accumulation and fat release is a rationale for the theories that one's weight is determined or fixed by internal mechanisms beyond conscious control, called the **set-point**.

The set-point theory is based on the fact that some people always have the same weight and fat levels no matter what, and that we have any number of internal regulators that maintain body homeostasis. For some people, the hypothalamus seems to control appetite, hunger and satiety signals at some stable calorie level. This may fall within the statistical "appropriate weight" tables or it may be higher or lower. Once a person has achieved a set-point weight he/she will not change much (neither gain or lose weight).

For most of us, weight loss activates metabolism that promotes weight gain to restore the "set-point", one of the reasons that so few who lose weight keep it off.

Managing Weight

Managing weight is not easy -- it’s a life-long commitment to healthy eating behavior and physical activity.

Problems of Overweight

Why do so many gain weight? Since the obvious response is that weight gain occurs when we consume more calories than we use, the real question is **why do we eat too many calories**? Answers fall into two categories: Genetics and Environment. Both contribute and both are important. It is also important to not use either as an "excuse" to maintain a weight that is not health promoting.

Environmental Stimuli for Weight Gain

Environmental stimuli promote behavioral responses that involve eating unrelated to hunger. As we shall discuss, environmental stimuli for some promote behavioral responses that prevent eating and promote weight loss leading to health impairment.

Although it is tempting to say that only overweight people just overeat, it is not true. Diet reports indicate that overweight people eat about the same amount, statistically, as normal-weight people. Virtually all under report calorie intake. A recent study showed that most of us under report calories by as much as 500 – 600 per day. Moreover, diet studies only show what is currently happening. An overweight person may be at a stable weight and consuming the same calories per day maintains that weight. He or she may have consumed more calories in the past than currently to achieve the current weight. In rats, overeating when young promotes excess weight gain which they keep when mature. Mature rats, no matter their body size, eat about the same amount.

So what about the environment promotes eating too much? In many cultures, food is associated with social behavior – eating is socially acceptable, and promotes ease and comfort in social situations.

- Food is celebratory.
- Food eases pain and hurt, both emotional and physical.
- Food is distracting – we eat when bored or stressed
- Food is used to bribe or for rewards. Children are often given treats for good behavior or as bribes to induce good behavior. As we grow older we use food to bribe ourselves, too.

Culturally, those who have more financial success eat well.

We are often taught to eat when we have no hunger. Most of us have heard something like:

- "It's 6:00 pm, time for dinner"
- "Finish your meal, people are starving in downtown Seattle..."
- "I baked these just for you, what do you mean, you're not hungry."
- "I just ate, but this looks so good I'll have to try some"
- "If you don't clean your plate you won't get your dessert" I suspect we have never heard "If you don't clean your plate you won't get your broccoli"

Some who study eating behavior, however, are leaning towards a simpler explanation: Food is just too readily available and highly promoted. We are bombarded with the convenience of food everywhere: Food courts in malls, mini-marts in gas stations, fast-food restaurants on every free-way exit and arterial intersection, delis in grocery stores, etc. Too much of the convenience food is high in fat. Even the convenience salads, which have healthy ingredients, are coated with an average of 1/4 cup of dressing or marinade, most of which are full-fat. Since the satiety value of fats in low, but the calorie count high, it's just very, very easy to take in those extra 500 calories each day.

Whopper with Cheese
Calories = 730
Fat = 46 grams
Saturated Fat = 16 grams

Cinnabon
Calories = 670
Fat = 34 grams

McDonald's Supersize Fries
Calories = 610
Fat = 29 grams
Saturated Fat = 5 grams

The advertising budgets for food manufacturers is in the billions of dollars. It's big business and we have bought the message. And because we've bought the message, we want our money's worth. The portion sizes in the United States have increased dramatically. Since we eat portions rather than amounts measured on a scale, we simply are eating more food more readily available and more often.

Tufts University's Health and Nutrition Newsletter a year ago, made some comparisons of portion sizes in today's food industry compared to the 1950's. Here are some excerpts:

- Fries at McDonalds came in one size in the mid-1950's, the small size offered today, which is 1/3 the size of their supersize fries. Today's large fries is the same size portion as the supersize fries were in the mid-1990's.
- The most recent edition of *The Joy of Cooking* has the same brownie recipe as an earlier edition. The only difference is that today they state it yields 16 brownies rather than the original 30 brownies.
- Ford Motor Company installed larger cup holders in its vehicles to hold the larger size cups we now need for our sodas. And we are averaging 41 gallons of sugar-containing soda per person per year. Diet soda is rapidly gaining in popularity, but not at the expense of sugar-containing sodas. In the 1950's, sodas came in 6-ounce bottles, the size of today's juice-drink boxes.
- Weight Watchers and Lean Cuisine frozen dinners are now available in "Hearty" portions that contain about 50% more than their regular frozen entrees.

Physical Activity

Associated with environmental influences on eating behavior is our collective lack of physical activity. Two-thirds of us over the age of fifty get no physical activity beyond walking around the house or going on errands. Research links inactivity among children to sedentary living among adults. Inactivity and poor diet cause at least 300,000 deaths a year in the United States. Studies indicate that we sit at a computer for non-work purposes or watch televisions between 2 – 4 hours a day, but have less than 30 minutes of physical activity. Most of us state that we haven't time for physical activity. Increase in calories consumed accompanied with a decrease in activity results in weight gain.

Genetic Role in Obesity

There is a strong genetic component to one's weight, and therefore to one's susceptibility to obesity. This does not mean that genetics determines one's body composition or proportion of fat tissue but genetics definitely has an impact.

Two people given identical diets may have different weight gains or losses, even when they have comparable body shapes and physical activity levels. Researchers are interested in finding genes that control appetite, hunger and satiety, not just to explain why some are more prone to obesity than others, but as mentioned previously, to try and find ways to help people control eating behaviors that impact health.

Several proteins are involved in metabolism of fats and the efficiency with which we use fuels or store fats.

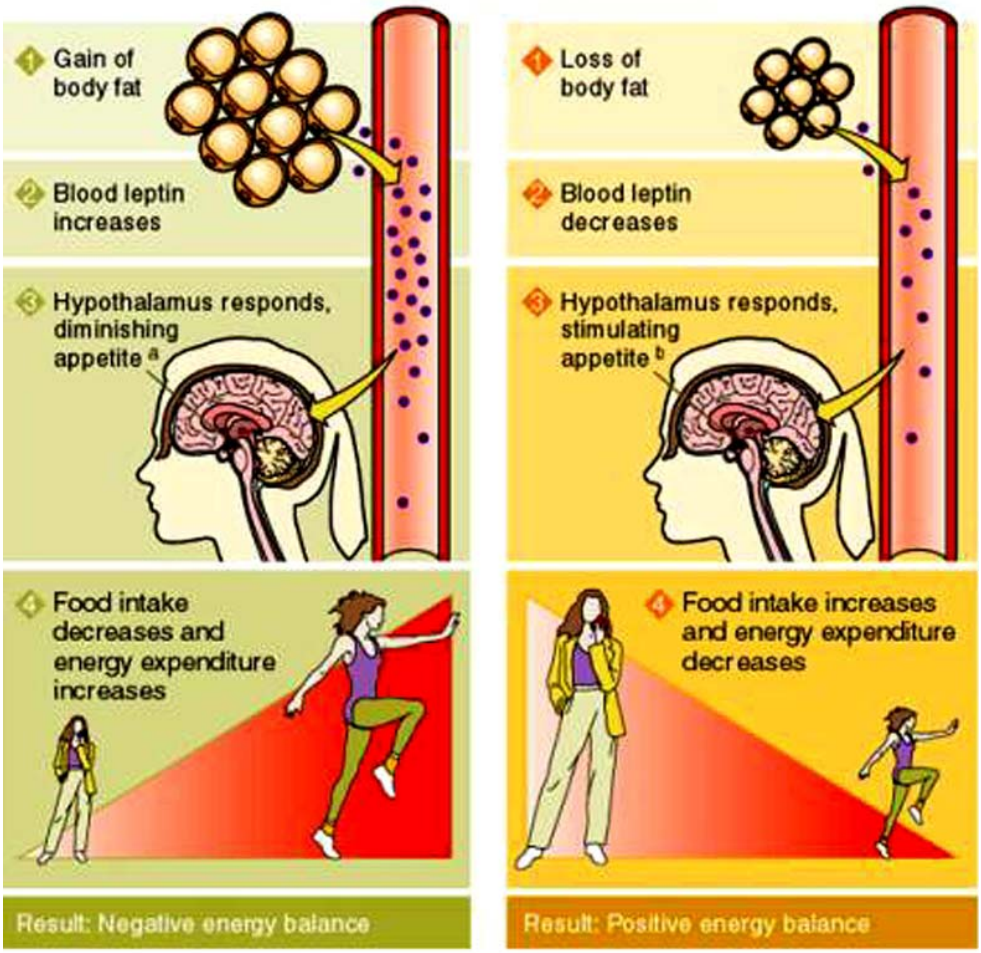
Uncoupling Proteins

Oxidation of fat generally produces both energy in the form of ATP, via the Krebs cycle and electron transport and the associated heat loss. We have two forms of Adipose tissue: brown and white. White adipose tissue releases fats for cell respiration. Oxidation of fats in brown adipose tissue releases just heat energy. Having the ability to release heat energy from stored fat is important for thermoregulation. Use of fat for heat generation requires special proteins that prevent the oxidation of fats in ATP synthesis. Such proteins are called **uncoupling proteins** because they separate ATP synthesis from heat generation in fat oxidations. People who store minimal fat may have more uncoupling proteins. People who gain weight readily may have fewer. Children who have fewer uncoupling proteins are more often overweight.

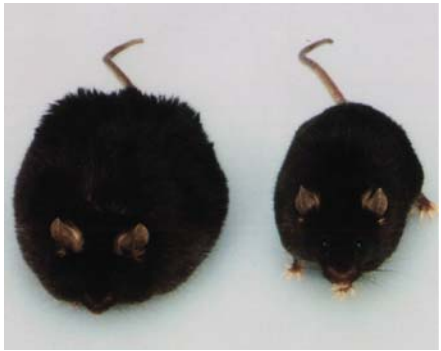
Leptin

Leptin is a protein hormone that acts on the hypothalamus appetite signals. Leptin blood levels increase when body fat reserves are high. When body fat reserves diminish, blood leptin levels decrease. This normally is a mechanism that helps maintain homeostasis.

- When levels of leptin are high, the hypothalamus produces **melanocortins**, substances which decrease appetite. High levels of leptin also promote energy expenditure by elevating metabolism. Leptin may also promote the "desire" to increase physical activity.
- When blood leptin levels are low, the hypothalamus produces **neuropeptide Y** that stimulates appetite so people eat more, along with using less energy. (Perhaps too much television watching reduces leptin levels causing couch-potato syndrome.)(Note: No study exists to validate the previous statement.)



It is possible that for some obese people, high levels of leptin do not stimulate the normal responses. Such individuals may be leptin resistant. It is an area of obesity research. In preliminary studies obese people given leptin injections lost weight. Mice who lack the gene to produce leptin become seriously obese. Obese mice who are given leptin lose weight.



Mouse on the right was given leptin.

Treating Obesity

Thousands of weight loss strategies have been studied. Thousands more are advertised. A quick look at grocery store paperbacks or magazines reveals dozens of diet promotions. Bookstores have shelves of diet books*. Each claims that one who purchases this book and follows its advice will achieve weight "nirvana". Yet only about 5% of diets are effective. Far too many plans make often misleading and downright deceptive assertions that will appeal to the purchaser and won't require hard work and effort. To reach an appropriate weight for health (not for appearance) one needs to adopt eating patterns that are lifestyle patterns. One also needs to have a realistic goal for appropriate weight and body appearance.

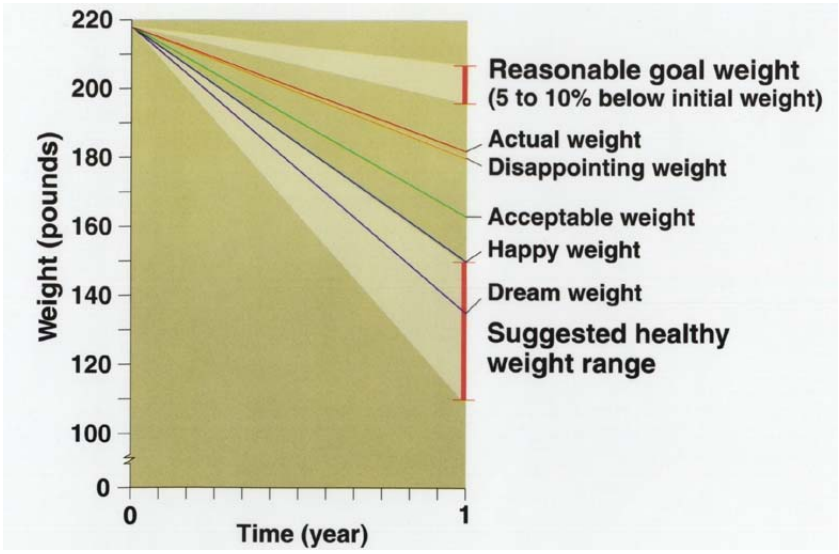
Far too many of us think we need to lose weight to be "slender". Slender is an underweight category that includes the 5% of us with a BMI of 17 – 18, and an accompanying bone structure. There are more than enough of us who need weight management for health reasons, and weight loss is needed to achieve that health goal. But what works?

Weight Loss Strategies

Despite the thousands of weight loss strategies available, the tradition advice is still most reliable. Reliability is determined by surveying those who have successfully lost weight and maintained their target weight for more than one year. For most other strategies, weight loss may occur, but is not maintained.

The Sensible Plan

Plan a reasonable strategy – Miracle weight loss does not take place. Plan short-term modest goals and look for weight loss in increments rather than focusing on the target weight and how long it's going to take to achieve it. When the short-term goal is achieved, make the next one.



Strategies

- Plan a nutritionally adequate diet with about 500 fewer calories than needed for your target weight and activity level. For example, if the target level for weight and light activity is 2000 calories per day, the diet plan should provide 1500 calories. One's calories should never be lower than 1200 per day, unless medically supervised and prescribed.
- Eat small portions at all times.
- Drink non calorie containing fluids, preferably water, frequently.
- Eat at least three well-spaced meals per day of a minimum of 250 to 300 calories per meal, and snacks to complete the total calories if one of the meals is not "more calorie generous". It's OK to eat smaller meals more frequently.
- Maximize the satiety value of foods eaten – High fiber whole grains and vegetables have maximum satiety staying power. Protein has good satiety value. Protein choices should be very lean and small portions.
- When possible, use concentrated sugars or high fat foods as condiments, or as small occasional treats rather than included as a part of the foundation diet. This includes sodas and many juices. Be aware of alcohol consumption. All calorie-containing liquids have minimal satiety value.
- Prepare foods that are tasty and appealing in appearance.
- Plan conscientiously for dining out. Adjustments of other meals may be needed to accommodate the calories of the special meal. Know portion sizes and take advantage of take-home containers.
- Include a minimum of 30 minutes per day of physical activity. Choose an activity or activities that will have "staying" power. Joining a fitness center to do the treadmill everyday sounds good, but may not fit into your schedule. Unless the activity fits, it won't be done.
    - Physical activity also affects BMR. Studies show that physical activity elevates overall metabolic rate, and metabolic rate stays elevated for some time after the completion of physical activity.
    - Physical activity also increases the proportion of muscle tissue relative to fat tissue and muscle tissue is more metabolically active, using more calories
    - Physical activity detracts from behaviors that promote eating. One is seldom in front of the TV being subjected to food advertising while participating in physical activity. For some, physical activity actually depresses appetite.

*Three diet books that are recommended by the Tufts University Health and Nutrition Newsletter (August 2004) are: *Thin for Life: 10 Keys to Success from People Who Have Lost Weight and Kept It Off* by Anne M Fletcher, MS, RD (Houghton Mifflin Company: Boston, 1994); *Strong Women Stay Slim* by Miriam E Nelson, PhD, with Sarah Wernick (Bantam Books: New York, 1998); and *Volumetrics Weight Control Plan: Feel Full on Fewer Calories* by Barbara Rolls, PhD and Robert A Barnett (Harper Collins: New York, 2000).

Changing Lifestyle Behaviors That Lead to Obesity

There are many assumptions made about why any one individual eats more than he or she needs. When these assumptions are validated, then changing behavior can result in achieving appropriate weight. But for most, it's hundreds of little things that contribute to a cycle of eating for reasons other than hunger, little activity and the resultant overweight. No one can change lots of things at once. A first step in behavior change is identifying the behaviors that contribute to eating and focusing on one that can be altered. For example, when one eats when unhappy, being unhappy about one's lack of success at managing weight triggers more eating to distract from unhappiness. Making changes is difficult. Support from others to help maintain healthy eating behaviors and continued exercise plans is one of the few behavioral strategies that has success.

- Attitude is critical. Being positive about one's goals and means to achieve them makes for success. Those who look forward to getting outside each morning for a jog are more likely to do it. Buying pants a size smaller and trying them on everyday to see if they fit is not. Putting on a pair of pants that have been fitting and finding they are loose is positive.
- Many weight loss programs emphasize mutual support, goal-setting and rewards (non-food) for successes.
- Some plans include meals. Having pre-planned meals makes eating decisions easier, so there can be more success.
- The down side to organized plans is that too many don't maintain the eating behaviors imposed while in the program and weight returns when we fall back into our older, more comfortable eating behaviors. In addition, some organized plans are expensive.

A nutrition therapist, a registered dietician who specializes in nutrition counseling, can provide professional guidance and may be of value. The American Dietetic Association's website, http://www.eatright.org, can help you find nutrition professionals in the local area. Some identify their nutrition specialties to help locate one who specializes in nutrition therapy.

The Less-Sensible Plans for Weight Loss

Surgery

- One method sometimes used for the morbidly obese is **by-pass surgery**, in which a portion of the stomach is removed, and the diameter of the pyloric sphincter is reduced so that food passage into the small intestine is slowed, and the amount of food one can eat without stomach discomfort is decreased. There are always impacts from such surgeries, and one has to have a monitored diet to maximize the ability of the altered stomach to effectively do what the stomach must do.

- **Liposuction**, a form of cosmetic surgery to remove subcutaneous fat deposits is also practiced. Since areas of adipose storage are being removed, individuals initially have reduced dimensions and lowered proportion of fat tissue. Unfortunately, remaining fat cells can expand to take care of the loss, and unless lifestyle behavior changes, most refill. Liposuction can also have impacts on health, as can any surgery, and reports of infection and nerve damage from the surgery are not uncommon. More frequently, distorted body shape from the distribution of remaining fat cells occurs.

Drugs

Although several drugs have been marketed for weight loss, both prescription and non-prescription, there are more "horror" stories than successes. Currently two prescription drugs are available for use with medical supervision. Both are recommended only for those who are very obese, and their effectiveness is only about 10%. That is a 200 pound person would lose only about 20 pounds with the drug, and that in combination with exercise and a reduced calorie diet.

- **Sibutramane** affects serotonin uptake and helps suppress appetite.
- **Orlistat** inhibits production of pancreatic lipases so reduces the digestion of dietary fats. One complication or orlistat is that non-digested fats carry fat-soluble vitamins and anti-oxidants and reduce their absorption, too. Other side effects are similar to those of non-digestible fat substitutes such as olestra.

Non-prescription weight loss products are more common. Only one, **benzocaine**, has FDA endorsement. Benzocaine numbs the tongue, so taste sensation is diminished. Just as some people with colds enjoy the tastes of foods less, and so eat less, some who use benzocaine eat less because food doesn't taste as good.

The "Horror" Stories – Ineffective and/or Dangerous Weight Loss Methods

- **Fen-Phen**
  In the 1990's, use of two prescription drugs, Phentermine and Fenfluramine, neither of which was developed for weight loss was popular because in combination, they were effective. After several deaths, fenfluramine was withdrawn by its manufacturer along with a similar drug, Dexfenfluramine in 1997. Phentermine was not recalled. It is estimated that over 6 million persons took fen-phen.

- **Phenylpropanolamine**
  The FDA requested withdrawal of products containing phenylpropanolamine in 2000 because of reported increases in hypertension , heart arrhythmia and rapid pulse, seizures and stroke, along with less serious effects such as sleeplessness and increase anxiety.

- **Ephedra**
  The herbal product most frequently used for weight loss prior to its forced withdrawal was Ephedra, also known as ma huang. There are dozens of legal suits in the United States involving heart complications from the use of Ephedra and Ephedra/caffeine combinations for weight loss. Ephedra exacerbates asthma and cardiovascular conditions, although it is marketed for the treatment of asthma. Ephedra chemically is similar to methamphetamine. The FDA was able to prove sufficient harm from the use of Ephedra to order its withdrawal in December 2003. FDA regulation of supplements is discussed with general supplement use in this class.

- **Herbal Laxatives**
  A number of herbs are recommended for weight loss simply for their laxative action. Promoting more-rapid movement of materials through the intestines is neither safe nor healthy.

- **Gums and Texturizers**
  Plant-derived gums and texturizers expand in the stomach as they imbibe water, but their effectiveness at producing the claimed "fullness" response so one eats less is questioned. Cellulose and alginate-containing products are marketed for such purposes.

- **Diuretics**
  Use of diuretics, herbal or otherwise, achieves rapid, but temporary water loss. The old person's tale that a pint of water weighs a pound is accurate. But as soon as one hydrates to replace the lost fluid, the weight is regained. Diuretics are totally ineffective weight loss products and potentially harmful just as all causes of dehydration are potentially harmful.

- Heat wraps, body wraps and similar things promote dehydration and are not effective or safe.

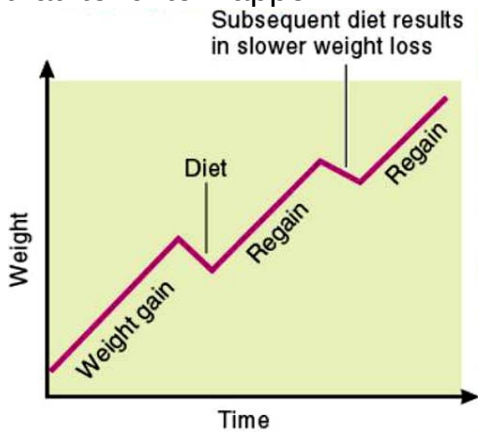
- **Regulation Intervention**
  Some health-conscious consumer groups advocate regulations that would limit our access to health-endangering foods. Proposed controls might include:
  - Restrictions on advertising for high-fat and non-nutritious foods
  - Requiring health warnings on high-fat and non-nutrient dense foods for more consumer awareness,
  - Removal of non-nutrient dense and high-fat foods from vending machines, particularly in schools
  - Taxing high-fat and non-nutrient dense foods
  - Controlling package sizes
  - Fines for companies that promote sales of high-fat and non-nutrient dense foods without health statements

Weight Maintenance

Once a person achieves a target weight, ideally using a sensible weight loss strategy, how can the appropriate weight be maintained when the majority of those who lose weight regain the weight within months, and often gain more than they lose.

Those who successful maintain an appropriate weight do two things the rest of us don't: **Exercise seriously** and **scrupulously watch what is eaten**.

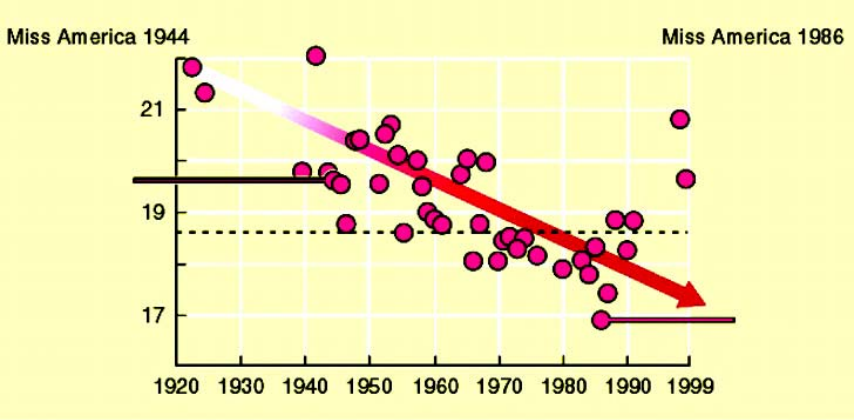
- Unless regular and sufficiently vigorous exercise is maintained, the body slows metabolism when calories are reduced as part of our evolutionary protection against starvation. Even when we are eating enough, the body may be more efficient as using calories, so we store more.
- Unless eating behavior changes, after the target weight is achieved, most revert back to the eating patterns that resulted in weight gain in the first place.
- Each time one gains weight it's harder to lose it, since most diets result in some combination of both fat and muscle tissue loss (we don't spare protein by eating sufficient carbohydrate) and excess weight gain is fat tissue only. We slowly accumulate more fat and less muscle. All of us are familiar with the 'yo-yo" effect of chronic dieting, including the changes in proportions of fat to muscle tissue that tend to happen.



Gaining Weight to Achieve and Maintain Health

So many of us focus on trying to control eating behaviors, that we lose sight of the problems that some have trying to consume adequate calories. Underweight individuals need strategies just as much as those who are overweight, and weight gain can be difficult, emotionally as well as physiologically. Many underweight people fail to understand the potential health risks associated with their body weight.

The problem of underweight is so great that we also have a national epidemic of "**disordered eating behaviors**". This is especially true in a nation that seeks approval in body appearance, and we are in a time when the excessively slender individual in promoted as desirable. If one doubts this, we need look no further than the BMI scattergram for Miss America winners from the past 50 years.



At least 5% and probably closer to 20% of America's teenage females have some level of eating disorder. The 5% figure includes just those who need medical intervention. Our collective idea of the ideal body is one that is increasingly slender in waist and hips, while maintaining an unnatural bust in proportion to waist and hips. This idea of ideal is so ingrained in our young people, that boys of six when asked to describe an ideal girlfriend, as if a boy of six should have a girl friend, they draw circle around the chest to indicate that a girlfriend should have large bosoms. Girls of six are talking about dieting to become slimmer and more attractive.

At least one fashion designer stated she would prefer to have male models for her women's clothing designs because her clothing draped better over the more-slender male hips. Why are we designing clothes that fit male hips when genetically the female pelvis is broader than the male pelvis? Forensics can most easily identify the gender of skeletal remains by looking at the pelvis.

For those who are moderately underweight and can accept that the appropriate body for health requires weight gain (and a new wardrobe for a modified body shape) some of the following are recommended:

- Consume energy dense foods that have a higher fat content, such as peanut butter, nuts, seeds and full-fat dressings. Maintain a fat intake of 30% of calories, with an emphasis on monounsaturated fatty foods.
- Eat at least three meals per day, preferably more. Be sure that each meal has adequate calories and variety.
- Try to increase portion size of foods consumed. Those who are underweight often have portion sizes that are too small, in contrast to so many of us who prefer the super sizes.
- Eat lots of calorie-rich snacks. This is one case where the fat-free snacks that have lots of calories are fine, so long as adequate nutrient dense foods are included in the diet.
- Consume juices and milk rather than water and sugar-free beverages
- Exercise daily to ensure that weight gain will result in muscle development, not just adipose tissue.

Unfortunately, we have in the United States today between 5 - 20% of our young women (and some men) with some degree of eating disorder that affects their health and total well-being who are not able to accept that an appropriate body shape for health is not one that is excessively slender.

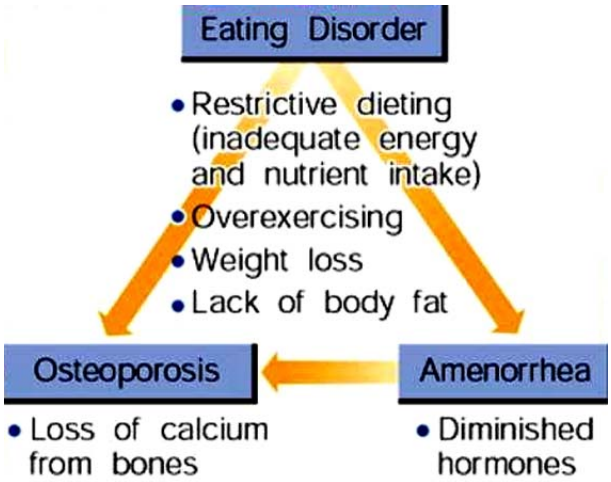
For some, their self-image is one of a person whose body is inappropriately large. A woman suffering from the eating disorder, anorexia nervosa can look at someone else and see a slender person. When she looks at herself in a mirror, she sees not a too-thin person but one who is obese. Young women who weigh 75 pounds and whose bones are clearly visible through their skin can look into a mirror and state they need to lose 2" in their hips. What they see is that the width of their hips in the mirror is greater than the width of their shoulders – and equate that difference with excess body weight. It is not for the rest of us to wonder why this is. It is. The reasons that underlie eating disorders are too complex for a general nutrition course, and involve physical and mental health. The factors that lead one young woman to an eating disorder and not another have no explanation, but there are some trends. Puberty is a particularly vulnerable time for impressionable young people bombarded daily with ideal body image messages and how to be attractive. It is also a time when young people are geared toward achievement and success.

All of us feel pressure to do well and succeed. All of us want to please. All of us want to be attractive. All of us want to be in control. Many of us feel that our lives are out of control. When we think we have lost control, we are also more likely to have a negative self image. Most of us, at some time or another, think we have lost control of almost everything around us and seek to find at least one thing we can be in charge of. For some, that one thing starts out as being in control of what we ingest. And for some, what starts as a way to gain control of some aspect of daily life, becomes an eating disorder.

Among the most common suffering eating disorders are young female athletes, in particular those who participate in distance running, gymnastics and ballet. Often weight is associated with better performance. It is common for weigh-ins and target and/or maximum weights for competition may be imposed by coaches. Even when not imposed, impressionable young women may see a competitor who performs better and who weighs less, and think they can improve performance with weight loss. Wrestling is another sport that imposes similar restrictions, and young male wrestlers are subject to the same pressures. It is common for young men to restrict both eating and fluid intake to meet a weight criterion for wrestling. Failure to meet the weight restriction means no competition. Since water loss achieves weight loss most rapidly, it's a common practice to dehydrate prior to weigh-in. Intense physical activity when dehydrated can be deadly, literally.

Severe eating restriction becomes habit with young female athletes. Since young female athletes start out in optional health conditions, the effect of malnourishment and extensive exercise are not readily seen, sometimes for months, or even years. Our society applauds slender and applauds athleticism. Young women who succeed get the praise and reinforcement they need to continue, sometimes unknowingly, unhealthy behaviors.

Young women who chronically under eat while extensively exercising often have associated amenorrhea and osteoporosis, a condition called the female athlete triad. Amenorrhea is common, because there are insufficient fat reserves to synthesis needed hormones. Sterility can be a longer-term impact of this. Stress fractures are common because bone density is affected by calcium loss. Loss of body muscle tissues to maintain critical energy needs impacts long-term cardiovascular health.



Before we leave the subject of disordered eating and athletes, the reverse is also true. Some young men will do almost anything to achieve muscle bulk, spending hours daily on muscle-building exercise and taking assortments of supplements, growth promoters, protein powders, not to mention anabolic steroids that promote more-rapid muscle gain at the expense of normal steroid hormone regulation. Heart, Kidney, and Testicle function are affected with the use of anabolic steroids.

Clinical Eating Disorders: Bulimia and Anorexia Nervosa

All of us should be aware that anyone can be a victim of an eating disorder. We need to have awareness of this subject because those with eating disorders are just like everyone else, with the exception that too often their disease is hidden. Since we often react with "How could someone do that? I could never do that?" when discussions of eating disorders come up, eating disorders remain hidden. Each of us needs to increase our sensitivity to these problems, so that we might support better those who are not able to have normal eating patterns.

We still ask why do we uniquely have this problem in the United States? As stated previously, much of which is presented on TV, and in magazines and in shopping mall manikins, show women as slender, attractive, with perfect makeup and clothes. Slender women are portrayed as vibrant, active and beautiful. Commercials for all sorts of products display slender women and attractive muscular men enjoying life (presumably because they use certain products). Rarely do advertisements show larger dimensioned humans.

A typical fashion model is 5'8", weighs about 106 pounds and is a size 4-6. "Large" fashion models are usually size 14. The average woman is not 5'8" tall and does not weigh 106 pounds. The average large woman wears plus sizes, not size 14. It's all image. During the 1988 presidential political campaign, Barbara Bush was asked why she did not color her hair to "improve" her image. This inquiry received national TV and news magazine coverage. No male has ever been asked that question. To Barbara Bush's credit, she saw no need to improve her image.

Slender has not always been the ideal, and is not the ideal today in all cultures. Some differences from the past:

- The models for the "Masters" of the European Art, such as Reuben's were voluptuous. Today we view voluptuous as "fat".
- The female movie stars of the 1940's and 1950's by today's standards are fleshy.
- WWII pin-up models are considered fat by young men and women who are shown their photos today.

We lack a sense of biological reality today and young teens are most susceptible to image.

Thirteen and 14 year olds hear of ways to lose a few pounds. Teen magazines have profiles of young teens who have "successfully" achieved weight loss to reach desired weights and clothing sizes. It's easy to try a diuretic, or laxative or purgative once or twice when a friend tells you it's OK to have that fattening pizza because you can "get rid of it" afterwards. It's easier even still, to keep on using them.

Your text profiles typical women who have eating disorders, and discusses some of the characteristics of anorexia nervosa and bulimia. Our focus should be on the development and nature of the problem. Once an eating disorder is established, the behaviors are not by choice.

Anorexia Nervosa

Diagnosis of Anorexia

- Weight 15% below minimum recommended weight range for height and age
- Not being able to gain weight induced by psychologically not being able to eat
- Fear of weight gain and fear of getting "fat"
- Distorted body image – Anorectics think they are fat in comparison to normal weight persons they perceive as normal weight.
- Amenorrhea
- Obsessive and compulsive non-eating. Anorectics can not and/or will not eat

Anorexia may have elements of addiction related to starvation and release of brain chemicals that alter the body to help cope with the effects of starvation, but this is speculation.

Anorexia and marasmus are two variants starvation. In both, victims are literally dying. For both it's a matter of whether adequate nutrition can be provided to restore the body to health before death happens.

Physical Problems Associated with Anorexia Nervosa

- Thyroid and adrenals abnormal
- Blood pressure abnormal
- Heart and other muscles weaken, heart arrhythmic
- Immune system abnormalities
- Anemia
- Digestive disorders (atrophy of digestive tract)
- Diarrhea
- Amenorrhea
- Starvation symptoms
    - blood lipid levels
    - Vitamin A levels
    - abnormal brain waves
- Sudden death, usually from heart failure

Treatment

Treatment of anorexia requires both counseling and assistance in addressing the reasons for not being able to eat, and far too often, forced feeding. When force feeding is mandated, it often complicates the treatment of the causes and exacerbates the problem. If we can't treat why the person isn't able to eat, forcing eating doesn't help in the long term. However, sometimes it's needed to prevent incipient death.

Bulimia
Diagnosis:

- Binge eating, especially of high calorie high carbohydrate and high fat foods that are easy to swallow, alternating with serious calorie restriction
- Eating alone and secretly and feeling guilty about the behavior
- Conscious that eating behavior is abnormal
- Anxiety about eating and anxiety surrounding the planning needed to eat secretly and keep behavior secret.
- Chronic concern about weight and need to control eating patterns
- Purging after binge eating and sometimes after "normal" eating
    - vomiting
    - laxatives
    - enemas

Those who have bulimia are often normal weight and body appearance, or may have yo-yo dieting with weight gains and weight losses. Friends and family members may be unaware of bulimia for months and even years, because binging is secret, and calorie restriction that doesn't lead to serious weight loss goes unnoticed.

After a period of time, a person with serious bulimia can no longer keep food in body, since the behavior has "trained the body". Even the perception of food can cause purging reactions.

Physical Problems Associated with Bulimia
Bulimia can result in serious nutrient deficiencies, damage to the esophagus and oral cavity from stomach acid from chronic purging. Tooth erosion from acid is common. The electrolyte imbalances may cause liver, kidney and heart damage

After a period of time, the person can no longer keep food in body, since the behavior has "trained the body". Even the perception of food can cause purging reactions. Reverse peristalsis is automatic when food enters the stomach if vomiting is habitual. If the bulimic uses cathartics, diarrhea is uncontrolled.

Treatment of Bulimia
Training the stomach to accept food without purging is often the first step in serious bulimia cases. For others a structured and monitored eating plan that includes appropriate calories for daily requirements to maintain weight can be implemented for bulimia treatment. A big step is learning to eat regularly for health. Bulimia is rarely self-cured. Most need counseling and support to treat the underlying reasons that lead to binge eating.

Binge eating behavior does not have to be associated with bulimia. Some who are chronically overweight and chronically diet without success may binge eat after a few days of dieting. Their attempt to restrict calories is so frustrating that the cravings for foods overwhelm them and they over-consume to satisfy the cravings. Those who binge eat think they cannot control the cravings. The binge brings no relief, the dieting doesn't work, and the weight stays on. Fortunately, binge eating without the other symptoms of bulimia can be treated and most respond well with therapy. Therapy does not ensure weight loss, however, and obesity can still be a health problem.

Treatment of the Societal Causes of Eating Disorders

This is something that each of us has to work on. There is no miracle pill to erase the culture that has brought us to the slender ideal or any miracle pill that will change us to a culture that values health more than image. An introductory nutrition class can advocate eating and lifestyle behaviors that promote health. It has no explanation for why we think body image is so important to who we are, or what determines the body image we think is ideal.