

American Adiposity

A Growing Concern



Obesity is quickly becoming one of America's biggest quandaries. The affliction is at epidemic proportions and there are no signs that it is slowing down. It has become such a concern that the United States government has waged a "war on obesity". The reason for this heightened attention to America's midsection is cost. Some States have reported obesity costs health care insurance over \$1000 per year per person¹, with a national average of about \$175 per person². This equates to hundreds of billions of dollars. What compounds this problem is that the population is getting even fatter. Estimates suggest that by 2030 the obesity level in this country will be between 60-70% if it stays at its current rate of growth. If this occurs it will become unaffordable to maintain health insurance. The reason for the cost is very clear - obesity has deadly side effects. Unlike other diseases that can kill a person quickly, obesity often takes decades before a sufferer pays the ultimate price.

Obesity is so detrimental to health it has even developed its own multi-symptom condition called Syndrome X. Syndrome X is quickly becoming a common term in the medical and health professions. It is the combination of obesity with its comorbidities - hypertension, hyperlipidemia, and Type II diabetes. This condition eventually leads to a very costly death, most often from heart disease.

Obesity has the Allied health professions on the ropes without a solution. Insurance companies are now reimbursing treatments for obesity. Prior to 2004, insurance would only cover costs for diseases stemming from obesity, but the number and variety of diseases related to excess body fat has companies scrambling to intervene. Drugs and invasive surgeries are becoming very common, and costs, risks, and ineffective long-term results show it is not the solution.

To furnish a viable solution for the current epidemic one must understand what causes the disease in the first place. The logical conclusion for most cases of obesity is an imbalance between calories consumed and calories expended. Essentially it is an over consumption of food and not enough physical activity to balance it out. Although physical activity, or the lack

there of, is a major contributor to the problem, excessive food intake is the primary reason for obesity. This is evident by the number of physically active Americans that are still overweight. So, the question that begs to be answered is why do people consume too much food?

Part of the answer to this question lies in the complex process the body undergoes to regulate weight. Numerous interconnected systems, chemicals and hormones influenced by environmental and genetic factors ultimately determine a weight homeostasis, often referred to as set point. Set point is the theory that the body wants to keep adipose mass at a constant. Some people claim that they cannot gain a pound of weight no matter what they eat, while others claim that no matter what they do they cannot lose any weight. Although characteristics of both statements have some merit, neither is completely factual. The fact is that the human body does have preferences towards a certain level of fatness. As long as the conditions are reasonable and no acute external force is so great it drives the body weight up or down the body will maintain certain fat levels based on a genetic predisposition. And though there are certain people with a greater propensity to become obese it doesn't mean they have to. Just like there are people with a greater chance of developing cancer it doesn't always mean they will. In both cases if we identify the risk and take appropriate action to intervene we can help to reduce its potential effect.

Genetics are said to account for 25-60% of a person's adult somatotype or level of fatness, suggesting there is definite predictability with genetics. It sounds bad, but the predictability is limited to these percentages. This means between 40-75% of a person's adult shape is a controllable factor. Additionally, the percentage of people with two generation risk factors is much lower than the 30% obesity population segment. This suggests that much of the obesity today is a combination of genetics and behaviors, with many scientists leaning towards the latter. Genetic obesity traits are often identified by a higher number of fat cells and larger fat cells. A genetically predisposed individual may have twice the

number of fat cells (preadipocytes included) and those cells can hold 1.5x the lipids of a normal fat cell. Whereas individuals that become obese due to behaviors often saturate their fat cell capacity for lipids and then recruit preadipocytes to take on lipids to become mature fat cells. In either case reductions in total fat mass is attainable, but the prevention of the individual from becoming obese in the first place should be the priority.

So the question still exists; if genetics can only account for a small part of the blame than what is the cause of epidemic obesity? Ironically the same culture that condemns the word fat is the reason its population has become fat. American society has created and ultimately become a fat-flourishing environment. This environment is fueled by modern socialization, industrialization, manufacturing, commercialization and technology.

Modern socialization lends itself to the problem in three ways.

- 1) We associate food with festivity and social interaction.
- 2) Adults send signals to children about eating based on socially influenced cueing.
- 3) Education de-emphasizes the importance of the physical health in schools.

Socialized eating behaviors have a long history in all human cultures. Food to early humans was based on a reward system. Successful hunts called for a feast, while unsuccessful hunts came with a negative connotation, starvation. When humans were able to control food availability and longevity the feasts continued to represent gratification as the basic pleasure of feeding hunger became social or religious celebration, while plumpness was a sign of wealth. Today is not much different. Social events are still reflective of the feasts of the past. Most family gatherings have excessive food and drink. Social outings are often centered around eating or drinking, and food is still used as part of a reward system. We eat and drink more when we feel we have earned it. A common example of this phenomenon is take a look at restaurant patronage on Thursday and Friday compared to Monday and Tuesday. People feel they need to be rewarded at the end of the week for the effort they put in during it.

This reward system has transferred into another aspect of human sociology. Parents use food to positively reinforce children when they have been good or "earned it". If they are bad the action uses food to negatively reinforce behavior so they must go without. For example when a child behaves positively they get ice cream. When a child misbehaves they don't get any sweets or go to bed without dessert. Food itself has even become the reward for eating food. "Eat everything on your plate or you do not get dessert." is a commonly used statement. These signals are maintained through adulthood.

Many people will consume food until they are full and then continue to eat because their memory recalls their mother saying, "Finish your plate, people are starving in Africa" or their father saying, "I spent hard earned money on that food, eat it." Additionally some adults have kept, and often suppressed, emotional feelings related to eating and they use food as a comfort reward when those emotions are evoked, eating to replace the negative feelings inside.

Compounding the social/food relationship is a lack of education. In grades K-12 very little, if any, attention is placed on food and physical activity. When students are in grade school they learn colors, then numbers, then grammar, and as they age they get requisite academics, but when do they learn how to eat healthy? What courses teach healthy eating behaviors, appropriate serving sizes, the types and

Even some of
the high school
hero-athletes have
bellies flopped over
their pants. If they
couldn't stay fit
who can?

characteristics of carbohydrates, healthy versus unhealthy fats and the foods that represent the different aspects of healthy nutrition? At best, students get an incomplete representation of the food pyramid, some exposure to the classes of nutrients in biology, and maybe a lesson or two in health class, at best! For some reason we are exposed to math and English for twelve years, but the fuel that runs the body and the nutrients that keep it healthy and free from disease is academically irrelevant. Unless a person has nutritionally educated parents or role models they never learn about healthy

eating behaviors. The only attempts at health related fitness come from play or sports. Most physical education emphasizes moving around not learning about how to become healthy and then staying that way for a lifetime. This becomes painfully evident when you see how fat everyone has become at the five or ten year reunion. Even some of the high school hero-athletes have bellies flopped over their pants. If they couldn't stay fit who can?

Once one graduates from high school or college this lack of knowledge in healthy eating is combined with environmental conditions. Industrialization has pre-determined the average Americans day. We have scheduled eating patterns based on transportation, productivity, and time availability - which ironically is a factor of the previous two. Due to job responsibilities we must hustle to get up, hopefully eat something, which is often convenient food, deal with rush hour and enter an increasingly sedentary workday. This daily situation forces us to follow specific eating patterns. Commonly feedings occur based on a preset timetable. We can eat before work, at lunch hour, and after work, with an occasional snack in between. Industrialized feeding times are based on productivity.

After about two hours at their desk most people feel a biological poke called hunger. It is a response from the body indicating reduced blood sugar. If hunger is not met by food consumption, that poke from the body moves to the brain, where appetite is initiated. Appetite is a psychological

response to unmet physiological signals. Appetite causes our cravings to grow beyond what the body actually needs. So since productivity decreases after three or four hours industry figured it would be smart to have its human machines refuel at lunchtime. At this point most people over indulge on calories because their appetite has grown beyond biological need. Most people binge-eat during this one hour break from work partly because they feel they are starving and partly as a reward well earned. Following lunch the situation is recreated before we are allowed to leave for home. Dinner soon follows with the same outcome. This situation is played over and over again leading to a continuous and rather terrible internal environment

The human body is not designed to experience highs and lows in blood glucose levels – a response to the way most people eat. On the contrary, human physiology works best when the conditions are stable. This suggests several small meals throughout the day rather than two or three large meals. Eating 2500 calories over six meals for instance maximizes the metabolic process and enhances the efficiency of the body's systems. Fewer large meals increase the propensity for fat storage and expose the blood to surges of excessive concentrations of insulin. The long-term outcome of which is creeping obesity and Type II diabetes.

To make matters worse, manufacturing has changed the characteristics of the foods that Americans consume. Foods once rich in whole grains are now processed into low fiber, quickly digestible food products. These processed carbohydrates lead to dramatic and rapid increases in blood glucose referred to as the glycemic index. When the glycemic index is high the blood glucose concentrations increase quickly. This initiates the release of insulin to cause the sugars to be stored in the cells and subsequently lower the blood glucose to appropriate levels. When cells become saturated with glycogen (chains of glucose) the excess sugars circulating in the blood are used for energy or converted to triglycerides in the liver. This action leads to a reduction of fat metabolism and an increase in fat storage. And as if this situation weren't bad enough any other nutrients, particularly the fats, that were consumed with the processed carbohydrates have a greater chance of becoming stored fat.

If processed carbohydrates are bad, then sugars are worse. Manufacturers put sugar in almost all foods. It is commonly found in two forms in the American diet, sucrose or table sugar and high fructose corn syrup. High fructose corn syrup is manufactured to taste as sweet as naturally occurring fruit sugar, fructose, but does not have the same chemical formula and therefore reacts differently in the body. Both sucrose and high fructose corn syrup are a direct reason America has

become fatter. In the early 1900's Americans consumed about six pounds of sugar a day. In 2004 we consume 30 x that amount. Some studies suggest the average American eats between 20-30 percent of their total calories from sugar without even knowing it. Sugar is a major contributor to childhood obesity and Type II diabetes in individuals under 35.

When carbohydrates are consumed in the form of sugar and processed carbohydrates, everything bad about carbohydrates is identified. When more complex sources of carbohydrates are consumed in the form of whole grains, whole fruits and vegetables, the benefits become quite evident. Complex carbohydrates provide fiber, increase the thermic effect of food (calories burned during digestion), and provide very important nutrients. When these complex foods are examined for glycemic index they are comparably very benign because they have a longer processing time. This reduces insulin spiking and the conversion of sugar to fat, and can actually enhance the efficiency of fat utilization during rest, rather than the body always running on ingested sugar. Manufactured foods should be consumed in moderation.

Once the manufacturers are done processing the food, commercialization takes over, using marketing tactics to control our perception of it. Food advertising often confuses consumers. Products that are fat-free or reduced fat make foods seem healthier. People often purchase the product believing they are eating foods that will improve their diet. The reality is people tend to consume more of the product, and the same, if not more calories than the original fat containing food itself. Food labels are also somewhat confusing for most people. They

read the fat grams and calories but do not relate the numbers to the quantities they consume. Most people do not have any concept as to what an appropriate serving size is. They often consume two to three times the serving size of food but believe they get the same number of calories that the label says is in one serving. Restaurants also contribute to this problem. In many eateries the quantity of food provided is much larger and has many more calories than a consumer needs. In general this confusion contributes to high calorie diets.

Eating habits in general are also a contributing factor. Location eating, emotional eating, and comfort foods cause people to add unnecessary calories. Many of these eating sessions are learned from childhood. Eating in front of the television, eating when we feel bad or bored and eating foods that we associate with certain situations, add calories to the body even though the energy is not needed. Additionally these



**Appetite causes
our cravings to
grow beyond what
the body actually
needs.**

habits are worsened because the quantity of food is frequently uncontrolled. Sitting down with the whole bag of chips or can of nuts does not provide any quantifying end to the eating. At least when the food is in a portion-controlled container or on a plate you know how much you have eaten.

The television adds two additional problems 1) People tend to eat when they are not hungry and 2) they often choose high calorie snack food because of its convenience. Nutritionists often attempt to separate the relationship between food and TV, recommending never to eat meals when watching it; whether dinner, breakfast or even a snack because much like Pavlov's dogs, humans too, have eating triggers. This association causes many people to want food when they watch television. Movie theatres have capitalized on this concept. More than 50% of their bottom line is soda, candy and popcorn.

Convenience eating has also become a huge problem for many people. Food on the run is simply a quick grab of calories. The foods purchased in convenient stores or fast food establishments are often high calorie low nutrient selections with the majority of energy coming from fat and sugar. Even the so-called nutrition bars are not so nutritious. These glorified candy bars are loaded with all kinds of unhealthy ingredients. For instance, just one bar a day can contribute to almost twenty pounds of sugar in a year. These diet disasters have saturated fat, trans fat, hide their sweeteners as sugar alcohols, and by volume, provide huge quantities of calories. As far as energy goes, two bars a day equate to about six miles of running. They are also often less filling than healthier meals of similar calories. Many people eat an energy bar and become hungry again in a relatively short period leading to additional consumptions of calories.

To coincide with the fast pace world that has us eating out of gas station food marts, technology has added its own set of complications to the maintenance of body weight. All of the increases in caloric intake have not been met by an increase in caloric expenditure. Many of the jobs that Americans perform have evolved to require less physical activity to complete them. In almost all aspects of American culture technology has lead to decreased movement. Daily activity has been minimized because it is no longer required to accomplish anything. The internet, television, computers and video games all encourage sedentary behavior. So as we drench our bodies with energy we do not provide an outlet for it to go. Remember energy can not be created or destroyed but it sure can be stored.

In most cases there is not just one reason why people become overfat. Rather it is the combination of the above mentioned variables, conditions and environments. Since there is no single cause there will never be a single cure. But if we can identify the pitfalls it is much easier to avoid falling into them. The key is being realistic. For most people it has taken their whole life to create the problem so expecting a quick and brisk resolution is unrealistic. Behaviors that took years to form may take years to break, but if people start taking steps, however small, in the right direction they will certainly get closer to reaching their goal. 
