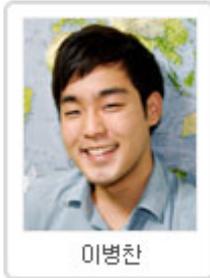


아동의 지방 섭취 실태와 관리 방안

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🔊 **[00:01]**

🔊 **[01:50]** Well thank you very much for inviting me to come and meet with you at this afternoon and talk about a serious problem that we are dealing with all around the world and that is childhood obesity.

🔊 **[02:05]** I am going to tell you a little bit about the situation in the United States and what we are trying to do to reduce the prevalence of childhood obesity.

🔊 **[02:18]** I am not suggesting that what we are doing is particularly the right way, but it is a way to go forward.

🔊 **[02:26]** Also I did not think that my slide presentation might hang gone through because it's a huge file within hand, I made some changes between bring the time I sent it because you will see a little bit of a difference between what I show and what is in your books.

🔊 **[02:45]** So why are kids fat and what can we do about it?

🔊 **[02:51]** In the United States about two thirds of our population is either overweight or obese.

🔊 **[03:00]** Or another way of looking at it is only a third of our population are of normal weight.

- 🔊 **[03:07]** So we have a prevalent problem and it affects children as well as adults about 20 to 25% of children between 6 and 19 years olds of age are overweight or at risk for becoming overweight.
- 🔊 **[03:25]** That means they are above 85% of weight for height on the gross chart for children.
- 🔊 **[03:35]** And since 1960 children between 6 and 17 years of age have gained weight increase 9 to 15 pounds more.
- 🔊 **[03:48]** So for example a ten year old child in 1960 may have weighed 40 pounds in 2002 that same child might weighed 50 pounds.
- 🔊 **[04:03]** So we are seeing a significant increase.
- 🔊 **[04:08]** The good news is that our data from the most recent years, 2007 and 2008, show no further increase in the prevalence of childhood obesity.
- 🔊 **[04:22]** We don't know if this is because we plat toed at a new level or if it is just a temporary plat toe and takeoff and go up higher again, time will have to tell.
- 🔊 **[04:35]** But we are encouraged that our list did not go further either in 2007 and 2008.
- 🔊 **[04:45]** So what we have is a generation XL among our children you know, in other words a extra large generation.
- 🔊 **[04:54]** I don't know if you do that in your clothes in Korea but you can buy a small, medium, large or extra large.
- 🔊 **[05:05]** We are pretty soon going to need small medium and largest will be extra large.
- 🔊 **[05:07]** And basically since 1980 the obesity rates in pre-school children, school-aged children and adolescents have tripled.
- 🔊 **[05:18]** And what we are seeing in conjunction with that is as our adolescents become young adults the rate of obesity between 20-30 years of age has also gone up.
- 🔊 **[05:34]** In fact, young adults is one population where the incident of obesity has been increasing more rapidly than any other group.
- 🔊 **[05:45]** So here are the maps of the changes in the prevalence of obesity



within United States.

- 🔊 **[05:53]** These maps show each state and they are color coded to tell you what portion of the population in each of these states had a BMI grader in 30 or were about 30 pounds overweight for person that was 5 foot 4 inches tall.
- 🔊 **[06:12]** So you see in 1990 the map is pretty blue, meaning that the population across the United States generally only about ten to fifteen percent at the most who have BMIs above 30.
- 🔊 **[06:31]** This is 1999, look how much has changed since 1990.
- 🔊 **[06:39]** We now see a lot of dark blue states indicating that now the prevalence between 15-19% in those states and we see some tanned states which are, have prevalence between 20-24%
- 🔊 **[06:59]** And the tanned states are primarily in southern part of the United States, the southeast portion of United States where as you see lower rate obesity along the west coast or up in the northern part, north eastern part of the United States.
- 🔊 **[07:19]** It's not so great on the map the west coast and north eastern part of the United States, but it's rather than the South and the Midwest.
- 🔊 **[07:27]** Here we go to 2008 and you can see they are continuing to go up.
- 🔊 **[07:33]** Now we have only 1 blue state left in the United States and it's dark blue meaning that it's 15-19%.
- 🔊 **[07:44]** That state is Colorado.
- 🔊 **[07:47]** I lived in Colorado for 40 years. It is a state where there are lots of opportunities for physical activities, lots of mountains to go hiking on, skiing on, many many parks throughout the cities.
- 🔊 **[08:04]** It's a city of avid joggers, bicyclers and so I am not surprised to see that Colorado is the last holdout but now you see in the southern part of the United States and also up through most of the Midwest the incidence of obesity between 25 or over 30%.
- 🔊 **[08:26]** So even though we have a blue president now, you know that in United States we divide party by colors and there democrat like president Obama is, that's the blue party, president Bush was a Republican that's the red party.
- 🔊 **[08:43]** Right now, we have a blue president, a democrat but we become a



very red state or set of states when it's becomes to obesity.

- 🔊 **[08:55]** Also we've learned this, look at the population across the States that the incidence of obesity varies by race.
- 🔊 **[09:03]** These are data from 2008 and here are, is the prevalence of obesity in non-Hispanic white individuals living in the different states and you see that that's mostly around 20%,24% some of them up to 30% and these are less than 20%.
- 🔊 **[09:31]** So in California, my home state for example non-Hispanic white incidence is less than 20% obesity.
- 🔊 **[09:40]** but among the black population living in the various states you see the highest prevalence of obesity greater than 35%.
- 🔊 **[09:52]** And in between whites and the blacks are the Hispanics.
- 🔊 **[09:57]** I do not have of similar data types for exhibition but in general Asians living in the United States do not have as higher prevalence of obesity as our Hispanic population or an African American population.
- 🔊 **[10:14]** So Ethnicity affects the incidence of obesity and we see this among our children as well as among adults.
- 🔊 **[10:25]** And these are data for children in United States among all of the States and the highest prevalence of obesity is seen among the American Indians.
- 🔊 **[10:40]** In those children is actually above 20%, the highest of any population of children.
- 🔊 **[10:46]** Right behind them comes the Hispanic children and then down here, at the bottom of a, with the prevalence of around 10-12%, you see the blacks children as well as the Asian children and the Pacific Islander children.
- 🔊 **[11:10]** Remember I just told you previous slide that the Black population across the United States is where we see the highest prevalence of obesity.
- 🔊 **[11:21]** I've just told you here that among the Black preschoolers, their among the lowest in terms of obesity.
- 🔊 **[11:30]** So obesity in the Black population is primarily among the adults not the young children but that is not the case among our American Indian or our Hispanic children.

- 🔊 **[11:45]** So how does obesity affect the future of today's youth?
- 🔊 **[11:51]** If we have not leveled off increasing rates of obesity, if they continue at the same rate as they are going between 1990 and 2006.
- 🔊 **[12:11]** By 2040 90-92% of the people living in United States will be obese.
- 🔊 **[12:16]** In other words almost everybody will be obese.
- 🔊 **[12:21]** If that occurs a life expectancy is expected to decline in fact some people have done modeling for this phenomena and have predicted that children born today and becoming obese are going to live shorter lives than their parents.
- 🔊 **[12:39]** In other words, they are not going to live as long as their parents.
- 🔊 **[12:44]** It's been estimated than 1 in 3 children born in 2000 will develop diabetes and 1 in 2 minority children will develop diabetes.
- 🔊 **[12:58]** So the health care cost are going to triple and you probably been hearing in the news that we are trying to approve a new health care plan for the United States, if this actually occurs I have no idea how we will be able to pay for it.
- 🔊 **[13:15]** And another thing that is a problem is finding people who can carry out jobs that are important to society that require a lot of physical activity who are able to perform the jobs.
- 🔊 **[13:30]** Such as the arm forces or other jobs of physical labor such as fireman and policeman.
- 🔊 **[13:37]** In fact my son has served in the army and he tells me one of the most serious problems he had to deal with in the Army was obesity and overweight among the soldiers that couldn't do their jobs.
- 🔊 **[13:56]** So why has obesity increased over the past 35 years not just in the United States but also around the world?
- 🔊 **[14:05]** And there are 3 reasons.
- 🔊 **[14:07]** Maybe there is genetic mutation that has occurred so that we are going to be all obese.
- 🔊 **[14:15]** Maybe we are eating more or maybe we are moving less or maybe some combination of these 3 reasons.

- 🔊 **[14:25]** I really can't think of any other possibilities, so let's take a look in each one of these.
- 🔊 **[14:31]** Here's the stone-age man and here's the man of today.
- 🔊 **[14:38]** As you look at the man from a stone-age, a back of thousands of years ago and compare him to the man of today you might concluded that there has been a genetic mutation that has occurred.
- 🔊 **[14:51]** They don't look similar.
- 🔊 **[14:54]** But actually there is no evidence that we have a genetic mutation in our genes that are leading us to become obese.
- 🔊 **[15:03]** But what we do have still today in adults is the physiology that was created during the stone-age which enables us to use the energy that we consume in our diet very efficiently.
- 🔊 **[15:19]** And if we don't need to use it at that time for physical activity to store it and then mobilize it when we need to run away from the tiger or whatever was chasing us back in a stone-age.
- 🔊 **[15:34]** Unfortunately today, we don't live those kinds of lives but we still have the same physiology that we needed a thousand of years ago.
- 🔊 **[15:48]** A physiology for survival during hard times and that's part of our problem.
- 🔊 **[15:56]** We do need to think little bit about epigenetic though.
- 🔊 **[15:58]** They are probably epigenetic changes in Genome that has enhanced the risk of obesity.
- 🔊 **[16:08]** An epigenetic change is a structural change in the gene that turns the gene off or on in response to the environment.
- 🔊 **[16:19]** In other words it's an adaptation that you can make in your genes so that you can survive in the environment, you are in more easily.
- 🔊 **[16:31]** And this structural change is basically just putting a methyl group onto cystine in your DNA and when that methyl group attaches to the cystine then that gene cannot be activated.

- 🔊 **[16:50]** and so it doesn't carry out its function and it appears that there are critical times in our lives when we can undergo epigenetic changes.
- 🔊 **[17:02]** Those critical windows are in [17:08] utero, fetal life, and during the first couple of months after birth.
- 🔊 **[17:13]** So there is a evidence that is accumulating now, but infants who are un nourished in utero are more likely to become fat, if they encounter excess calories once they go into the real world.
- 🔊 **[17:31]** If a mother is surviving on a marginal diet during her pregnancy, the fetus gets the signal from her based on the amount of nutrients crossed into the placenta, and goes to fetus, and epigenetic changes in DNA of fetus occurs so that it be... those genes become more thrifty.
- 🔊 **[17:56]** Have you heard of the thrifty gene?
- 🔊 **[17:58]** Well, that's what happens in the fetus who are born to a mother who are under nutrients during their pregnancy.
- 🔊 **[18:03]** So, that baby is then born, but all that once the baby is surrounded by an excessive amount of food.
- 🔊 **[18:11]** And so there are plenty of calories, but since their thrifty genome there, it's thinking it has to conserve everything that is available, and consequently obesity occurs.
- 🔊 **[18:25]** And there are quite a lot of evidence now and that this has occurred in not only United States but also in many developing countries.
- 🔊 **[18:34]** So the theory is that it's the epigenetic changes in utero the program the child to store excess fat.
- 🔊 **[18:46]** And also overfeed in the child during the first four months of child is another way in which a child may store excess fat.
- 🔊 **[18:55]** There also is evidence that infants who are exposed to an excessive amount of energy in utero, have a change in their hypothalamus so that they can't regulate their appetite as well, and they tend to overeat and consequently they too are at risk for the obesity.
- 🔊 **[19:18]** Two totally different mechanisms, but infants born to underweight starving women, as well as infants born to obese women who have an ample supply of fuel for the baby, can both become obese.

- 🔊 **[19:39]** So let's move on then to energy imbalance, which is probable more likely to cause the obesity that we are seen today.
- 🔊 **[19:48]** Energy imbalance is when the energy that is going in from food is greater in the amount that were burning do the physical activity or work.
- 🔊 **[20:01]** In other words, the food supply relative to work out that you are doing with barbells or running or walking or bicycling or whatever you do is not equal.
- 🔊 **[20:13]** And consequently that energy get stored as fat.
- 🔊 **[20:18]** And it does not take a lot of extra energy to store a significant amount of fat.
- 🔊 **[20:24]** Over a period of time, say a year, if you eat a 50 to a 100 excess calories a day, you will gain about 1 to 2 pounds during that year.
- 🔊 **[20:38]** So small of differences can have significant effects.
- 🔊 **[20:45]** But it goes the other way too.
- 🔊 **[20:48]** You don't have to reduce your intake very much to lose a couple of pounds over a year, so we keep emphasizing small changes can have big effects if they are carried out for a long period of time.
- 🔊 **[21:04]** So, let's talk first about calories intake.
- 🔊 **[21:08]** Has it changed dramatically in the past 20 years among our children.
- 🔊 **[21:13]** We have about 10 percent increase in children in the last 20 years.
- 🔊 **[21:19]** In 1980s about 5 percent of our children were obese.
- 🔊 **[21:25]** Today it ranges from 15 to 18 percent.
- 🔊 **[21:29]** However, if you look at the national survey data that has been done in the United States, we do not find a very big increase in calorie intake.
- 🔊 **[21:43]** It comes out to less than 1 percent.
- 🔊 **[21:46]** People were just reported in the American journal of Clinique, nutrients they couldn't find any differences in calorie intake in our children between 1980 and 2006.

- 🔊 **[22:01]** And we all know, it's very difficult to find out what people are really eating.
- 🔊 **[22:06]** And people do tend to forget the major sources of calorie when you talk them about what they are eating.
- 🔊 **[22:14]** So possibly it's been under estimated.
- 🔊 **[22:18]** But in any rate, it does not seem like it is a big change in energy intake.
- 🔊 **[22:25]** But we know that the eating habits of children in the United States has changed dramatically during the 20 year period of time.
- 🔊 **[22:35]** There is a growing trend in fast food consumption over that 20 year period.
- 🔊 **[22:43]** Americans eat out two, I mean, 4.2 times per week they eat at a restaurant, what's that like in Korea?
- 🔊 **[22:53]** Do you eat out that much or do you eat at home more?
- 🔊 **[22:57]** It is about four times.
- 🔊 **[22:59]** A third of a American children, a third of them eat fast food every day.
- 🔊 **[23:07]** Ten percent of the adolescence in California eat fast food two times a day, and since 1970s the data shows the fast food consumption by children has increased by 5 fold in the United States.
- 🔊 **[23:33]** And when a fast food meal is eaten, it's estimated that the individual consumes almost two hundred calories more at that meal than if they have eaten at home because meals tend to be very high in fat.
- 🔊 **[23:42]** When I say, when I talk about fast food, I am talking about those restaurants that you can go really quickly, McDonald, BurgerKing, Pizza Hut, Wendy's, Wendy's I don't think you have when these in Korea, do you, KFC, yes, DunkinDoughnuts.
- 🔊 **[24:05]** Yes, those places, I've seen those places here too.
- 🔊 **[24:12]** Also, in conjunction with eating out at fast food restaurants seems to increase in sugar consumption among our children.

- 🔊 **[24:22]** In the last 20 years, the intake of soft drinks among children in the United States has doubled while the intake of milk consumption has dropped by 40 percent.
- 🔊 **[24:34]** And the high intakes of sugar and refined flours causes the spike in blood sugar that can lead to feelings of hunger and then lead to an intake of larger amounts of food.
- 🔊 **[24:51]** Go into that just a little bit of detail and just a little bit.
- 🔊 **[24:56]** So here is the soda data and you see that between 8 and 18 years of age, the milk intake drops by one half.
- 🔊 **[25:07]** This is the milk, 8 years old of child eats about, consumes about 12 oz a day, at 18 it stops to 6, whereas soda goes from 6 oz a day to 18 oz a day.
- 🔊 **[25:27]** So children stop drinking milk and start consuming more sodas.
- 🔊 **[25:33]** With [25:34] as well as higher intake of sugar.
- 🔊 **[25:40]** These are top 10 sources of calories in the United States among all individual, not just children but children and adults.
- 🔊 **[25:52]** The number one source of calories in the American diet is regular sodas making up about 7 percent of caloric intake of Americans on a daily basis.
- 🔊 **[26:05]** And I have color coded these ten items by making them red if they are high in sugar or refined carbohydrates and yellow if they are high in fat.
- 🔊 **[26:20]** You see the yellow, all of them are either high in sugar or refined carbohydrates are high in fat.
- 🔊 **[26:26]** So soft drink is number one, next is cake, sweet rolls and doughnuts and hamburgers, cheeseburgers, pizza, potato chips, rolls, bagels, muffins, cheese, beer, and then French fries, not a very good diet, is it?
- 🔊 **[26:45]** These ten sources of foods make up a third of total caloric intake.
- 🔊 **[26:54]** That means you have to get all the micro nutrients that you need, vitamins and minerals and the remaining calories because there is not much associated with these particular foods.
- 🔊 **[27:05]** Now I want to go back and talk a little bit about the type of carbohydrate and why it's important to be concerned about the type of

carbohydrate.

- 🔊 **[27:15]** I emphasized that there's been this increase in sugar and simple carbohydrates.
- 🔊 **[27:22]** Why are we concerned about that?
- 🔊 **[27:25]** If you eat for breakfast for example, several doughnuts with a glass of orange juice, you've consumed a meal that is high in rapidly digested carbohydrates.
- 🔊 **[27:42]** It goes through the stomach into the large, small intestine and the sugars get absorbed very quickly.
- 🔊 **[27:48]** So what is going to happen, your blood sugar is going to rise really fast and as the blood sugar goes up, the pancreas quickly response by pouring out insulin.
- 🔊 **[28:01]** But it's going up so much and so fast that the pancreas thinks she's going to have a huge load of glucose to take care of, so it secretes more than what is really needed to get that glucose into the muscle in the adipose tissue.
- 🔊 **[28:21]** And the blood glucose level dropped below what they were before you even ate that breakfast.
- 🔊 **[28:26]** So by 10 o'clock, your stomach is growling and you are hungry again and what do you do, you go have another doughnut or you go have a dish of maybe something that's primarily high refined carbohydrates.
- 🔊 **[28:43]** If, instead, you have a breakfast that's made up of carbohydrates that are very complex, high in fiber, and slowly digested, the response's very different.
- 🔊 **[28:57]** You see the blood glucose level goes up much more gradually, they don't get quite as high as they do when it's rapidly digested, the insulin secretion in pancreas is more slow and it takes the blood sugar into the cells at a gradual way.
- 🔊 **[29:17]** And you don't have this plummeting drop in your blood glucose that makes you feel hungry.
- 🔊 **[29:23]** So consuming oatmeal or a high fiber cereal or some legumes for breakfast would be type of slowly digested and that would prevent post perennial decline in blood glucose that makes you hungry.
- 🔊 **[29:42]** Now if you are overweight, and have a lot of body fat, the situation is



even worse.

- 🔊 **[29:52]** High amounts of body fat cause insulin resistance, meaning that that's more difficult to get the glucose into the muscle, and into the adipose tissue.
- 🔊 **[30:05]** So let's say that this is an individual here with healthy cells, no insulin resistance, and this is the cell wall right here, this is the barrier that you have, get that glucose across and into the cell.
- 🔊 **[30:19]** Everything's working pretty fine that insulin comes out, helps the glucose in and everything's fine.
- 🔊 **[30:25]** But if you got insulin resistance because you have a high amount of body fat, the insulin has to go really high in order to get the glucose into the cell.
- 🔊 **[30:38]** And if that goes on for a year and after year, or if you become pregnant which also causes insulin resistance to occur, sometimes your pancreas just wears out.
- 🔊 **[30:52]** And it can't continue to make the insulin needed to get the glucose into the cell and then you have the diabetes.
- 🔊 **[31:01]** So that is the major cause of diabetes today particularly type 2, we call it type 2 diabetes.
- 🔊 **[31:07]** It's a high amount of body fat and it can be exacerbated if not only do you have a high amount of body fat but you are also eating a diet high in simple carbohydrates.
- 🔊 **[31:21]** Then you are making that pancreas work even harder to get all the carbohydrate into the cells.
- 🔊 **[31:31]** So one of the ways we can deal with reducing type 2 diabetes is to lose weight particularly body fat and also consume complex carbohydrates.
- 🔊 **[31:44]** So the pancreas doesn't have to work hard to get the glucose into these cells.
- 🔊 **[31:52]** So we can do this by replacing simple, complex, slowly digested carbohydrates.
- 🔊 **[31:58]** And examples of rapidly absorbing carbohydrates are fruit juices, refined breads, pastries, and cookies, refined pastas and rice and wine, probably refined white rice is the most hydrated in your diet and sodas and sweet beverages.

- 🔊 **[32:21]** The slowly digested carbohydrates are whole fruits, WW breads, or low glycemic cereals like oatmeal and brand cereals, and there are some energy bars on the market that are low glycemic.
- 🔊 **[32:38]** There is a company, I don't know if you get the bars here called Kashi, do you get those bars, Kashi bars?, No.
- 🔊 **[32:45]** They are very high, complex carbohydrates that are slowly digested.
- 🔊 **[32:49]** And of course legumes, lentils, and beans and then water and dairy beverages instead of sodas and sweet beverages would be low glycemic.
- 🔊 **[33:01]** So what we want to do is to decrease the rapidly digested carbohydrates and increase the slowly digested carbohydrates.
- 🔊 **[33:12]** One more thing that has occurred in the last 20 years is that our portion size has gotten bigger, those of you have been to the United States, know that we get huge platters of food when we go out to eat, not appropriate portion sizes.
- 🔊 **[33:31]** In fact, if you go to our calorie books, and find out what a serve in French fries is, it's ten, ten French fries makes one service.
- 🔊 **[33:43]** There is nowhere that you can go in the restaurants in the United States and order a serving of French fries and just get ten.
- 🔊 **[33:54]** You get probably five times that of amount at least, so the servings of French fries increase the servings of hamburger that single oz three patty to multiple patties, we now that Burgerking has hamburgers that provide almost a thousand calories.
- 🔊 **[34:14]** And our sodas have increased tremendously, and even if you go to the latest editions of most popular cookbooks, you will find that the same recipe in 2006 serves fewer people than it did in 1970s.
- 🔊 **[34:35]** In other words, the cake is the same size but now you can only serve four with it instead of the 8.
- 🔊 **[34:43]** So even the recipe books have increased the portion sizes.
- 🔊 **[34:48]** The other thing is, when we have a larger portion offered to us, we eat more.

- 🔊 **[35:03]** And Brian Wansink, who is the author of very interesting book, it is fun book to read, called 'Mindless Eating' has found that people will eat more from large packages particularly around nine to thirty six percent more, then if they got a smaller package.
- 🔊 **[35:13]** And he did a very interesting study called the "Popcorn test."
- 🔊 **[35:17]** You know when you go to the movie you can get popcorn.
- 🔊 **[35:21]** And he did the study and what she gave some people small portion of popcorn, and other people the walked in got for free larger portions.
- 🔊 **[35:33]** And he found that individuals who got the larger portion, ate 48% more the know who got the smaller portions.
- 🔊 **[35:42]** In other words, even if they weren't hungry, was their, was very convenient weren't thinking, they were watching the movie and they ate the popcorn.
- 🔊 **[35:49]** The next day, he did the same study except now, he served popcorn that was three days old.
- 🔊 **[35:55]** So it was stale.
- 🔊 **[35:56]** It didn't even taste good.
- 🔊 **[35:59]** And he did the same thing and he found that the people who got the large portion still ate 34% more popcorn.
- 🔊 **[36:06]** So it wasn't taste that was cause them to eat the popcorn.
- 🔊 **[36:11]** It was the accessibility that made occur.
- 🔊 **[36:16]** Ok. So, our diet habit have changed
- 🔊 **[36:22]** What about calorie output?
- 🔊 **[36:23]** Has it changed in the past 20 years?
- 🔊 **[36:26]** And if you go to the surveys that had been done, on youth behavior and physical activity, the data show that physical activity has dropped about 13 percent among on youth in the last 20 years.

- 🔊 **[36:42]** So, what we have today, is a very sedentary landscape for our children.
- 🔊 **[36:50]** Children today spend of aged 2 to 18 spend about 5.5 hours a day in front of TV, video games, or computers.
- 🔊 **[37:01]** I find in our childhood weight management clinic that many of the children have computers or TV in their bedroom and as soon as they get home from school, they go into the bedroom and they sit there and they play video games until it's time to bed.
- 🔊 **[37:18]** They didn't eat dinner while they play the video games.
- 🔊 **[37:23]** Only 49 of 50 states students not required physical education for grades K through 12, the only state does is Illinois.
- 🔊 **[37:38]** So basically there's no physical education associated with the schools.
- 🔊 **[37:45]** I'm on the board of directors for programs called sports for kids
- 🔊 **[37:49]** This says group that goes into schools and manages recess and after school programs to enable the children to be more physically active and recess lunch time or after school
- 🔊 **[38:06]** And they have started this program because they found out that 40 percent of the schools in the United States no longer had recess or even lunch breaks.
- 🔊 **[38:20]** It just went straight through.
- 🔊 **[38:22]** They never provided time for the children to eat lunch.
- 🔊 **[38:26]** But the children couldn't get up and run around and go outside and work off some energy.
- 🔊 **[38:33]** And the main reason for doing away with the recess and lunch breaks was because the teacher said it's too difficult to manage the children during those periods of time.
- 🔊 **[38:44]** So they just asked to think of just continuing.
- 🔊 **[38:46]** If you think about child who has been physically active at all who has been playing on computer games at home at night.
- 🔊 **[38:55]** And comes to school sitting around some more, they going to be very



tired and fidgety and difficult to manage instead of sending them outside to work off some of that energy.

- 🔊 **[39:09]** They keep them more sedentary.
- 🔊 **[39:11]** So, not a very good solution.
- 🔊 **[39:13]** But sports for kids has been trying to overcome that problem.
- 🔊 **[39:18]** We have a lot of competitive sports programs, we have soccer programs for our children.
- 🔊 **[39:23]** We have a... baseball, we have youth football, we have youth basketball, but these are very competitive.
- 🔊 **[39:33]** Parents get very involved in those programs and they compete vigorously through their children with the neighboring town or the neighboring community.
- 🔊 **[39:44]** So these competitive sport programs have really evolved to be something just for the elite athletic child not for all children.
- 🔊 **[39:55]** So people are beginning to ask to children know how to play actively anymore.
- 🔊 **[40:01]** Have they actually forgotten how to do so.
- 🔊 **[40:07]** Here's the data from one of the study on the effect of electronic games.
- 🔊 **[40:13]** This study was actually done in Switzerland not in United States.
- 🔊 **[40:18]** It involved 870 of elementary school children and they looked at the youth of electronic games to determine the association between playing electronic games and obesity.
- 🔊 **[40:32]** And they found that the electronic game was an independent factor.
- 🔊 **[40:38]** After accounting for the fact of just watching TV on developing obesity.
- 🔊 **[40:44]** So I think it is one of the crucial determinants of a youth obesity.
- 🔊 **[40:53]** So let's talk a little bit about the mechanisms behind energy imbalance and why this energy imbalance is driving the obesity epidemic.

- 🔊 **[41:13]** We need to recognize that we have 8 complex systems of physiological factors to regulate our energy balance.
- 🔊 **[41:13]** It's not just one thing.
- 🔊 **[41:26]** It's not just appetite.
- 🔊 **[41:29]** It is a number of things.
- 🔊 **[41:31]** So, one aspect of our physiology involved in regulating energy balance is our brain appetite centers.
- 🔊 **[41:38]** Primarily in the hypothalamus that were increase your appetite or decrease your appetite depending upon your level of physical activity primarily.
- 🔊 **[41:51]** Blood metabolites, blood glucose, the amount of glucose going into your brain has an effect on your appetite.
- 🔊 **[42:01]** And so that two is involved in your hunger feelings, hormones, a number of hormones are involved in regulating how we metabolize our foods.
- 🔊 **[42:14]** And also signaling whether we hungry associated.
- 🔊 **[42:19]** Insulin is one of them, leptin is another one
- 🔊 **[42:22]** Signals from the stomach tell us whether we are hungry or full.
- 🔊 **[42:28]** Distention of stomach is key factor in telling you that you've been satisfied and now it's time to stop eating.
- 🔊 **[42:37]** I was giving this lecture recently to a group of school teachers in Oakland and we came to this point of the talk and they were surprised to learn that the way your stomach can talk your brain until you to stop eating and they set you know all of our children eat very very fast.
- 🔊 **[43:00]** They eat so fast that they don't take time to have that feeling of whether stomach has distended or not and therefore that they have been satisfied.
- 🔊 **[43:12]** So they felt that that was one of the most crucial problems.
- 🔊 **[43:15]** And then also what we eat has the factor.

- 🔊 **[43:19]** For eating fiber, as I just explained a bit ago, effectual glucose level, effect your hormone secretion and therefore affect your satiety
- 🔊 **[43:29]** So all these things together are involved in regulating our energy balance.
- 🔊 **[43:37]** So here is the old adipose cell, remember?
- 🔊 **[43:40]** We have the physiology of a man from the stone age.
- 🔊 **[43:44]** We're food wasn't always available,
- 🔊 **[43:48]** So we have a system to store energy that we can then use in times of need.
- 🔊 **[43:54]** And that system is add up the fat droplet, in the adipose cells.
- 🔊 **[43:59]** And we have a very crucial enzyme called "Lipoprotein lipase", that can enable us to take that fat out of storage and use it for energy.
- 🔊 **[44:12]** So what are the things that affect the activity of lipoprotein lipase?
- 🔊 **[44:17]** We want to increase this activity.
- 🔊 **[44:20]** Well, the, by increasing another puts more fat into the cell.
- 🔊 **[44:26]** We want to actually decrease the activity.
- 🔊 **[44:30]** It's not all fat is not the same in our body.
- 🔊 **[44:34]** The fat that is most metabolically active is that fat that is around the stomach and the liver.
- 🔊 **[44:42]** It's very metabolically active fat.
- 🔊 **[44:44]** And the lipoprotein lipase in that fat is extremely active.
- 🔊 **[44:51]** If you pick up some of the popular diet books, I don't know if you have seen the diet book called "South beach diet", here and Korea, across the top, they say, follow this diet and you'll lose your belly fat.
- 🔊 **[45:06]** Oh, it's old.

- 🔊 **[45:07]** Many many thousands, millions of copies
- 🔊 **[45:12]** Any diet will cause you to lose your belly fat if you cutting down on your energy intake or your fat intake.
- 🔊 **[45:21]** Your lipoprotein lipase activity is going to change and it will mobilize the abdominal fat first because it is the most metabolically active.
- 🔊 **[45:32]** Insulin, increases lipoprotein lipase so that it come put the extra energy into your fat cells.
- 🔊 **[45:41]** High energy intakes will increases it so that you can store that energy cause you are not going to burn it and if you sedentary you're not going to burn it so the lipoprotein lipase activity goes up.
- 🔊 **[45:54]** So, this is the system.
- 🔊 **[45:56]** So what happens then?
- 🔊 **[45:59]** In the stone-age situation, we have the situation were are genes haven't changed in years and we are designed to defend against weight loss.
- 🔊 **[46:09]** If you take away physical activity, the body is basically enable to regulate energy balance appropriately.
- 🔊 **[46:21]** We have to be physically active in order for this system to work.
- 🔊 **[46:28]** So here, we have this young boy who is thinking about going out and delivering his paper.
- 🔊 **[46:35]** He doesn't look to enthusiastic about it.
- 🔊 **[46:38]** He isn't wanting to be physically active.
- 🔊 **[46:41]** And consequently, his fat size, fat mass, and all of the hormones, secreted by the fat cells are going to become unregulated.
- 🔊 **[46:52]** Use of fuels, it's going to become unregulated, is going to use more glucose he's go to lose less fats, so the fat was stayed, and be stored.
- 🔊 **[47:02]** The brain signals will be altered.
- 🔊 **[47:06]** He'll not be able to recognize when he is hungry better.

- 🔊 **[47:10]** Body temperature will be adjusted and that's related to your energy expenditure.
- 🔊 **[47:15]** And the harmonic levels will be changed.
- 🔊 **[47:19]** All of those things are affected by physical activity.
- 🔊 **[47:24]** So, what are the guidelines for physical activity for children?
- 🔊 **[47:29]** The guidelines that we have in the states are at least 60 minutes, up to several hours if it is desired of age appropriate physical activity.
- 🔊 **[47:43]** Think there are very very few children in the U.S. that meet their standard.
- 🔊 **[47:47]** It's also recommended that there be several bouts of vigorous activity throughout the day and we discourage extended periods of inactivity.
- 🔊 **[48:00]** If you are going to watch TV, or play video games, keep it to less than 2 hours and then turn off the TV or the computer and get up to do something physically active.
- 🔊 **[48:14]** I used to make my son go jogging with me.
- 🔊 **[48:17]** They didn't like it at all.
- 🔊 **[48:18]** They will come after school, they have a small snack, and then I say, ok, it's time we jog upon the hills.
- 🔊 **[48:26]** Whole they complained .
- 🔊 **[48:29]** But I'm so proud of them they are both habit runners today as young adults.
- 🔊 **[48:34]** So, it helps to get this habits started early in life.
- 🔊 **[48:38]** So, lifestyle changes are effective.
- 🔊 **[48:40]** We've seen our own program.
- 🔊 **[48:44]** If you help children eat a healthy diet.

- 🔊 **[48:47]** Eat a healthy diet and be physically active by going for works for their parents they can achieve a healthy body weight.
- 🔊 **[48:59]** But it is also important that it isn't just parents that are necessary to carry out the changes.
- 🔊 **[49:06]** It takes the whole village to make a healthy child to valorous statement from Hillary Clinton.
- 🔊 **[49:13]** We need to think about the nutritional quality of our school lunches.
- 🔊 **[49:20]** I don't know you have bending machines in your schools, for we put in money and get a cookie or candy bar, or soft drink, you are lucky because we do.
- 🔊 **[49:32]** So you have, we have to be very careful about the quality of snacks.
- 🔊 **[49:37]** That we're put in Vending machines.
- 🔊 **[49:40]** We need to get physical activities back into the schools.
- 🔊 **[49:43]** Such concerns about the children meet in the standards of their testing requirements, but the physical activities has been continued but they can't learn if they have been active.
- 🔊 **[49:54]** We need to make sure that they have access to the safe playgrounds and need to careful about the types of advertising foods that occurs during Saturday morning, when they watching TV.
- 🔊 **[50:06]** And we need to provide healthy choices and portions in fast food restaurants.
- 🔊 **[50:11]** I want to end by pointy now even talking about children primarily in this talk.
- 🔊 **[50:17]** But preventing obesity is life long process.
- 🔊 **[50:20]** It starts in utero, I keep heating this wrong button.
- 🔊 **[50:24]** It stars in utero and that is also continues early in infancy by how the infant is fat.
- 🔊 **[50:34]** The toddler if the adiposity rebound the gain in body fats occurs earlier,

- ▶) **[50:42]** This means we're much more like it will become obesity later on and then as adults we have to continue being physically active watching our portion sizes and monitoring our body weight.

- ▶) **[50:53]** Thank you very much.