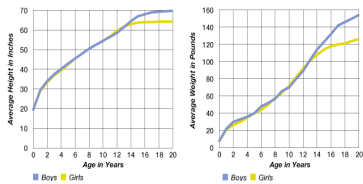


Goals & Objectives

- Learn the Facts
 - Physical growth, growth hormones, nutrition,
 - Puberty!
- Apply what you've learned
 - The "Fast Food Debate."
- Evaluate
 - Popular Diets.

By the Numbers

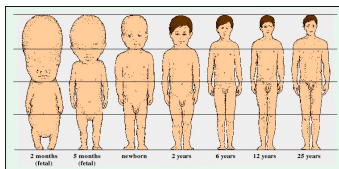
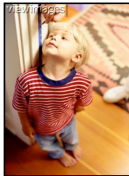


Features of Human Growth

- Not steady but in spurts
 - 1st year huge! 3x Weight
 - Then 3 inches and 7 to 8 pounds...
 - Until 10-12 when 4 inches, 16-17 pounds.

Cephalocaudal

- Grow from head to toe!
- Toddlers are top heavy.
- And inside-out!
- Proximodistal



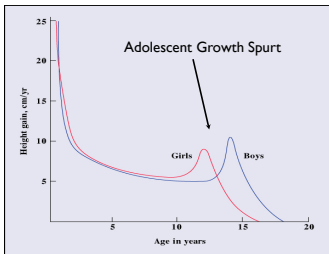
- Head = 50% of body in 2 month fetus but only 13% of adult stature.
- Legs = 13% of a 2-month-old fetus, but 50% of a 25-year-old.

Skeletal Development

- Prenatal skeletal structures are initially *cartilage* that will ossify
- Skull bones are separated by six fontanelles (soft spots) at birth; will be solid by age 2
- Ankles, feet, wrists, and hands develop more bones as child matures
- Bones develop both from center and ends (*epiphyses*).

Muscular Development

- No New Muscles! - Longer, Stronger!
- At birth, muscle tissue is 35% water.
- At birth, muscle tissue accounts for 18% to 24% of baby's body weight.
- By mid-20s, skeletal muscle accounts for 40% of male body weight and 24% of female body weight.



Adolescent Growth Spurt

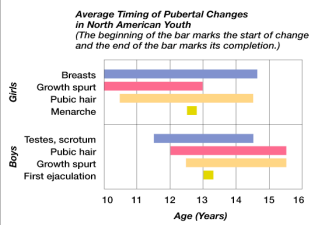
- 10-16 years: Something's a changing!
- 20-25lbs in one year!
- Puberty! Primary and Secondary sex characteristics.
- Ladies first (10-12)
 - Breasts
 - Pubic hair
 - Menarche (=13)



Puberty

- Boys (12-13)
 - Testes, scrotum
 - Pubic Hair
 - Growth Spurt
 - Voice lowers.
 - First Ejaculation (spermarche).





Maturing Varies

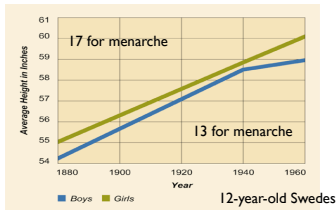
- Early maturation appears to be
 - Good for boys (athletics?)
 - Bad for girls
 - Initially good self esteem
 - But fewer friends and sometimes seek out older boys.

Cultural Variations

- Industrialized countries tend to mature faster than non-industrialized.
- People from Asia, South America, and Africa tend to be smaller than people from North America, Northern Europe, and Australia.

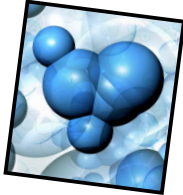


Secular Growth Trends



What makes us grow?

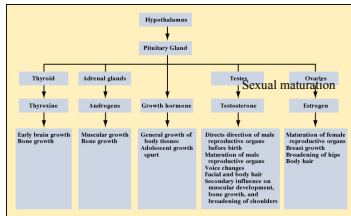
- Three things:
- HHN
- Heredity
- Hormones
- Nutrition



Mechanisms of Physical Growth

- Heredity--timing and end product is in the genes (Identical Twin = .9)
- Hormones--during sleep (80%) and exercise, the pituitary secretes GH
 - Acts on the liver and triggers another hormone, somatomedin to make muscles and bones grow.
 - Thyroxine (thyroid) - nerve development.

All about the hormones



Nutrition

- Growth is hard work, so the body needs calories to grow.
- 40% of calories are devoted to growth in a 2-month-old!
- By preschool only need 40 calories/lb.
- 1,500 to 1,700 calories a day.
- Adults only need 2000!

Breast Advantage

- Can't be contaminated!
- Antibodies
- Less bowel problems
 - (no diarrhea),
- Tasty (varies in taste).



Formula is good too!

- Avoid putting the bottle in bed
- propping the bottle,
- putting cereal in the bottle,
- feeding honey,
- heating bottles in the microwave,
- or feeding goats milk.



Some important minerals

- Iron
 - If don't get enough, permanent brain damage.
 - Absorbed via Vitamin C.
- Iodine
 - Goiters.
 - Birth defects.
- Selenium, Zinc, Magnesium - usually ok.
- And one other important mineral first in the next section, which talks about...

Watch out! Osteoporosis

- Brittle bones.
- 10 million Americans, 80% Women over 50.
- Caused by lack of calcium in childhood.
- 1,300 milligrams of calcium a day
- Prevented by Weight bearing Exercise.
- National Bone Health Campaign

Become Obese.

- Refers to individuals who are at least 20% over their body weight.
- Reflects heredity (activity level, basal metabolic rate) and environment (eating cues).
- Helped by: changing habits, monitoring, and parental involvement.

The Fast Food Debate

- 61% Weigh too much, 26% obese.
- A National Crises!
- Causes?
 - The food pyramid and HIGH CARBS?
 - NO EXERCISE?
 - Modern civilization?
 - McDonald's and the Super Size?
- What do you think?

How should we eat?

- What should we eat?
- USDA: 6 grains, 5 f&v, 2 milk, 2 meat.
- Harvard: Whole grains
- Atkins: 0 grains, 2 v, unlimited m&m.
- Others: 2 grain, 4 f & v, 6 m&m. No Sugar!
- French Paradox: Eat whatever you want.

Opponent Processes Effects

- Weebles.
- Dynamic systems maintain equilibrium
- Your body will compensate over time.
- Sleeping pills lead to sleeplessness.
- Diets can lead to weight gain.
- Low portions can kill your basal metabolic rate.
- Body will find a balance.



Moral of the story

Be careful of unintended opposite effects.

- Every action has a reaction.
- Make sure the reaction is what you want.
- Yelling at kids can make them rebel.
- Diets can make you fat.



Effective Weight Loss

- Parental Involvement.
- Monitoring
- Write it down (become aware).
- Change.
 - Establish goals and rewards (alternative reinforcement).
 - Get rid of environmental eating cues
 - Exercise (even a little is good).

Anorexia and Bulimia

- **Anorexia**--persistent refusal to eat and irrational fear of being overweight.
- **Bulimia**--uncontrolled eating and purging.
- Both primarily affect adolescent girls (10X) and are influenced by experience (cultural standards for appropriate body weight), family dynamics and heredity.



Watch out for Disease

- 11 million kids per year.
- Top 5 killers of children worldwide: pneumonia, diarrhea, measles, malaria, and malnutrition.
- Many diseases that kill young children are preventable with
 - Vaccines,
 - improved health care
 - and changing habits (e.g., mosquito netting)

Childhood diseases

- Some suspect that avoidance in childhood can be bad.
- Shingles.
- Antibacterial Soap.
- Acquired resistance.



Malnutrition

- Defined as being small for one's age
- Wide ranging developmental effects.
- Malnourished children frequently inactive and listless.
- Makes parents less likely to feed them.
- And the cycle continues.
- Not just a problem in 3rd World countries
- 10% of US kids. - linked to absenteeism
- 20% have significant iron or iodine deficits.

Watch out for Accidents

- In the US, car accidents are most common causes death in children over age 1 year
- Parents can help by enforcing use of seat belts, car seats, and bike helmets and by being realistic about child's abilities.
- Firearms are a leading cause of death among teenage boys.

- Start by getting on your hands and knees and looking around your home from a baby's eye view.
- Watch out for Small or sharp things.
- Anything a baby can reach will go into her mouth.
 - Coins, cigarettes, dust balls, paper clips, staples, etc.
 - Knobs on your television or stereo.
- Keep knives, scissors and razor blades out of the baby's reach.
- Throw out broken glass and other sharp objects.

Watch out for Electrical things.

- Cover unused electrical outlets with plastic plugs you can buy at the hardware store.
- Keep lamp cords out of the way behind furniture. Move fans up high.
- In the kitchen, don't leave cords dangling.



Watch out for Poisons.

- Cleaning supplies.
- Some house plants.
- Alcohol.
- Cigarettes.
- Medicine.
- Don't take medicine in front of your child.
- Never tell baby medicine is "candy."
- Keep the Poison Control number nearby.
- Keep ipecac. Read the directions.



More things

- Watch out for Hot Food.
- Watch out for Plastic Bags & Balloons, except the shiny Mylar kind.
- Watch out for Stairs.
- Watch out for Valuables.



Exercise! Hazard Inspector

- How could we child-proof this room?
- What is dangerous?
 - Floor?
 - Edges?
 - Edibles?
 - Noise?



WATCH OUT! KIDS ARE KIDS



- Many bad things
- Lots of trouble to get into.
- Obesity, Malnutrition, Anorexia.
- Diseases
- Household Accidents

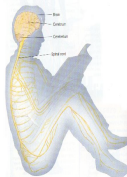
Getting on your nerves?

- What are the parts of a nerve cell?
- What are the parts of the Brain?
- When do different regions function?



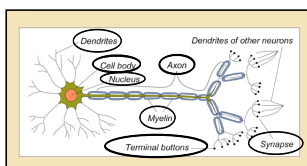
The Nervous System

- No, it isn't paranoid.
- It is your body's way of sending instantaneous messages.
 - "Hey, you just touched something hot!"
- REFLEXES
- The internet for your body (really electrical and chemical).
- Basic wiring is the neuron.



The Neuron

That's the way it goes!

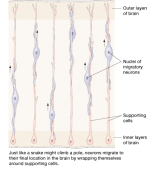


Emerging Brain Structures

- Brain and nervous system originates in **neural plate**.
- Rolls like a manicotti to a tube.
- Neurons produced inside tube 10 weeks after conception.
- 4,000 neurons per second.
- By 28 weeks, all done.

Migratory Neurons

- For the next 7 months, the neurons migrate into place.
- **Myelin** added in prenatal and postnatal development (4 month mark).
- 100 billion neurons at birth.
- Like topiary.
- Unused synapses disappear--**synaptic pruning**.



Brain Plasticity

- “**Flexible**” brain organization shown by children who recover from brain damage.
- Adults have a harder time.
- Brain organization is neither completely plastic nor completely rigid.

Structure and Function

- Brain structure and function revealed from studies of **adults with brain damage**, from **electrical activity (EEG)**, and from **imaging studies (PET and fMRI)**.
- Brain regions specialize early (e.g., left hemisphere for verbal functioning; frontal cortex for emotion). 7 months: adult levels for frontal cortex.

Da Brain

