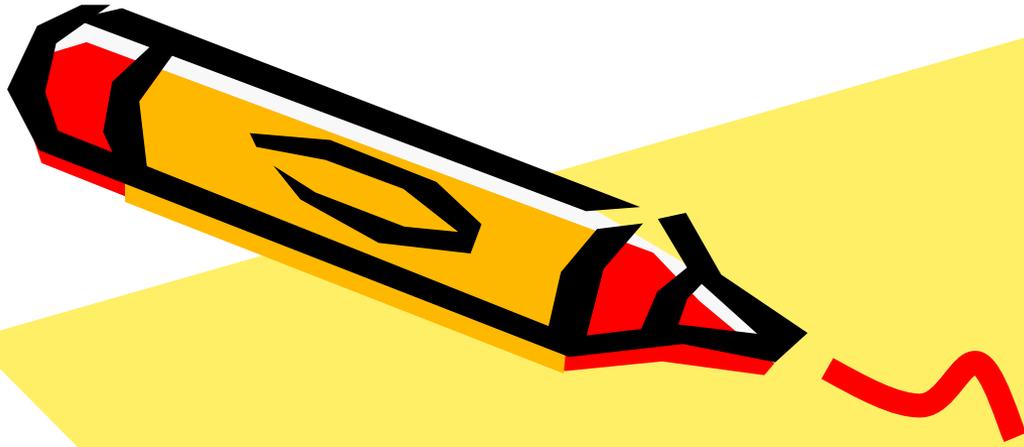


# Pediatric Nursing

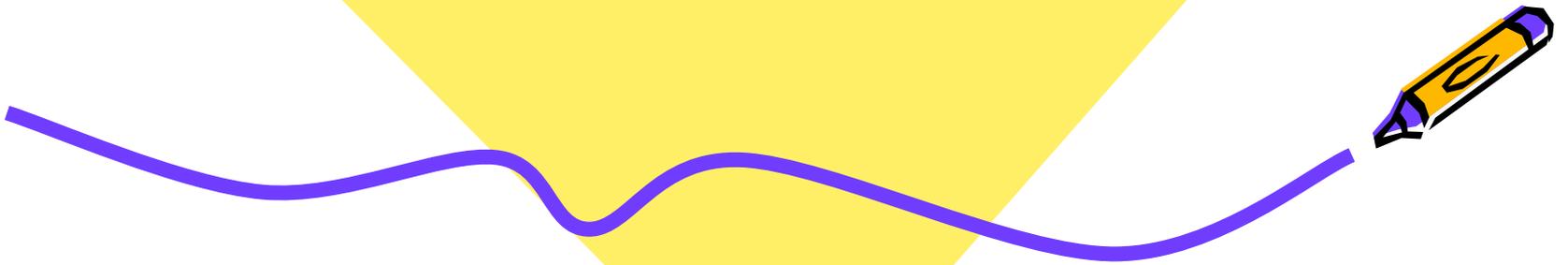
## Part 1

LVN-RN Track  
Cindy Gordey MSN, RN, CCRN-K



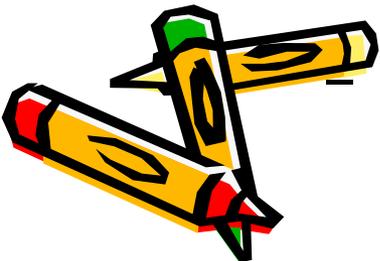
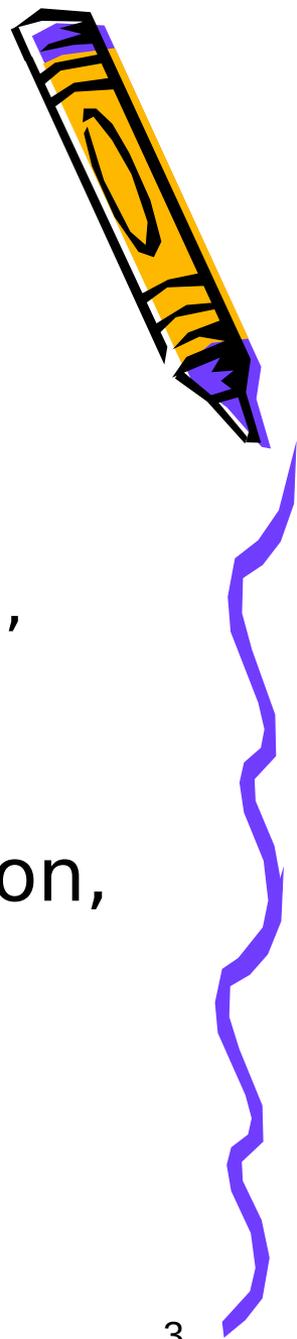


# Growth & Development



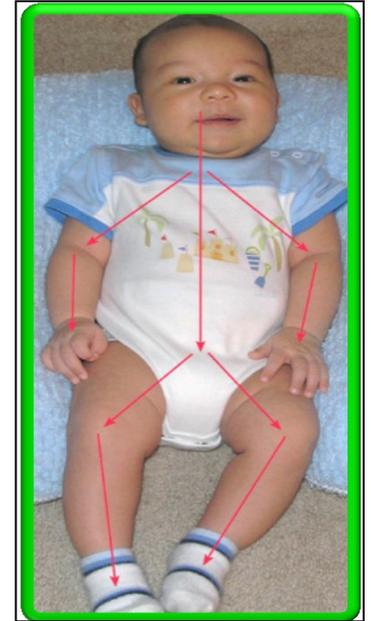
# Growth vs. Development

- Growth: Quantitative
    - Occurs In spurts
      - Ex. Height, weight, number of teeth, bone density
  - Development: Qualitative
    - Combination of growth, maturation, & learning
    - Simple to Complex
      - Scribble → letters → words
- Generally, measured by observation



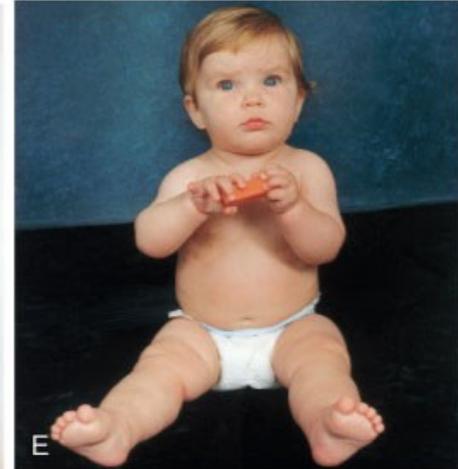
# Directional Trends

- Bilateral And Symmetrical
- Cephalocaudal
  - Head-To-Tail
  - Motor Control : Head → Trunk → Extremities
- Proximodistal
  - Near-To-Far
  - Motor Control Over Arm Before Fingers

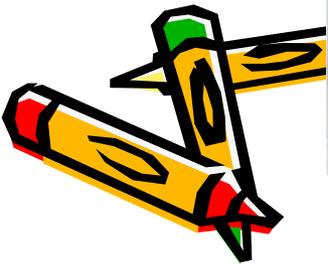
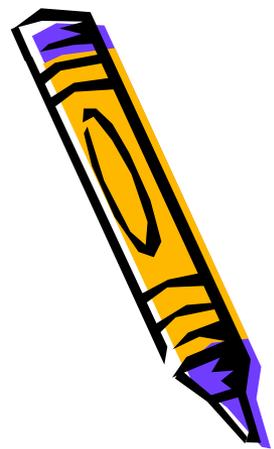




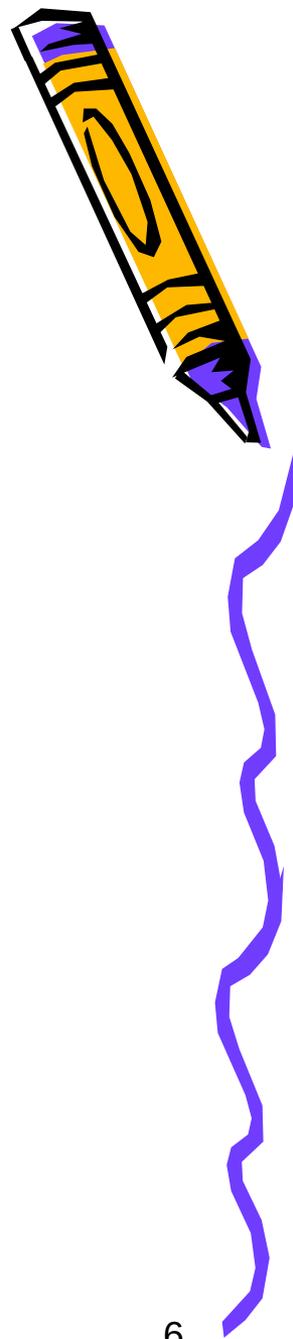
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Courtesy Paul Vincent Kuntz, Texas Children's Hospital, Houston.



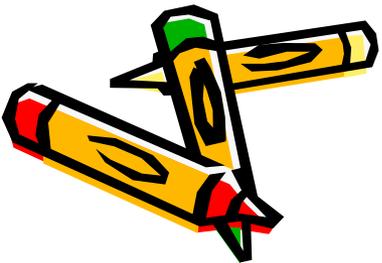
# Sequential Trend



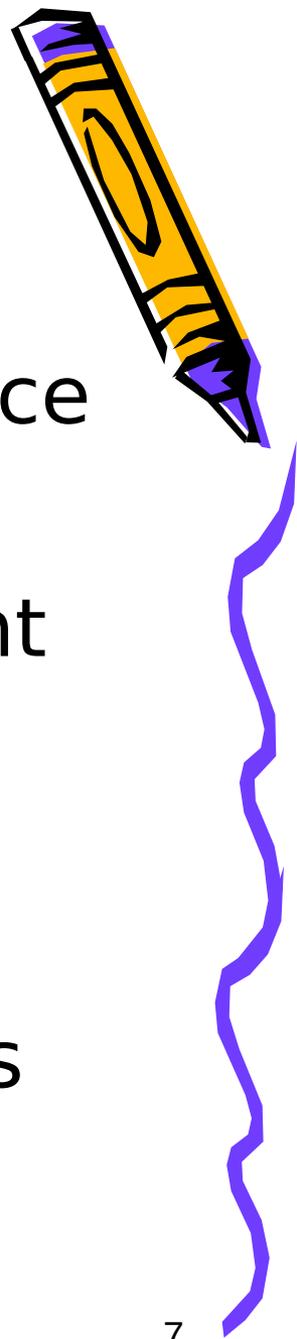
- Predictable Sequence

Crawl ▶ Stand ▶ Walk

Babble ▶ Words ▶ Sentence

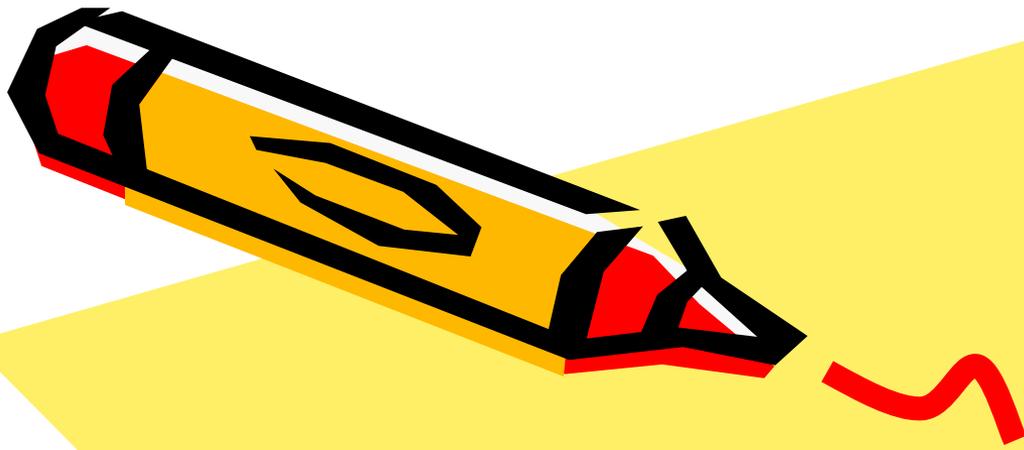


# Developmental Pace



- Each Child Grows At Their Own Pace
- Body Systems Develop At Different Rates
  - Example: Puberty
- Females Mature Faster Than Males





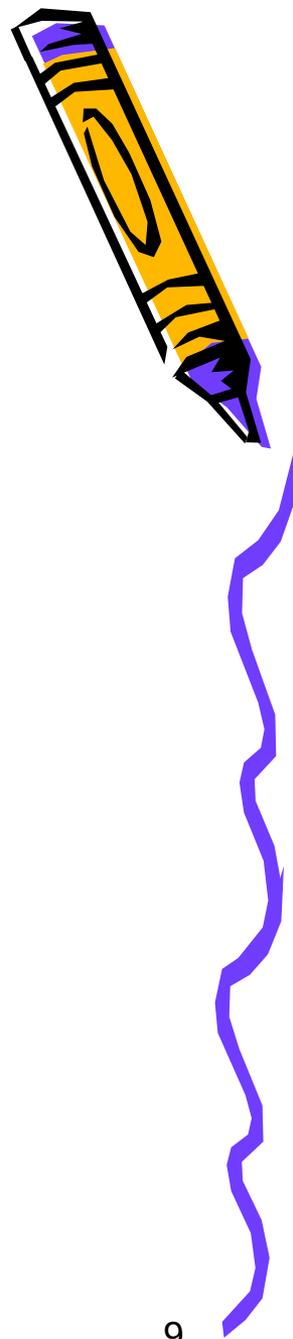
Infant

Birth to 1 Year

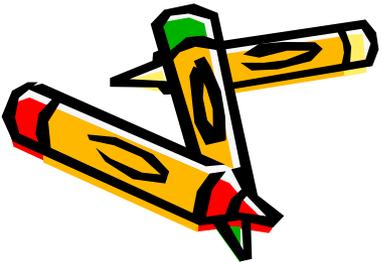


Erikson: Trust vs Mistrust  
Freud: Oral Stage  
Piaget: Sensorimotor Period

# Appearance

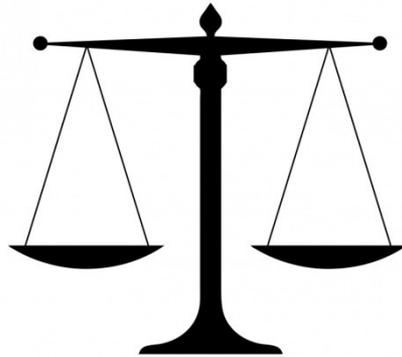


- 1 – 6 Months
  - 1 ½ Pounds Per Month
- 6 Months
  - Double Birth Weight
- 12 Months
  - Triple Birth Weight

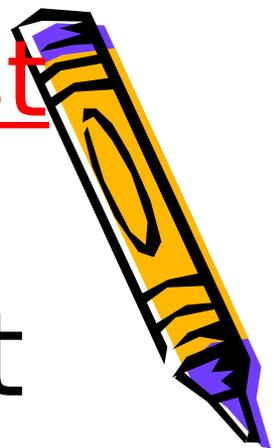


# Erikson – Trust vs. Mistrust

Trust

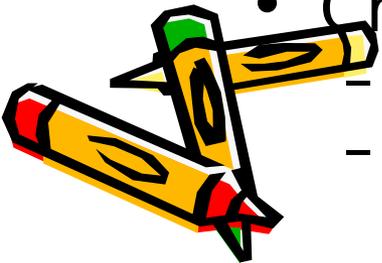


Mistrust

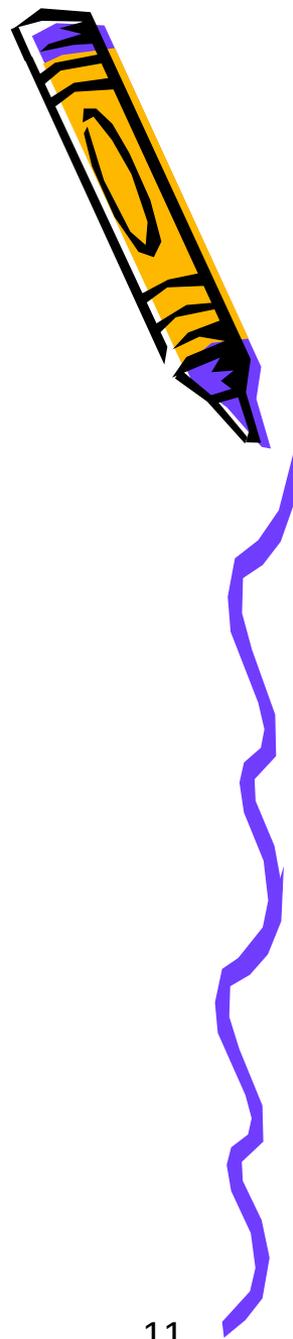


- Trust Is “The Sense That There Is Some Correspondence Between Your Needs And Your World.”
  - Food
  - Warmth
  - Tactile Stimulation

- Crucial Elements
  - Quality Of The Caregiver/ Child Relationship
  - Consistency of Care



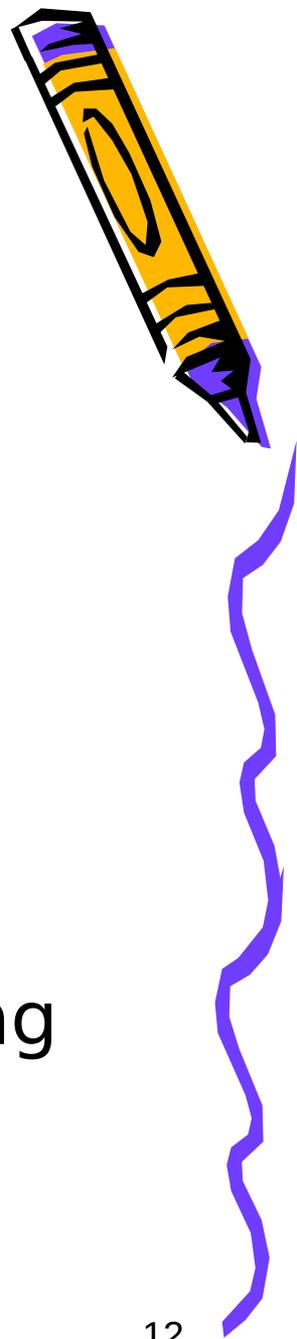
# Development of Trust



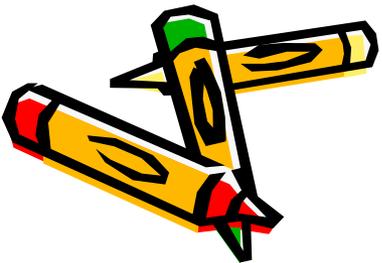
- Narcissism
  - A Degree Of Egocentrism
  - Total Concern For Self
- Transitional Object
  - aka Security Object



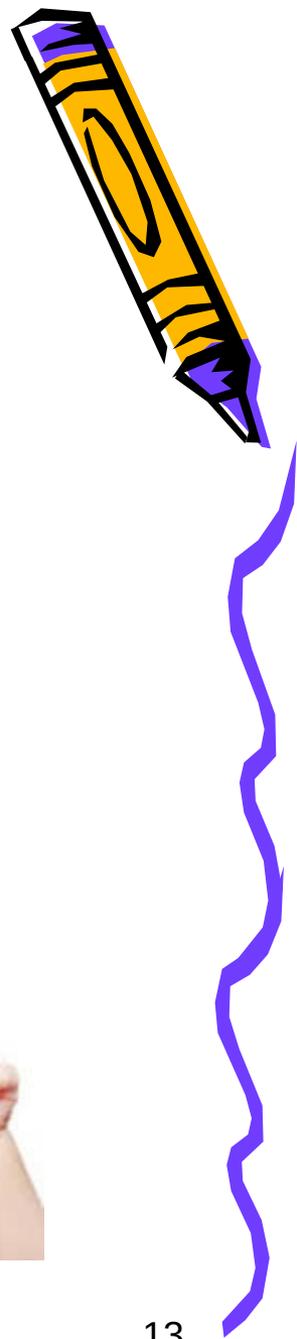
# Freud - Oral Stage



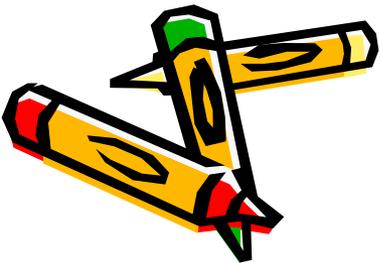
- Age
  - Birth - 1 year
- Source Of Pleasure Seeking
  - Oral Activities
  - Sucking, Biting, Chewing, Vocalizing



# Nonnutritive Sucking

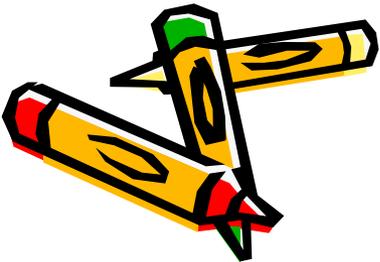


- Not Satisfied By Feeding
- Pacifier
- Thumbsucking

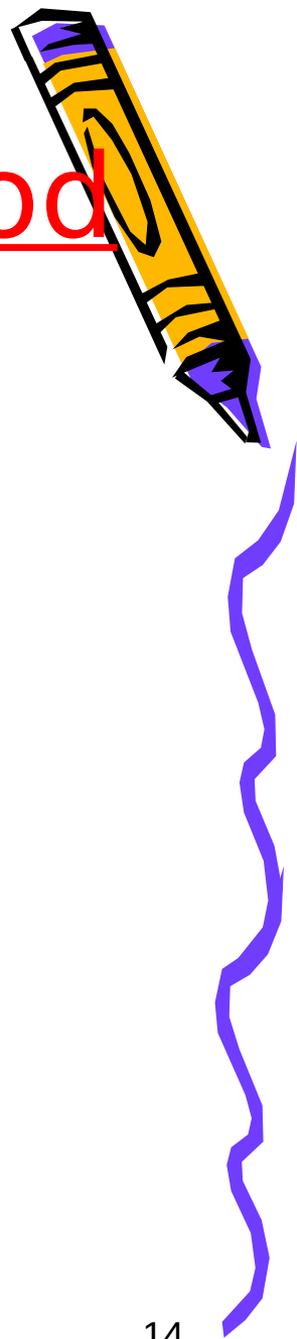


# Piaget - Sensorimotor Period

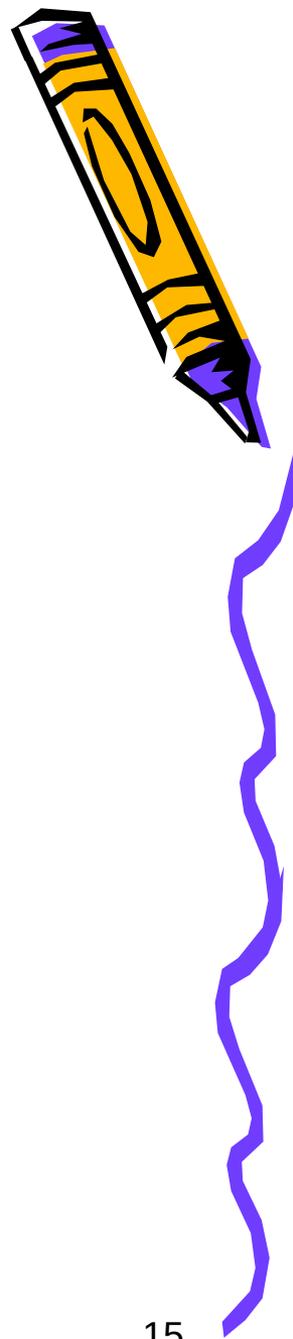
- Birth - 24 Months
  - Six stages
- Development Of Intellect And Knowledge Of Environment Gained Through The Senses
- Behavior Pattern
  - Reflexive To Repetitive To Imitation
- 3 crucial events
  - Separation
  - Object permanence
  - Symbols/mental representation



Piaget's Theory of Cognitive Development  
Infant: birth - 1 yr



# Definitions



- Assimilation
  - Interpreting New Experiences In Terms Of Existing Ideas Or Skills
- Accommodation
  - Previous Experience Is Modified To Explain A Current Situation

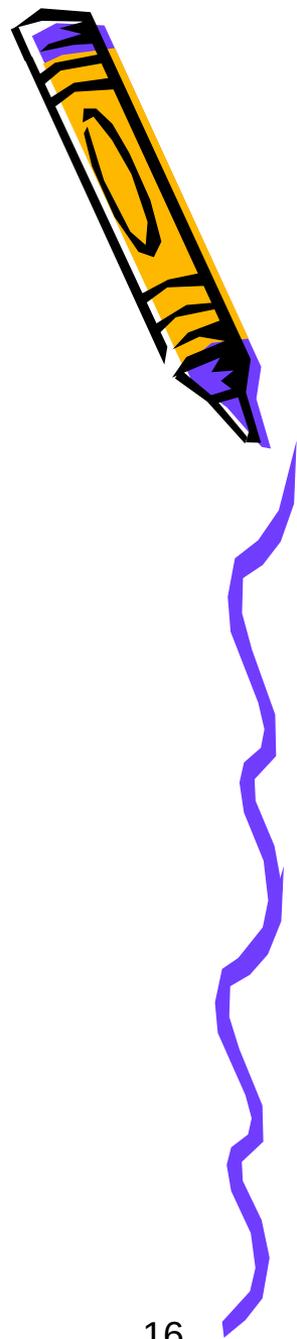
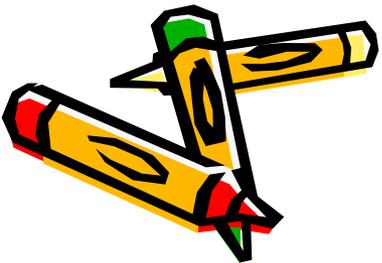
Piaget's Theory of Cognitive Development  
Infant: birth - 1 yr



stage 1  
Use Of Reflexes

- Birth – 1 Month
- “Bundle Of Reflexes”
  - Sucking, rooting, grasping, crying

Piaget’s Theory of Cognitive Development  
Infant: birth - 1 yr

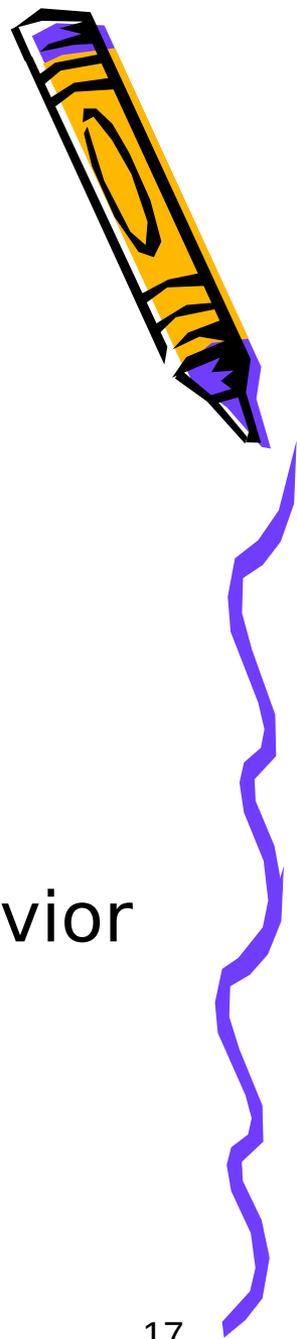
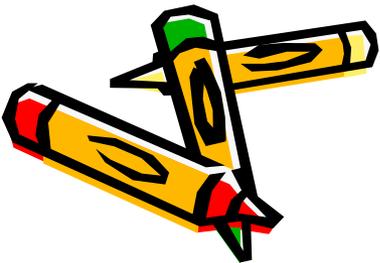


stage 2

# Primary Circular Reactions

- 1 - 4 Months
- Centered Around Body
- Beginning To Replace Reflexive Behavior With Voluntary Action

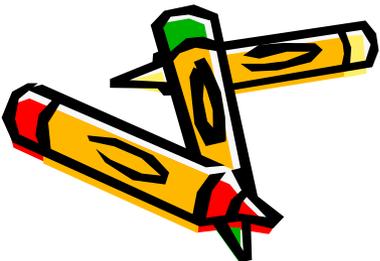
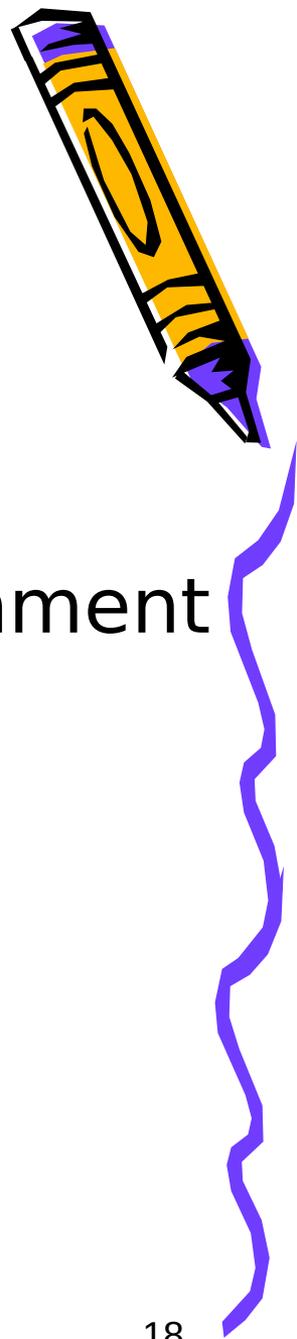
Piaget's Theory of Cognitive Development  
Infant: birth - 1 yr



stage 3

# Secondary Circular Reactions

- 4 - 8 Months
- Greater Awareness Of The Environment
- About 6 Months-Of-Age
  - Imitation
  - Increased Affect
  - Object Permanence



Piaget's Theory of Cognitive Development  
Infant: birth - 1 yr

# Separation Anxiety

Beginning Awareness Mother & Self Are Separate Beings

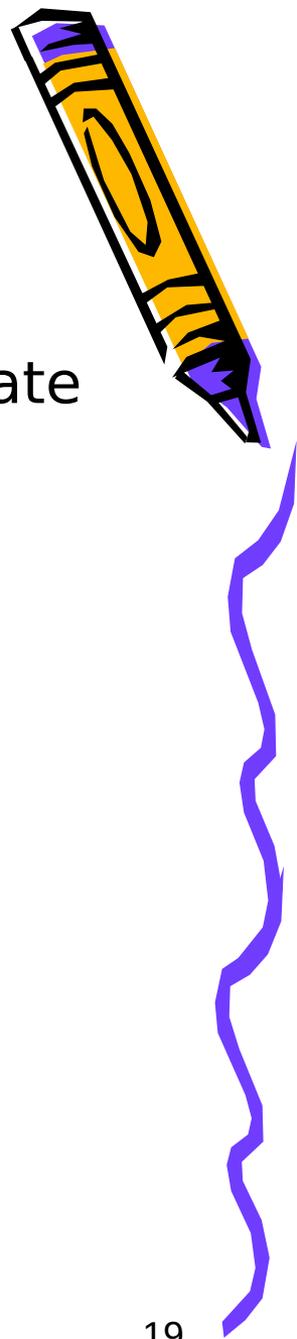
Plus

Developing Object Permanence

Equals

Separation Anxiety

Piaget's Theory of Cognitive Development  
Infant: birth - 1 yr

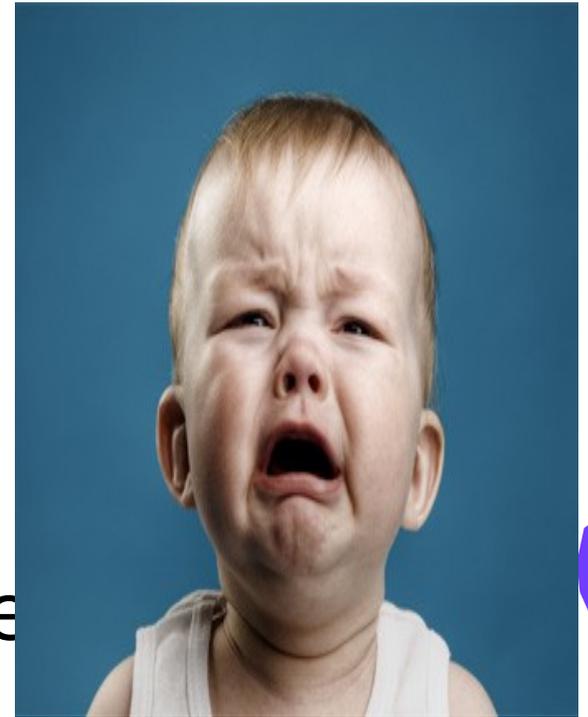


# Behavior & Separation Anxiety

- “The World Is Coming To An End”
- May Not Notice The Mother Has Left If Absorbed In An Activity



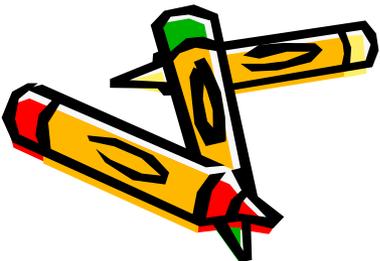
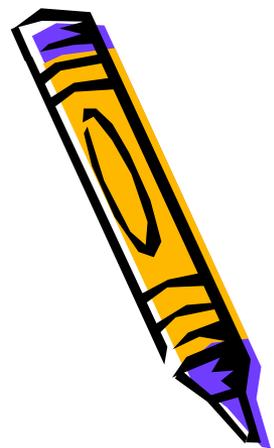
When The Infant Realizes The Mother Is Gone, Protest



Piaget's Theory of Cognitive Development  
Infant: birth - 1 yr

# Stranger Anxiety

- 6 – 9 Months
  - Reemerges During Toddler Period
- The End Of The World Has Come Again
- As The Infant Becomes Attached To One Person, They Show Less Friendliness To Others

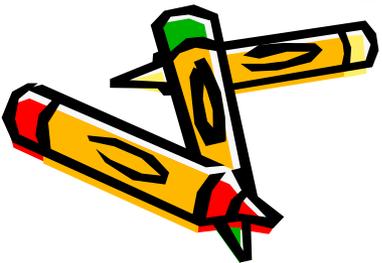


Piaget's Theory of Cognitive Development  
Infant: birth - 1 yr



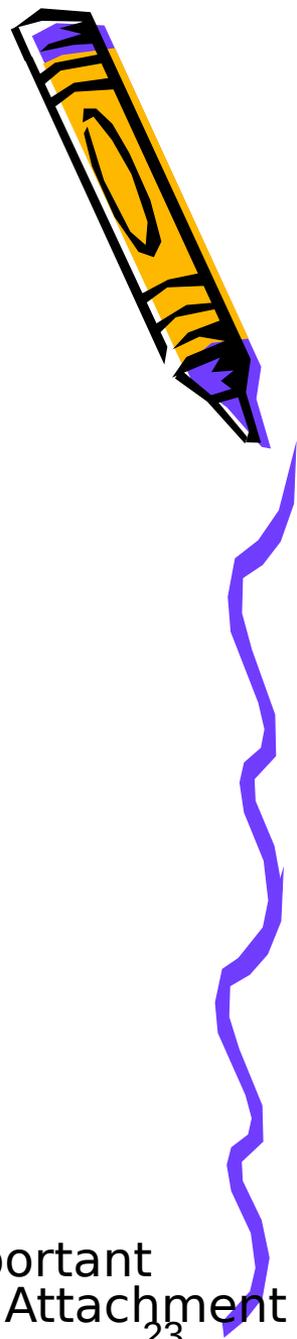
# Influencing Factors

- Gender, Age, & Size Of Stranger
  - Female, Younger Age, Smaller Size Is Less Stressful
- Approach
  - Loud, Sudden, Intrusive Approach Causes More Distress
- Child's Proximity to Parent
  - Closer To Parent Is Less Stressful
  - On Lap



# What To Do

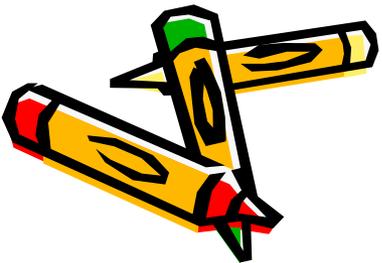
- Talk Softly
- Meet The Child At Eye Level
- Maintain A Safe Distance
- Avoid Sudden Intrusive Gestures
- Use Transitional Object
- Reassure Parents
  - Normal, Necessary, Healthy Behavior
  - Separation Anxiety & Stranger Anxiety Are Important Components Of A Strong, Healthy Parent-Child Attachment



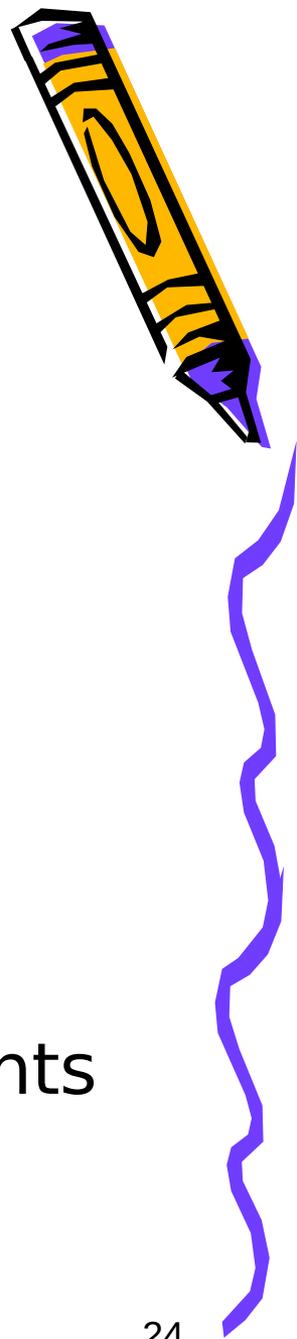
## Stage 4

# Coordination Of Secondary Schemes

- 8 - 12 Months
- Intentional Behavior
- Anticipation Of Events
- Begin to associate symbols and events



Piaget's Theory of Cognitive Development  
Infant: birth - 1 yr



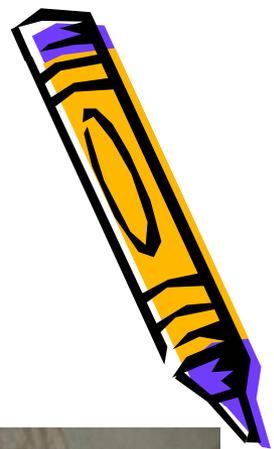
# Language Development



- Girls Are More Advanced Than Boys
- Birth Order
  - Firstborns Develop Language Skills Faster Than Other Children
  - Multiple Births Develop Language Skills Later
- Receptive Language Develops Before Spoken Word



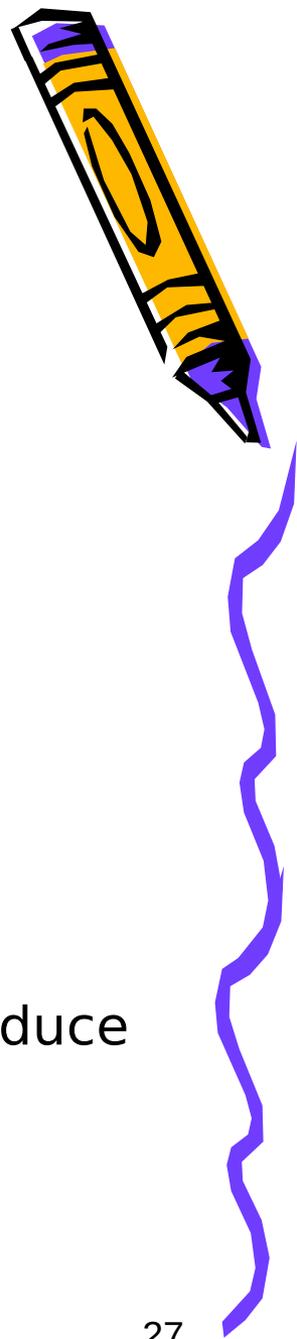
# Language Development



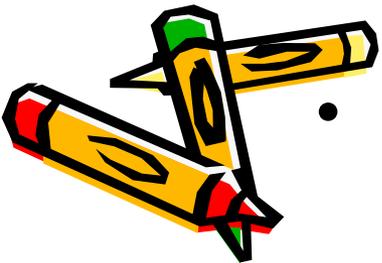
- Birth To 4 Months
  - Crying
  - Cooing & Babbling
    - 1 - 3 Months
    - 2 Months Social Smile



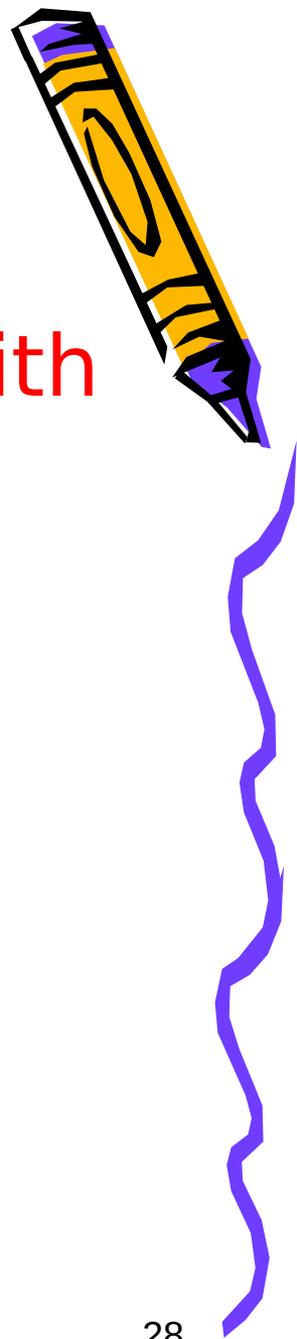
# Language Development



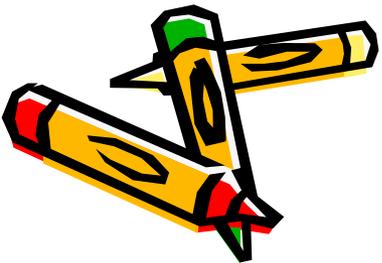
- 6 Months
  - Imitates Actions/Sounds
    - Piaget's Secondary Circular Reactions Stage
- 8 - 9 Months
  - Strings Vowels & Consonants Together
  - Obey Simple Commands
  - "No No"
- 10 - 12 Months
  - Start Ascribing Meaning To Words They Produce
  - By 10 months, "Mama" and "Dada"
- 12 Months
  - Holophrasic Speech



# Infants & Play

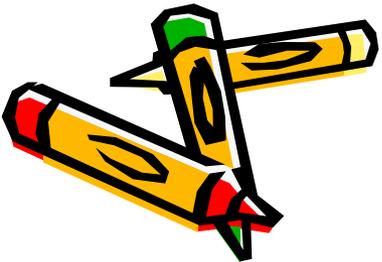
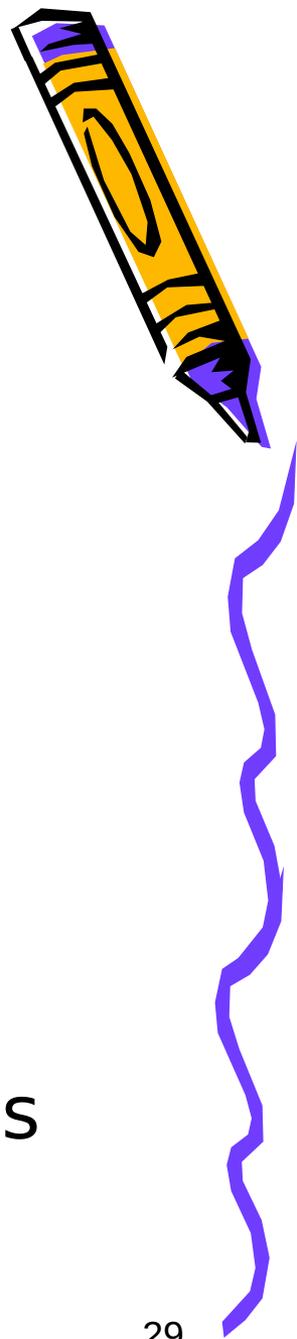


- An Infant Needs To Be **Played With**
- Stimulation Is Important For Developmental Growth
- Sensorimotor Play
  - Involves Senses And Motor Skills



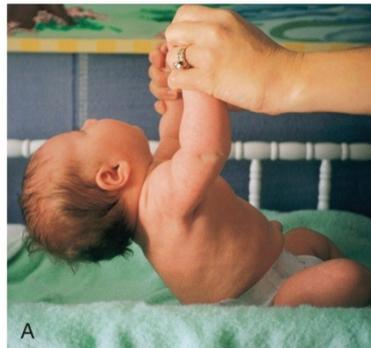
# Fine Motor Development

- Grasping object at 2 to 3 months
- Palmar grasp at 6 months
- Transfer object between hands at 7 months
- Pincer grasp at 10 months
- Remove objects from container at 11 months
- Build tower of two blocks at 12 months



# Gross Motor Development

- Head lag in first 2 months
- Head control at 4 months
- Rolling over (from abdomen to back) at 5 to 6 months
- Sit alone by 8 months
- Move from prone to sitting position by 10 months



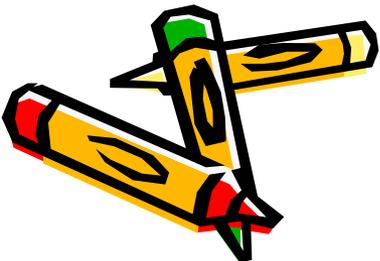
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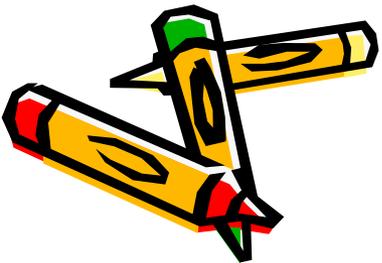


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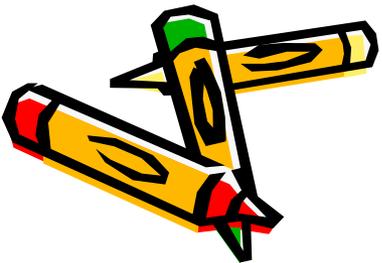
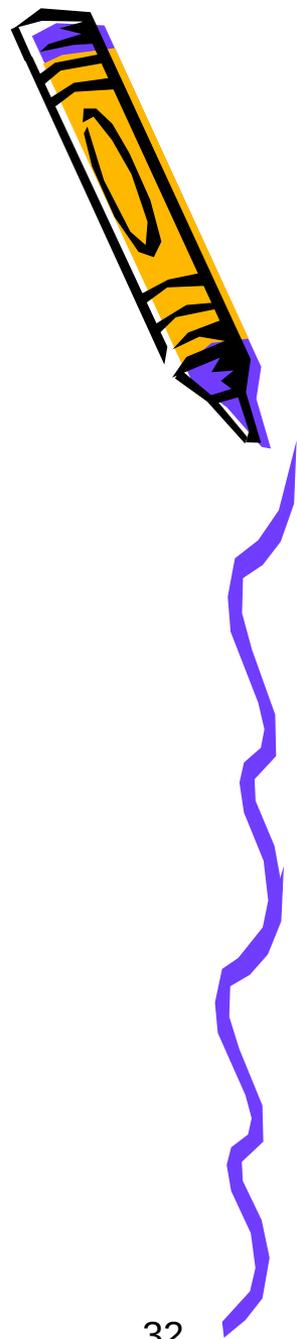
# Locomotion

- Increased coordination of extremities at 4 months
- Crawling at 6 to 7 months (usually backward)
- Creeping at 9 months
- Walk with assistance at 11 months
- Walk alone at 12 months

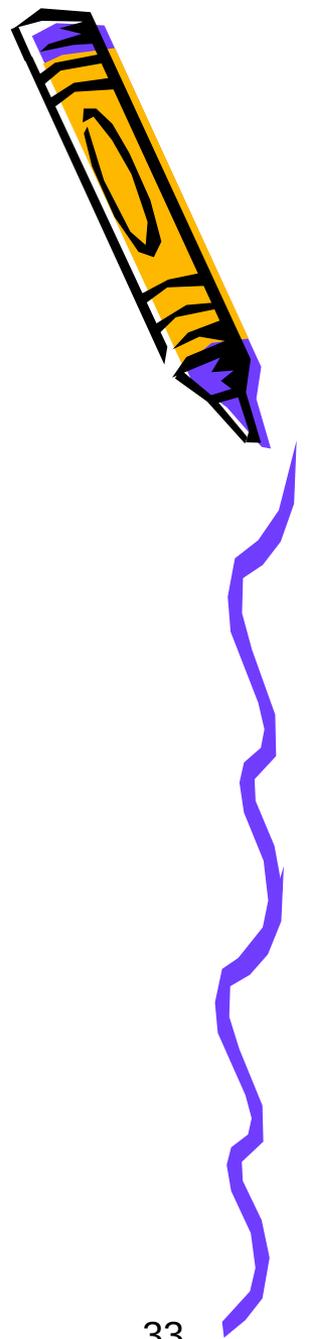


# Toys For Infants & Young Children

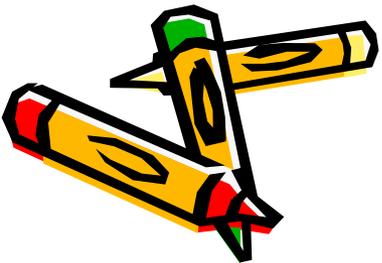
- Safe And Appropriate
- No Sharp Parts Or Edges
- No Detachable Parts
- No Part That Can Be Swallowed



# Examples

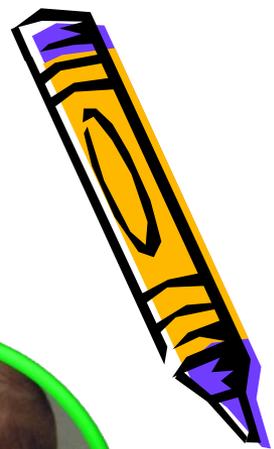


- Birth – 1 Month
  - Being Held Or Rocked
  - Listening To A Musical Mobile
- 1 – 4 Months
  - Mobile
  - Mirror
  - Music Box
  - Rattle

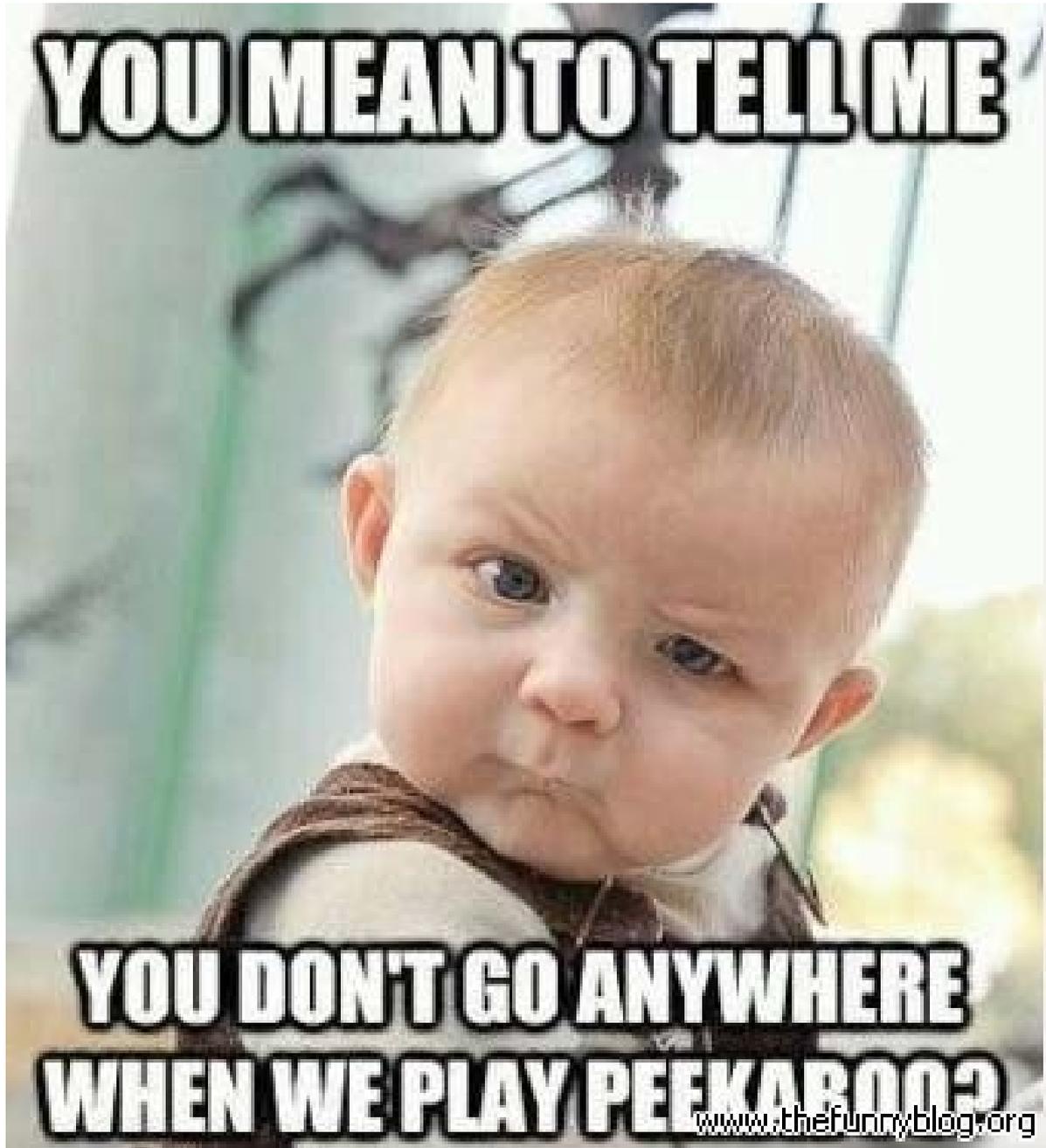


# Examples

- 4 – 8 Months
  - Squeeze Toys
  - Busy Boxes
  - Play Gyms
- 6 Months
  - Very Personable
  - Extends Arms To Be Picked Up
  - Peek-A-Boo

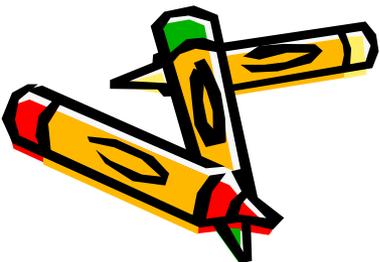
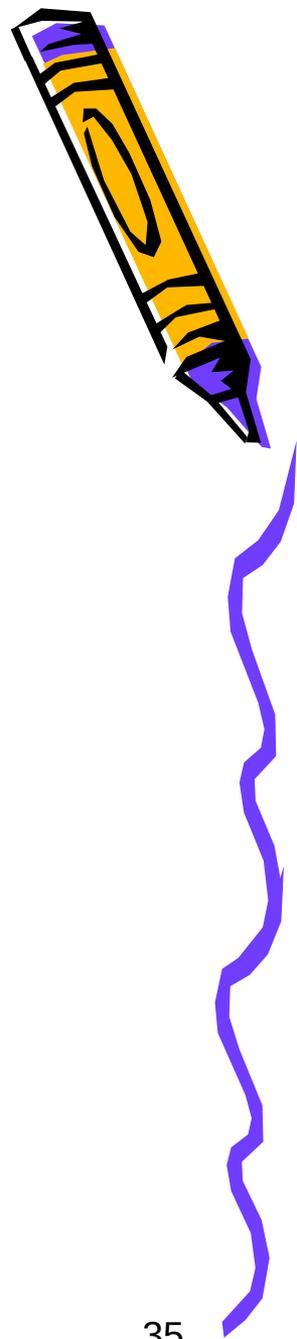


**YOU MEAN TO TELL ME**



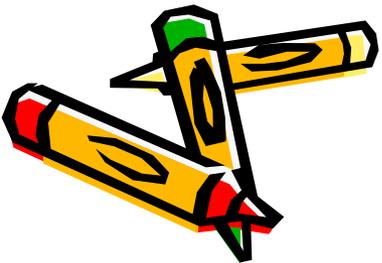
**YOU DON'T GO ANYWHERE  
WHEN WE PLAY PEEKABOO?**

[www.thefunnyblog.org](http://www.thefunnyblog.org)

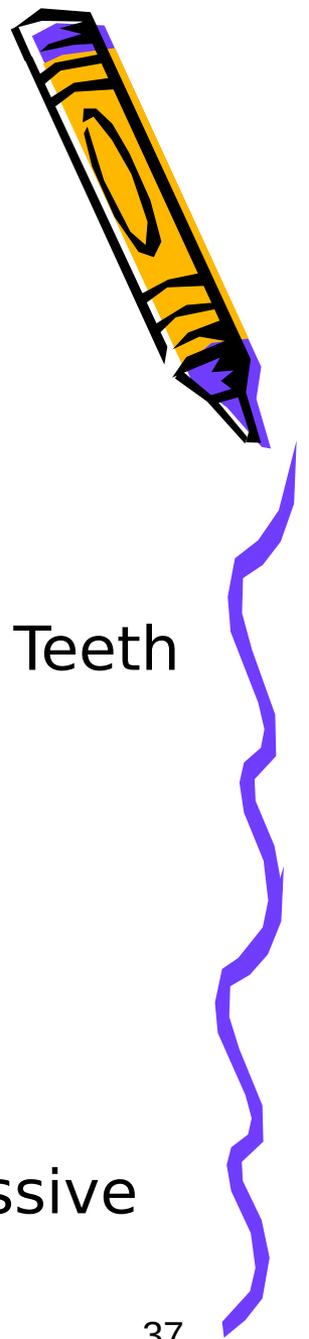


# Examples

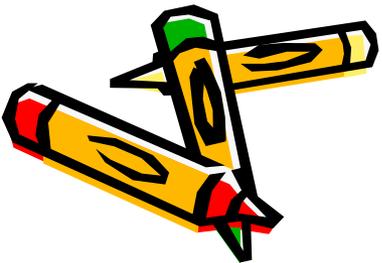
- 8 – 12 Months
  - Splashing Bath Toys
  - Blocks
  - Balls
- 10 – 12 Months
  - Large Building Blocks & Nesting Cups
  - Large Puzzles
  - Durable Books With Large Pictures
  - Push-Pull Toys



# Dental Health - Infant

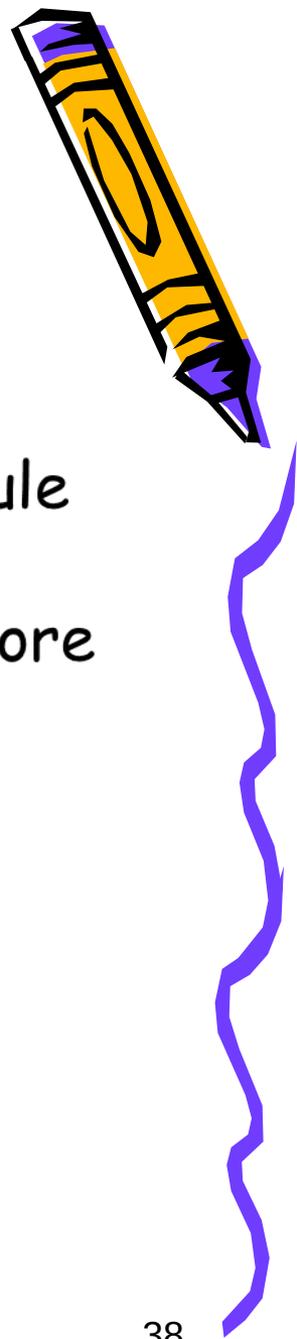


- Teething
  - Rule Of Thumb
    - Age In Months **minus** 6 Months = # Of Teeth
  - Normal Variation
    - 6 to 9 Months
    - Genetic Pattern
  - Signs of Teething
    - Night wakening, Daytime restlessness, Increase in nonnutritive sucking, Excessive drooling, Anorexia

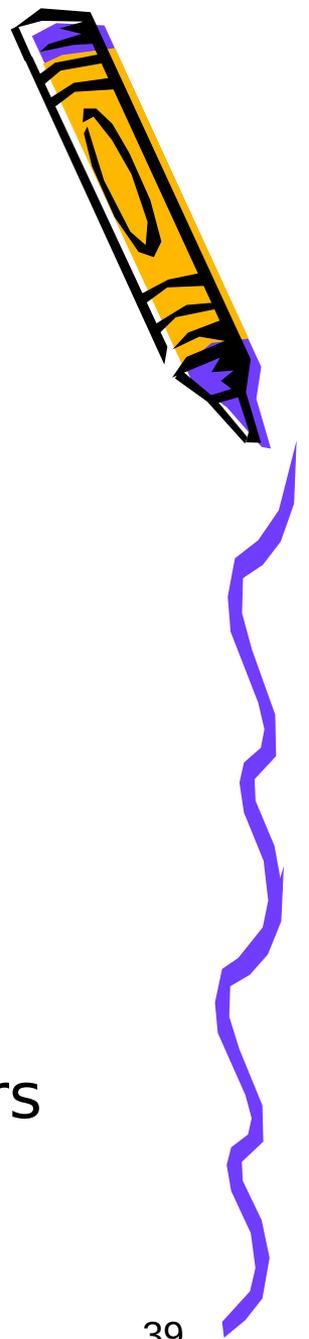


# Nutrition - The First 6 Months

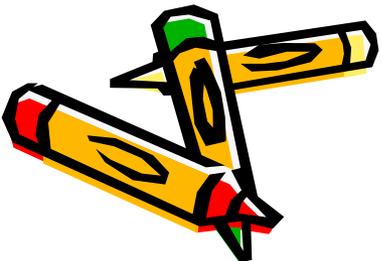
- On Demand Schedule
  - Allowed To Establish Own Feeding Schedule
  - Should Be Fed Until Satisfied
  - Easy Temperament Babies May Need A More Planned Schedule
- Breast Milk
  - Optimal
- Formula
  - Acceptable Alternative



# What About Milk?

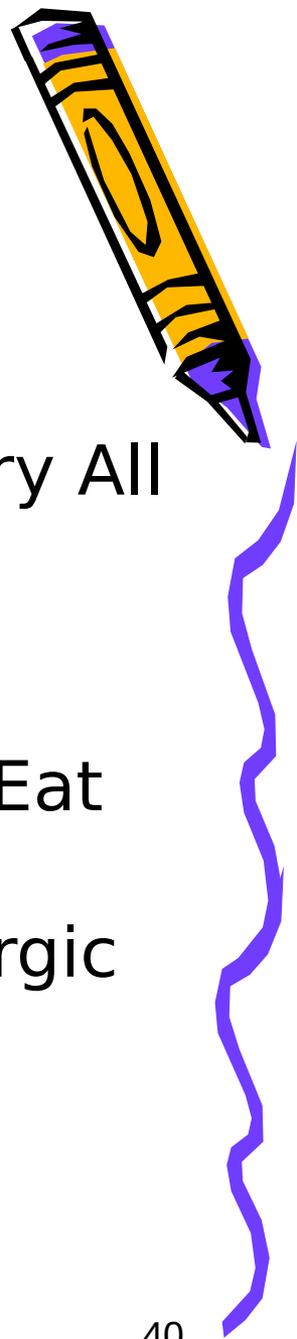


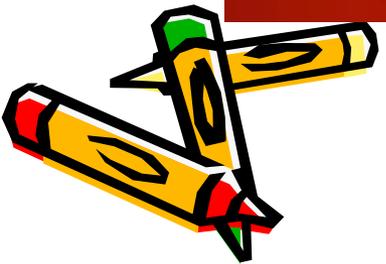
- Whole Milk
  - Not Until End Of The First Year
  - Deficient in Components Needed For Optimal Growth
- Skim (Low-Fat) Milk
  - If Parents Prefer
    - At The End Of The Second Year
  - Not Enough Fatty Acids For First Two Years



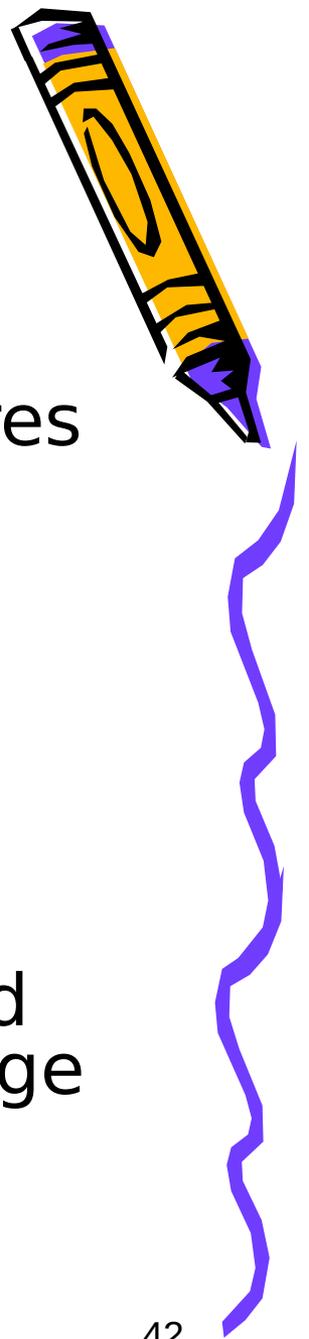
# Ready For Solid Food?

- 4 Months
  - Is Acceptable If The Baby Is Hungry All The Time
- 6 Months Is Optimal
  - Infant Is Physiologically Ready To Eat
  - Improved Digestive Ability
  - Improved Ability To Mount An Allergic Response
  - Extrusion Reflex Has Faded
  - Motor Skills





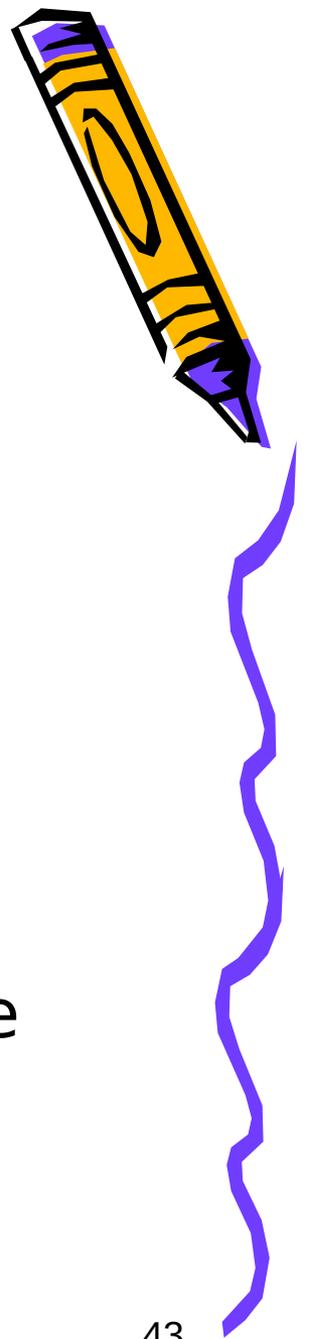
# Iron Supplement



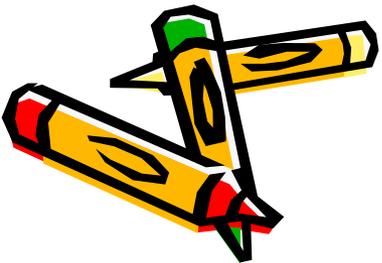
- During 3<sup>rd</sup> Trimester Unborn Baby Stores Iron In Its Liver
- Increased Bioavailability Of Iron In Human Milk
- Infants Who Are Partially Or Not Breastfed Should Receive Iron Fortified Formula From Birth To 12 Months-Of-Age



# Infants & Sleep



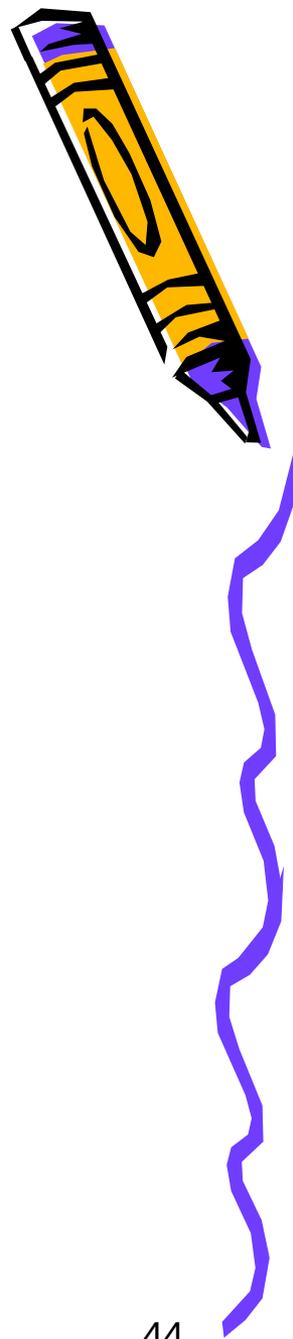
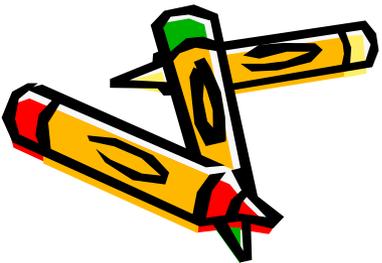
- 12 – 14 Hours By End Of First Year
  - Morning And Afternoon Nap
- Helping The Baby Sleep
  - Transition Object
  - Bedtime Rituals
  - Put The Baby To Bed While Still Awake
    - Learn to Self Soothe



IF I REFUSE TO NAP....



IS THAT RESISTING A REST?  
FUNNY-JOKE-PICTURES.COM



# Injury Prevention



- Aspiration of foreign objects
- Bodily Harm
- Burns
- Drowning
- Falls
- Poisoning
- Motor Vehicle injuries
- Suffocation



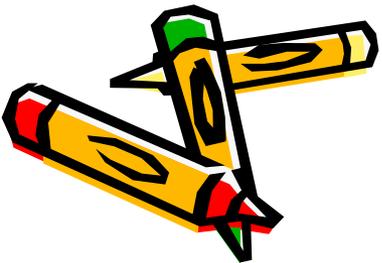
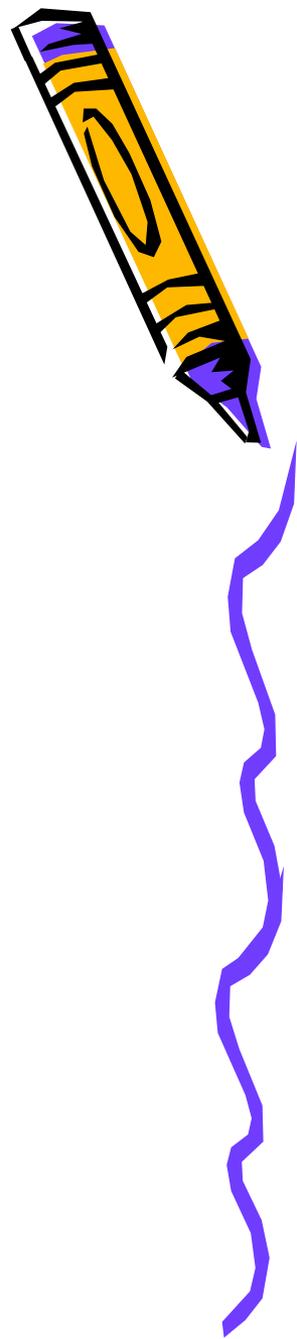
SNUG

NOT SNUG



# SIDS

- Etiology unknown
- Peak Age- 2-4 months of age
- Occurs during sleep



# SIDS Risk Factors

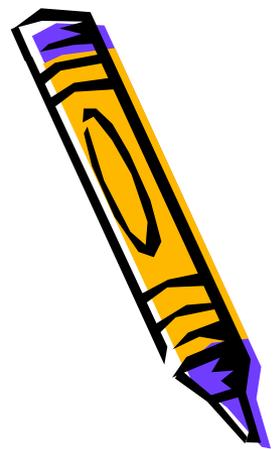


- Pregnancy related:
  - Drug use/Smoking
  - Poor prenatal care
  - Low maternal age
  - Prematurity or low birth weight
  - Multiple births/twins

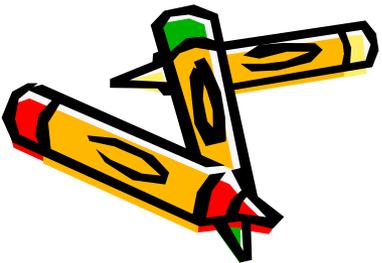
- Care related:
  - Overheating the infant
  - Soft pillows/bedding
  - Prone sleeping position
  - Co-sleeping
- Other:
  - 2 or more SIDS victims in family
  - Winter months



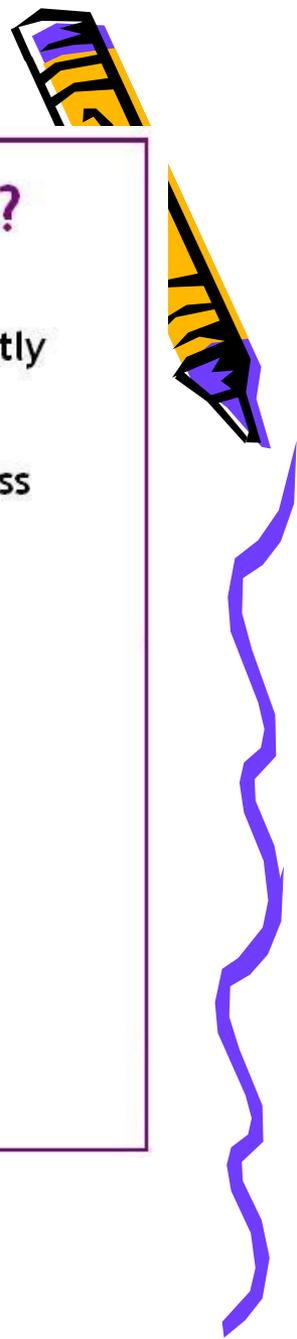
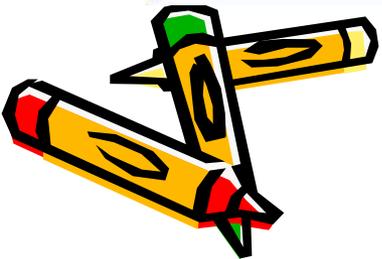
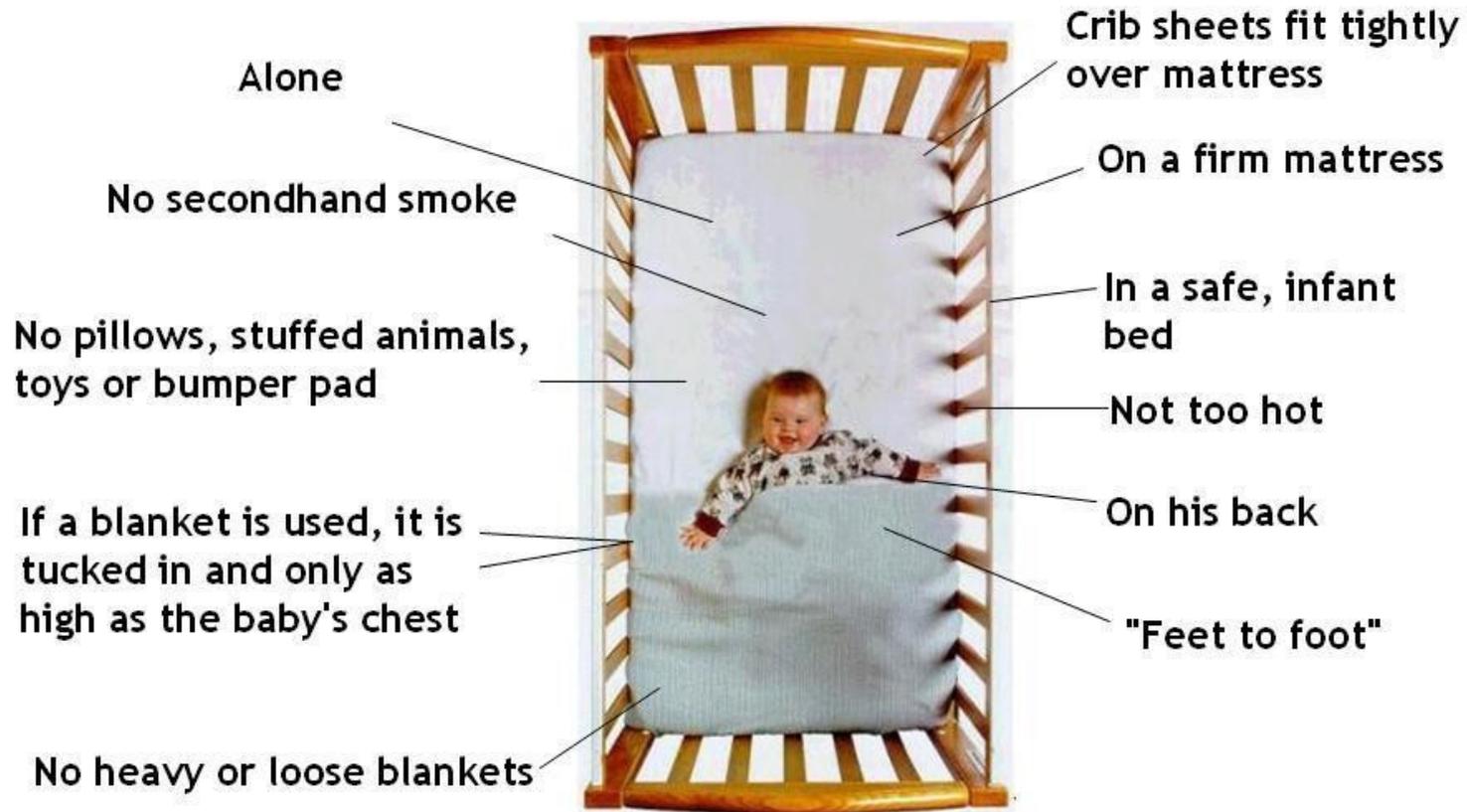
# The ABC's of Infant Sleep:



- **A** - Sleep alone
- **B** - On their backs with no blankets or bedding
- **C** - In a crib and cool (70 degrees)
- **S** - In a smoke free environment

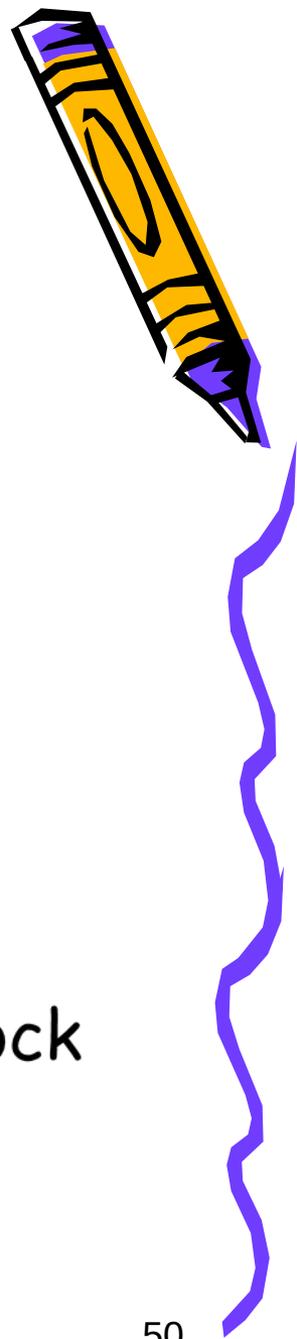


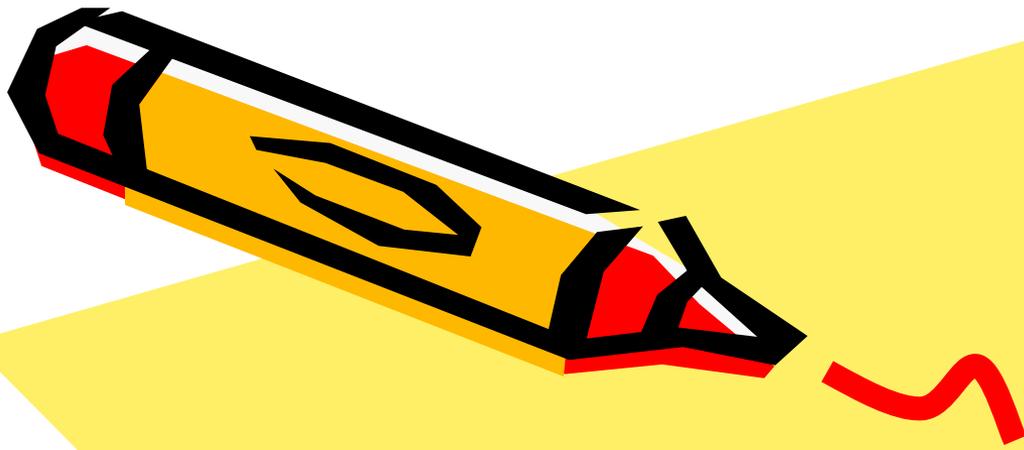
## What does a safe sleep environment look like?



# Limit Setting For An Infant

- Safety Issues
- Methods
  - Distraction
  - Negative Voice
  - Stern Eye-To-Eye Contact
  - At Times, One Slap On Hand Or Buttock
    - Controversial





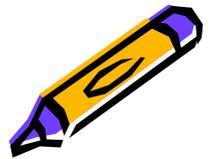
# Toddler

1-3 years (12-36 months)

Erikson: Autonomy vs. Shame & Doubt

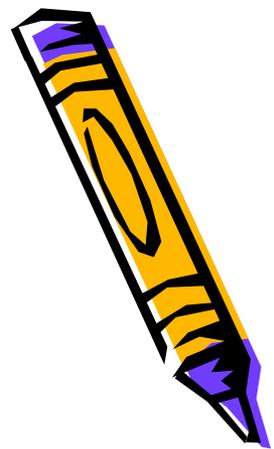
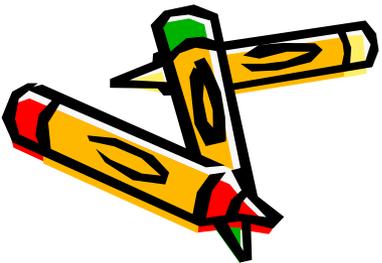
Freud: Anal Stage

Piaget: Sensorimotor Period, Preoperational  
Period



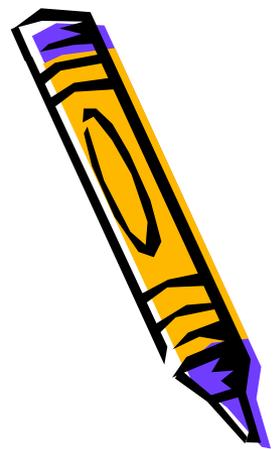
# Appearance

- 4 - 6 Pounds Per Year
  - Quadruple Birth Weight By 30 Months
- Appearance



Toddler: 1 - 3 years (12 - 36 months)

# Erikson - Autonomy vs. Shame & Doubt



- Developing A Sense Of Control
  - A Process Of “Holding On & Letting Go”
    - Food: Like it one day and refuse the next
    - To Button Or Not To Button
- Results In A Clash Of Wills



# Autonomy vs. Shame & Doubt



- Negativism

- “NO!”
- “Me Do”

- Ritualism

- Sameness

NO!

NO!

NO!

NO!

NO!

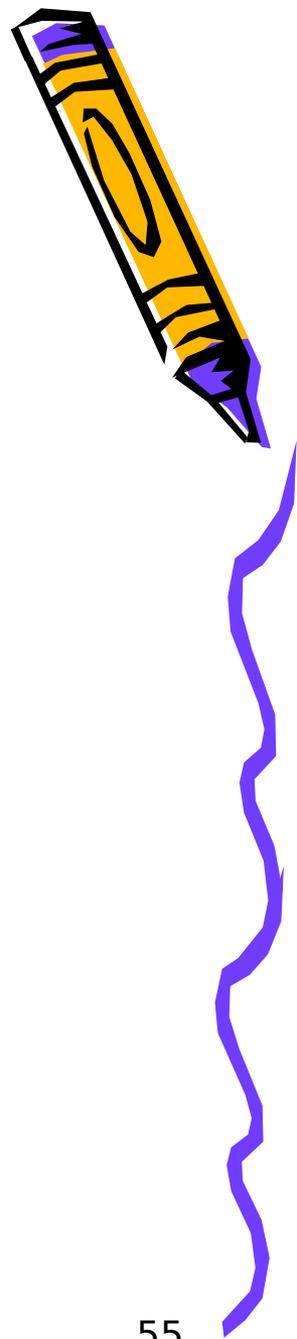
NO!



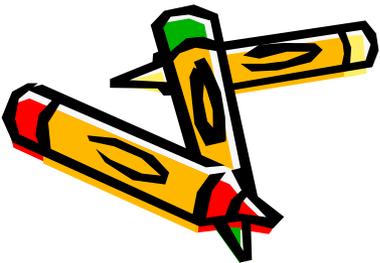
- Transitional Object



# Freud - Anal Stage

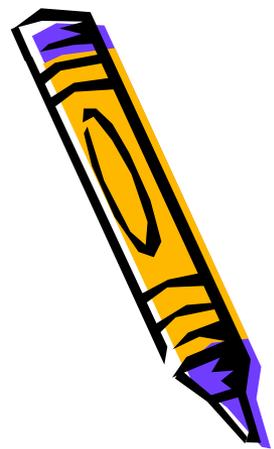


- Age
  - 1 - 3 Years
- Source Of Pleasure Seeking
  - Anal Region
- Major Event Is Toilet Training



# Piaget - Sensorimotor Period

Stage 5



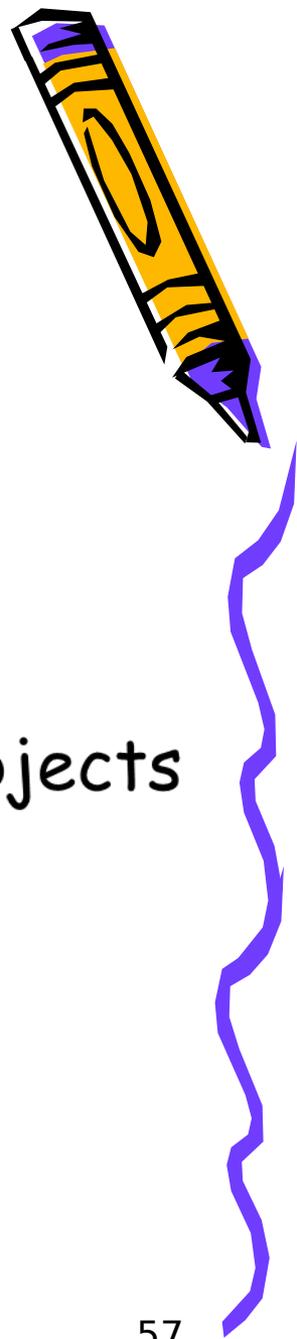
## Tertiary Circular Reactions

- 13 - 18 Months
- "Little Scientists"
  - Aware Of Causal Relationship
- Cannot Transfer Knowledge To New Situations
- Increasing Ability to Venture Away From Parent
- Aware That Things Are Behind Closed Doors



(stage 6)

# Inventions Of New Means

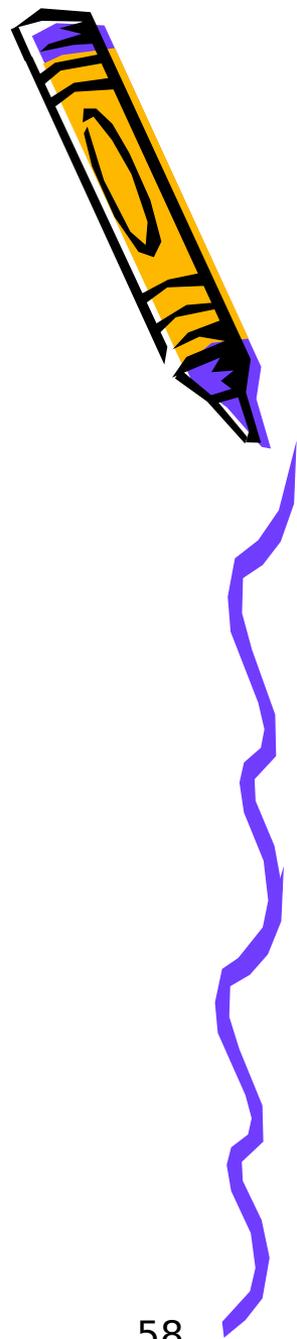
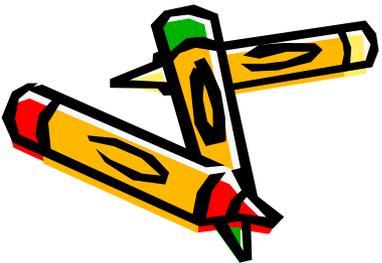


- 19 - 24 Months
- Imitation/Domestic mimicry
- Can Use Mental Images To Represent Objects
- Problem Solving In Their Mind
- Some Sense Of Timing



# Piaget - Preoperational Period

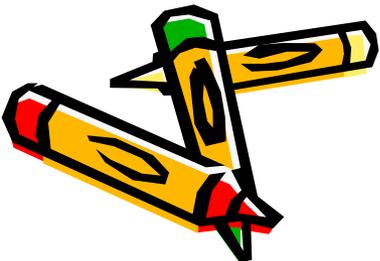
- 2 - 7 Years
- Problem Solving Based On What The Child Sees And Hears
  - Thinks And Reasons At A Very Primitive Level
- Difficulty Telling Reality From Fantasy



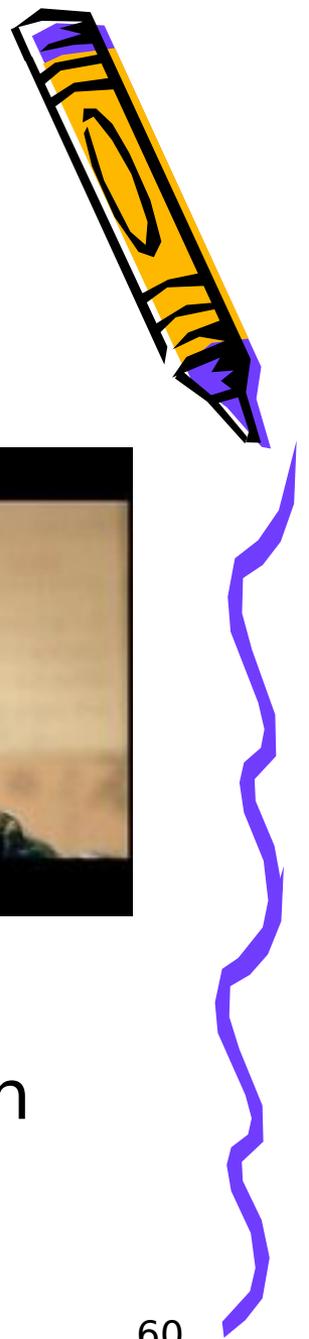
# Preoperational Period



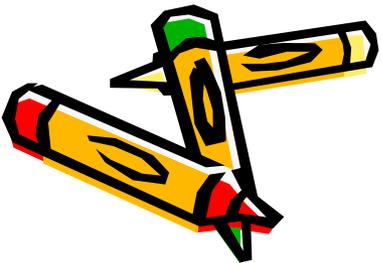
- Egocentrism
  - Some Degree From Birth to Death
  - Views Everything In Relation To Self
- Animism
  - Giving Life-Like Or Human Qualities To Animals And Inert Objects



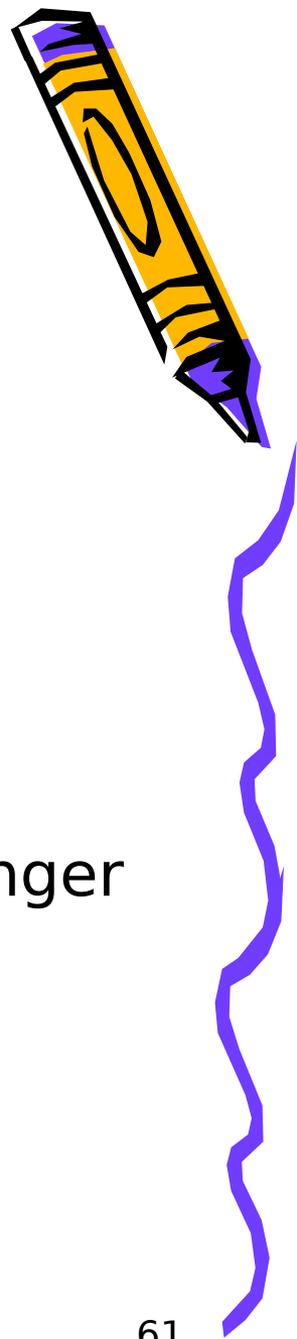
# Preoperational Period



- Magical Thought
  - “Wishing Makes It So”
- Irreversibility
  - Cannot Undo
- Centration
  - Focuses On One Aspect Of A Situation



# Language Development



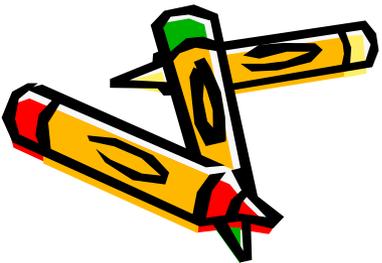
- 15 – 24 Months
  - Burst Of Language
- 2 Years
  - ~ 300 Words
  - ~ 50% - 65% Can Be Understood By Stranger
  - Sentence Is Words Strung Together
    - “All gone.”
    - “Mama go bye-bye.”



Toddler: 1 - 3 years (12 - 36 months)

# Toddlers & Play

- Characterized by
  - Imitation
  - Aggression
  - Short Attention Span
- Parallel Play
  - Playing Along Side Of But Not With
- Talking
- Activities

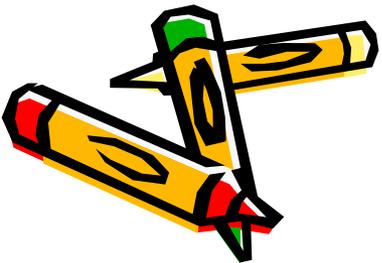


Toddler: 1 - 3 years (12 - 36 months)

# Dental Health - Toddler



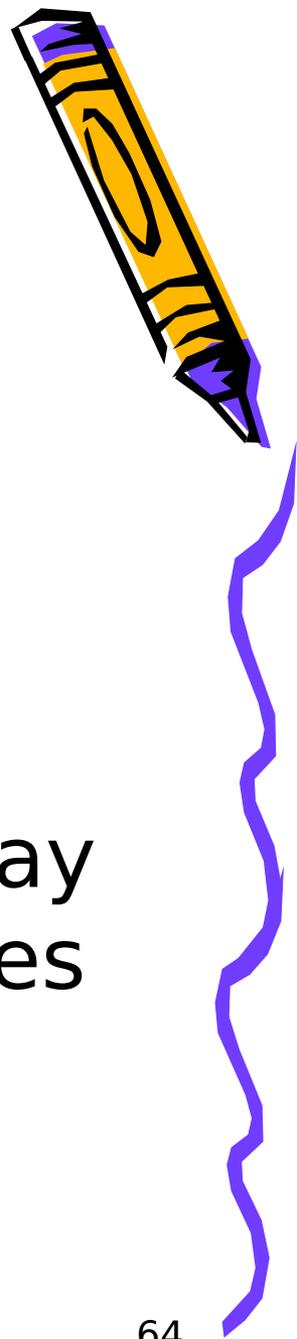
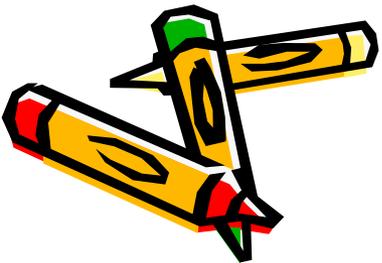
- Complete Set Of Baby Teeth By 24 Months
- Brush twice a day with assistance



Toddler: 1 - 3 years (12 - 36 months)

# Nutrition - Toddler

- Physiologic Anorexia
- Food Jags
- More Than 1 Quart Of Milk A Day Can Lead to Dietary Deficiencies
  - 24 - 30 Ounces Acceptable





**HELLO, MY NAME IS PENNY  
AND I REFUSE TO EAT FOOD  
UNLESS THE DOG HAS  
TRIED IT FIRST.**

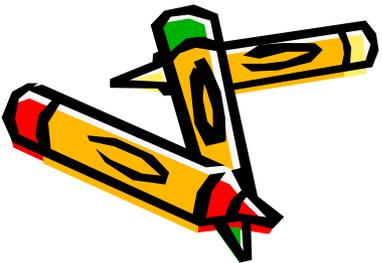
**#PICKYEATERSCLUB MOMMYSHORTS.COM**



Toddler: 1 - 3 years (12 - 36 months)

# Nutrition - Toddler

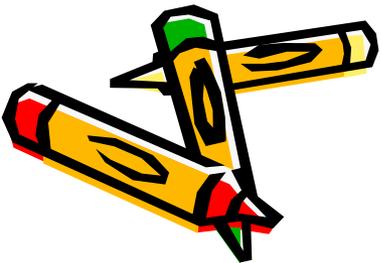
- Small Amounts Of Food With Frequent Snacks
  - Highchair Or Special Seat
  - General Guideline: 1 Tablespoon Of Each Food Per Year Of Age
- Healthy Snacks
  - Yogurt
  - Cheese
  - Thinly Sliced Fruits
  - Soft Vegetables



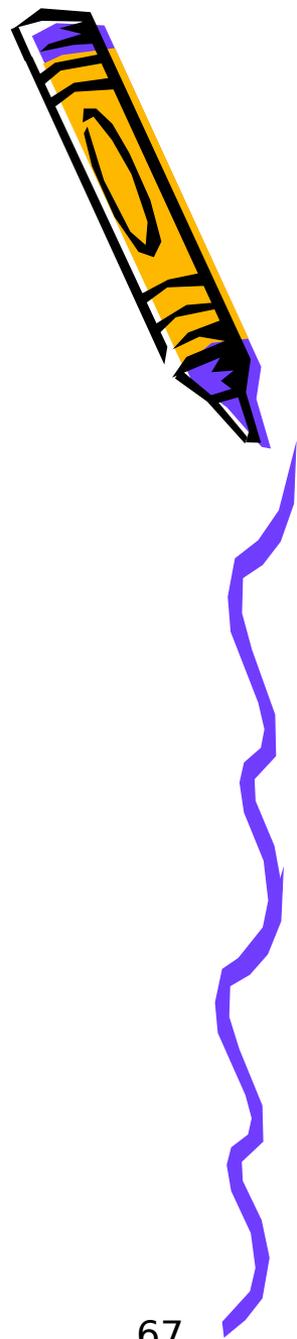
Toddler: 1 - 3 years (12 - 36 months)

# Toddlers & Sleep

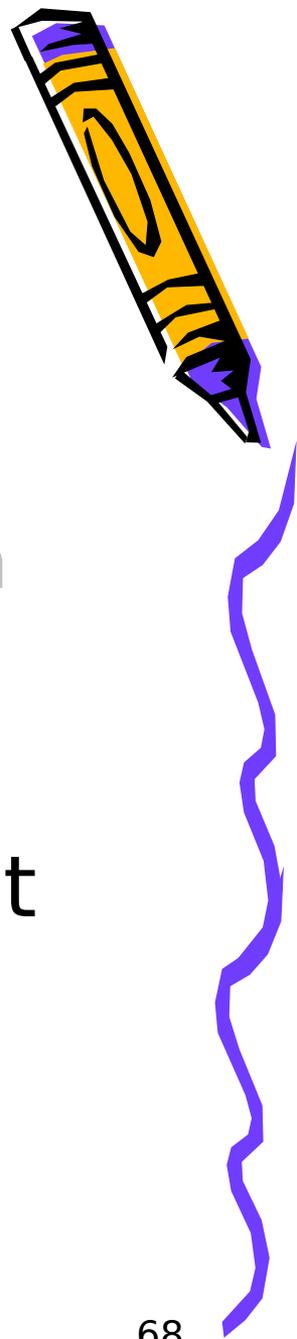
- 12 - 14 Hours
  - One Nap
  - Quiet Time Instead Of One Nap?
  - Resist Going To Bed [Click Here](#)
- Helping The Toddler Sleep
  - Firm Limits
  - Bedtime Rituals
  - Transitional Object



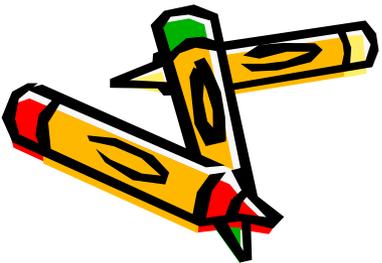
Toddler: 1 - 3 years (12 - 36 months)



# Limit Setting for Toddlers

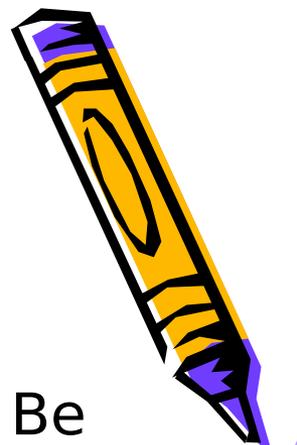


- Childproof Environment
  - Injuries Leading Cause Of Death In This Age Group
- Unrestricted Freedom Is A Threat



Toddler: 1 - 3 years (12 - 36 months)

# Types Of Discipline - Toddler



- Communication At Time Of Misbehavior Should Be ~ 1 Word Per Year Of Age
  - Reasoning Does Not Work
- Scolding Results In Shame
- Negative Voice
- Time Out
  - Rule Of Thumb: 1 Minute Per Year Of Age



Toddler: 1 - 3 years (12 - 36 months)

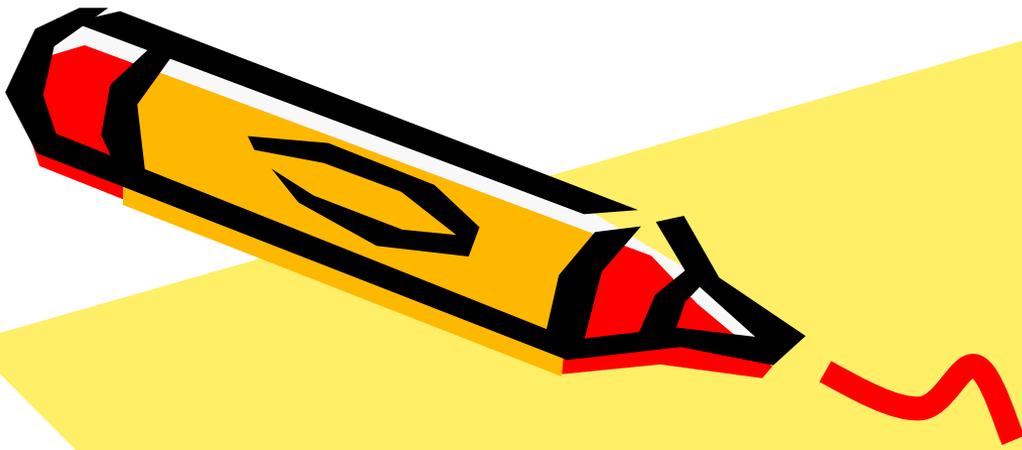
# Common Problems



- Temper Tantrums
  - No Secondary Gain
- Sibling Rivalry
  - Dethronement
    - Taken Off Center Stage
  - Egocentrism Plays A Role



Toddler: 1 - 3 years (12 - 36 months)



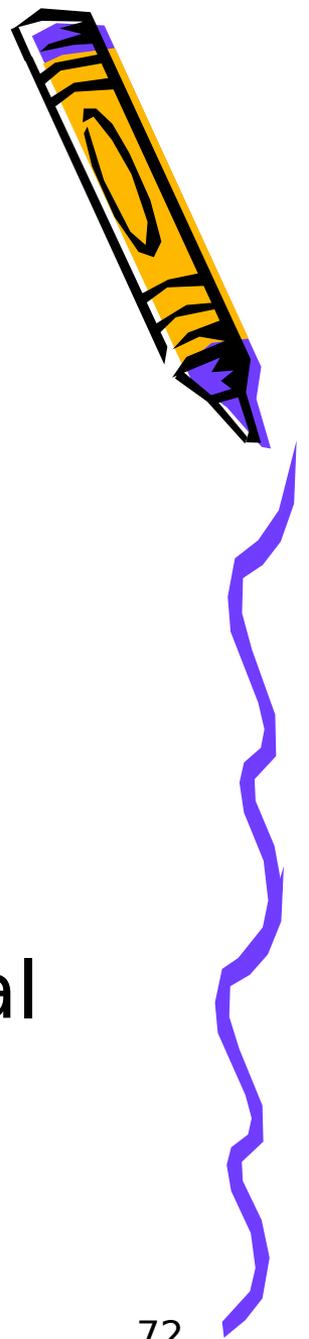
# Preschool-Age Child

3-5 years

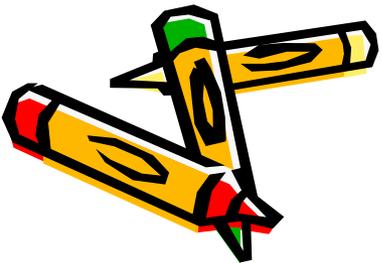


Erikson: Initiative vs. Guilt  
Freud: Phallic Stage  
Piaget: Preoperational Period

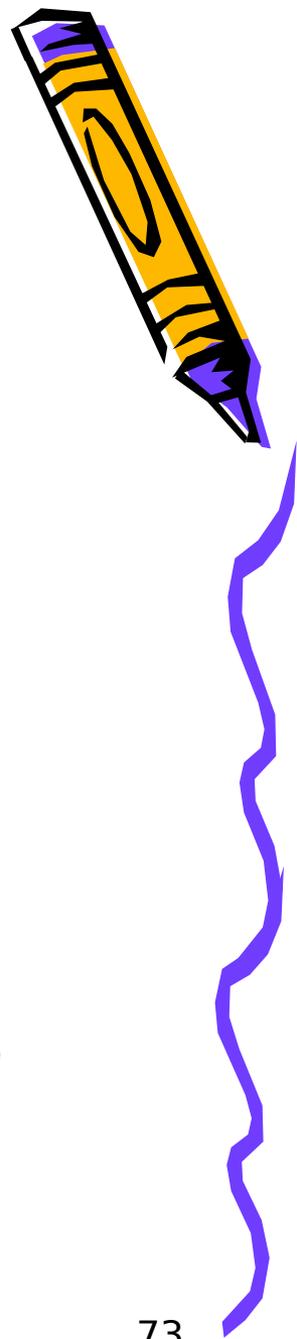
# Appearance



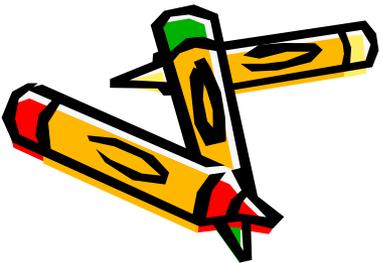
- 4 – 6 Pounds Per Year
- Slender, Graceful, Agile As Compared To Toddler
- Little Difference In General Physical Appearance Of Boys And Girls



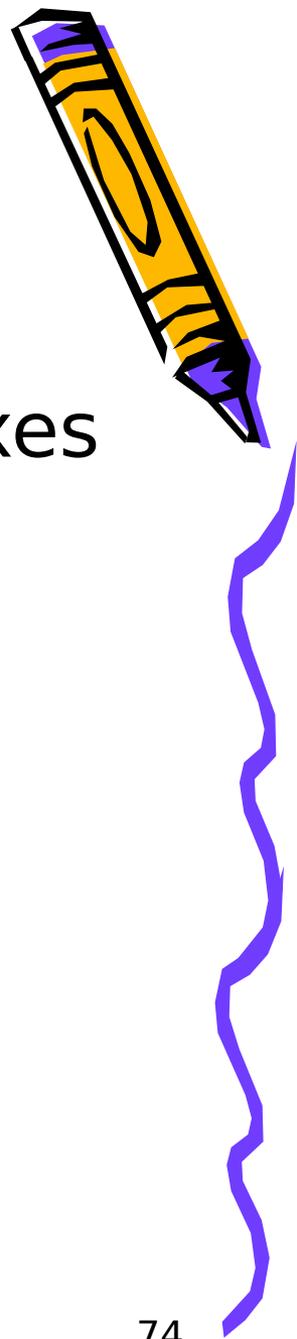
# Erikson - Initiative vs. Guilt



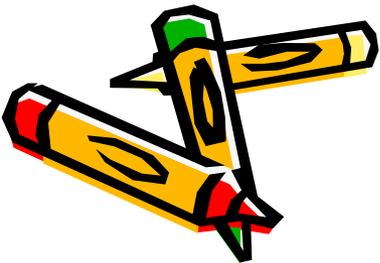
- Live To The Fullest
- Stage Of Energetic Learning
- Intrusion, Taking The Initiative, Forming And Carrying Out Goals



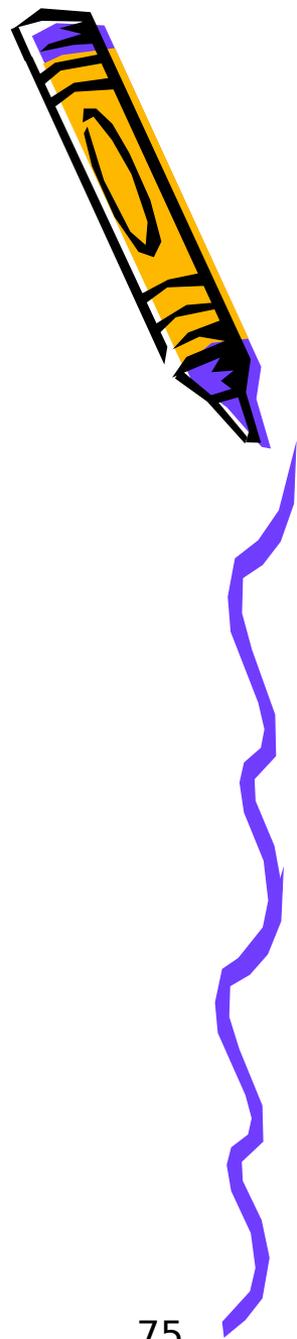
# Freud - Phallic Stage



- Recognize Differences Between Sexes
- Oedipus & Electra Complexes
  - Little Boy Loves Mother
  - Little Girl Loves Father
- “Where Do Babies Come From?”

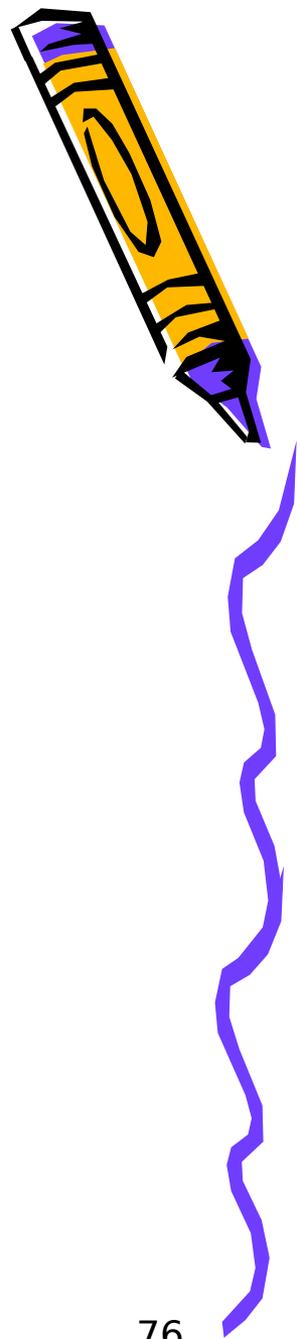


# Piaget - Preoperational Period



- Remain In The Preoperational Period
  - Egocentrism
  - Animism
  - Magical Thought
  - Irreversibility
  - Centration

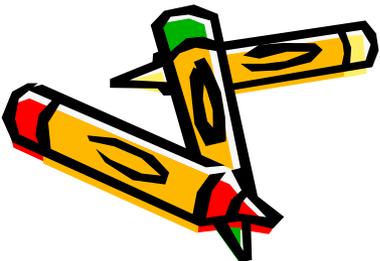
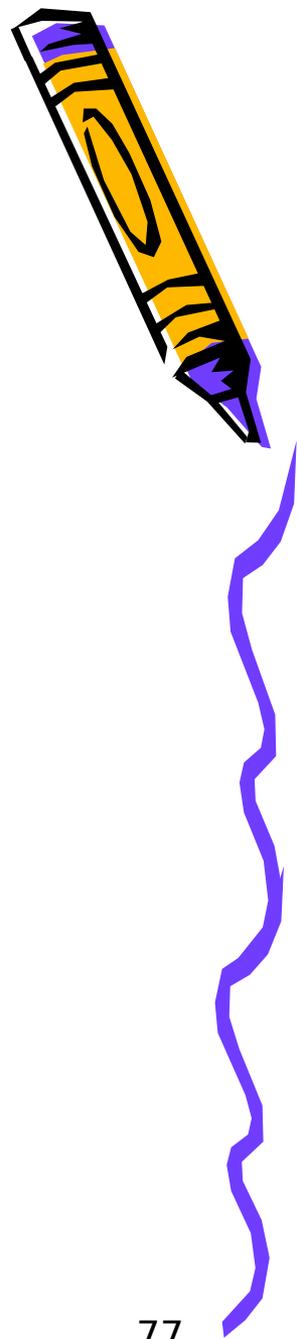




Piaget's Theory of Cognitive Development  
Preschool-age Child: 3 - 5 years

# Difficulty Telling Reality From Fantasy

- Immature Logic
- Fear Of Body Mutilation
- Adult Induced Fears
- Other Fears



# Language Development

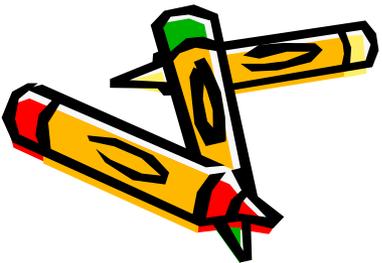


- 3 Years-Old
  - Telegraphic Speech, Sentences Of 3 To 4 Essential Words
  - Use Pronouns, Plurals, Past Tense, Name Familiar Objects
  - Talk Incessantly
- 4 Years-Old
  - Use Adjectives, Prepositions
  - Profanity
  - Asking Questions Is At Its Peak

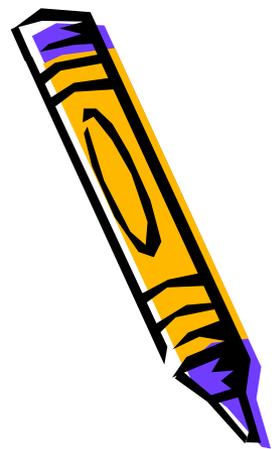


# Language Development

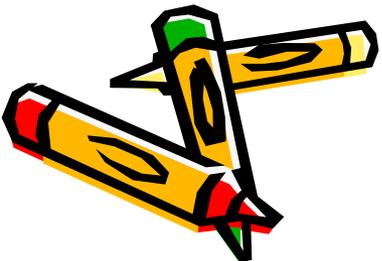
- 5 Years-Old
  - Use All Parts Of Speech
  - Story Tellers
- Stuttering During The Preschool Period
  - Ideas Come Faster Than Words Can Be Spoken



# Preschool-age Play



- Associate Play
  - In A Group
  - No Leader
  - No Goal
- Imaginary Friends
- Activities



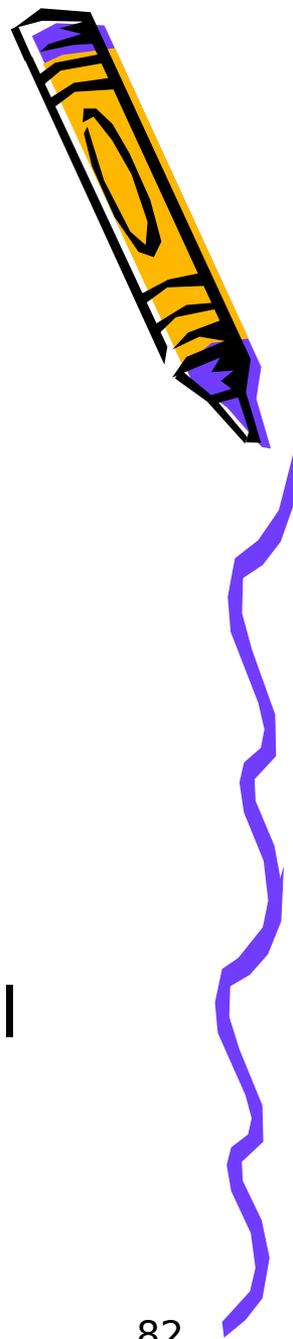
# Dental Health - Preschool

- Thumbsucking Or Pacifier Use Generally Stops By Age 4
  - Malocclusion May Occur If Thumbsucking Persists Past 5 Years Old



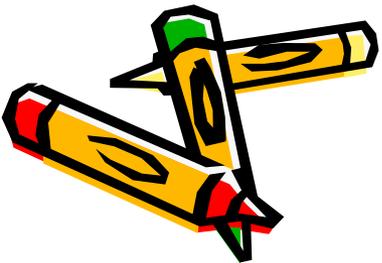
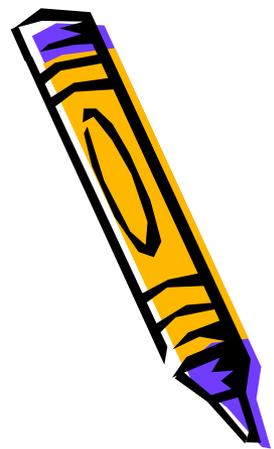
Preschool-age Child: 3 - 5 years

# Nutrition - Preschool



- 3 & 4 Years-Old
  - Continue To See Food Jags
  - Strong Taste Preferences
  - 3 Meals With 2 Snacks Is Norm
- 5 Years-Old
  - Starting To Be Interested In The Social Aspects Of Eating

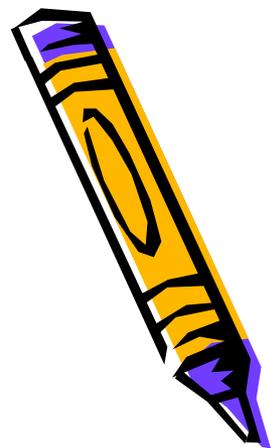




Preschool-age Child: 3 - 5 years

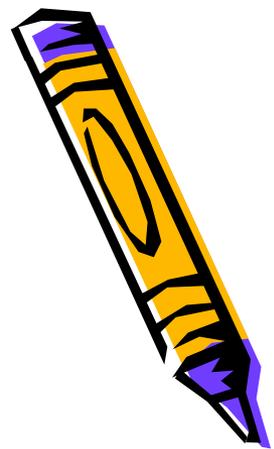
# Preschool-age Sleep

- Needs Average Of 12 Hours Sleep
  - Naps May Need To Be Discontinued
  - Quiet Play
- Helping The Preschooler Sleep
  - Immature Logic Leads To Belief In Ghosts, Monsters
    - Get The Monster Out Of The Closet
    - Transitional Object
    - Night Light

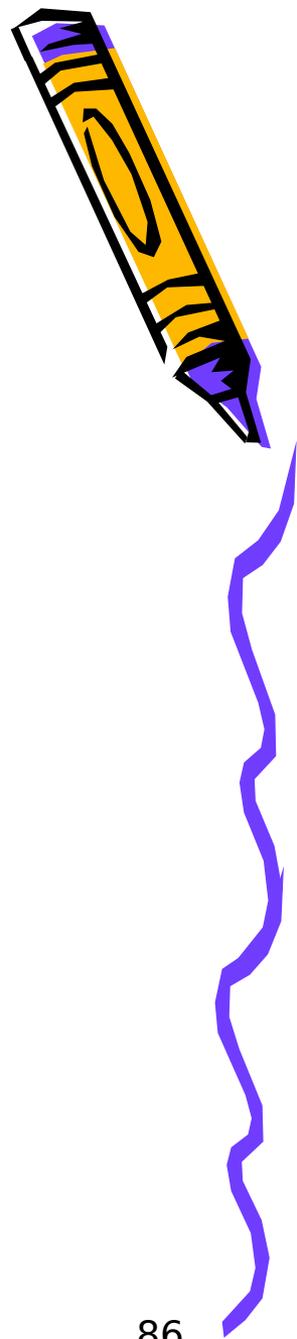


# Nightmares & Night Terrors

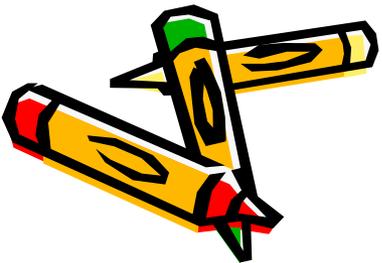
- Nightmares
  - Frightening Dreams That May Awaken The Child
  - Comfort And Reassurance
- Night Terrors
  - Child Cries Out. Appears Frightened. Not Fully Awake
  - No Recollection
  - Talk Quietly And Comfort. Allow The Child To Return To Sleep



# Types Of Discipline - Preschool



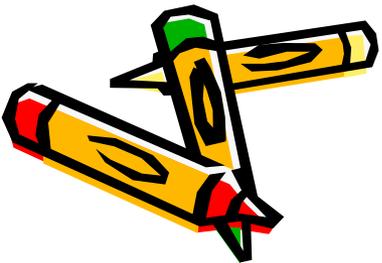
- Time Out
- Restricted Choices
  - “Either-Or”
  - “When-Then”
  - Choices The Parent Can Live With
- Diversion

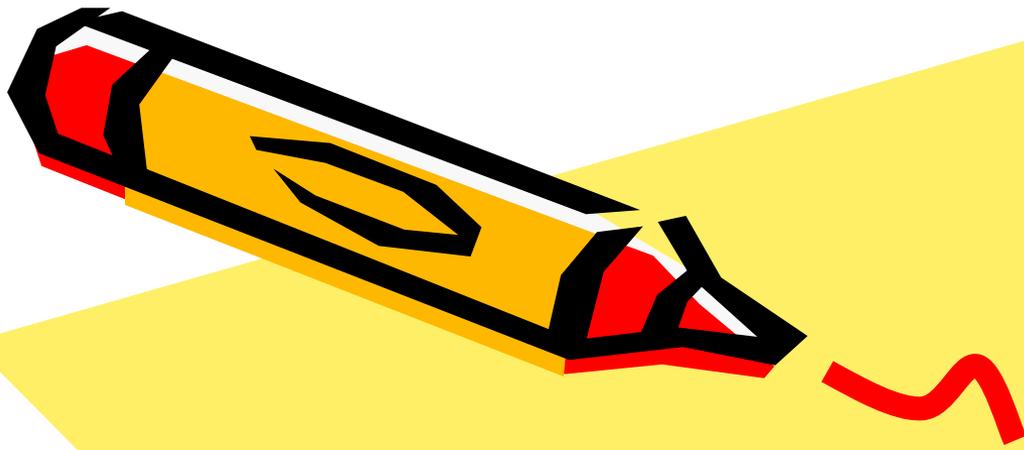


Preschool-age Child: 3 - 5 years

# Injury Prevention:

- Poisoning
- Pedestrian – motor vehicle injuries
- Proper car restraint
- Protective equipment (helmets,pads)
- Drowning
- Stranger danger





# School-Age Child

6-12 years/Puberty

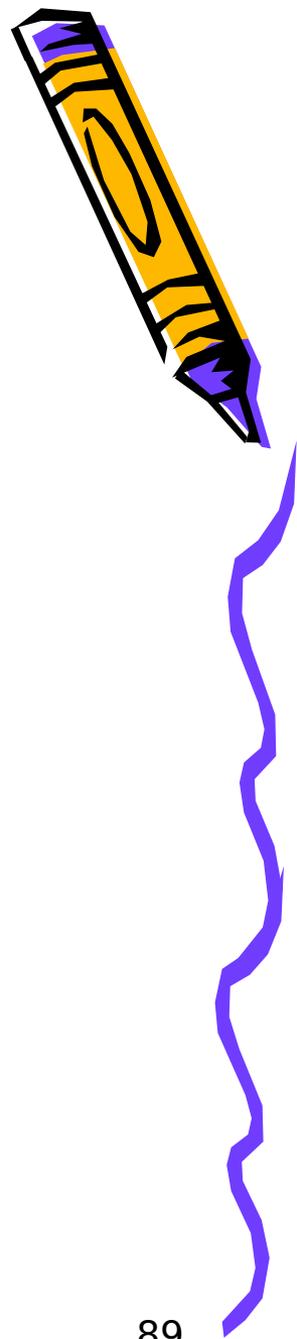
Erikson: Industry vs. Inferiority

Freud: Latency Period

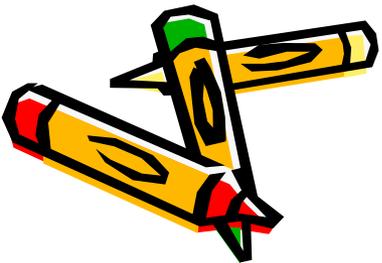
Piaget: Preoperational, Concrete Operational,  
Formal Operational



# Appearance

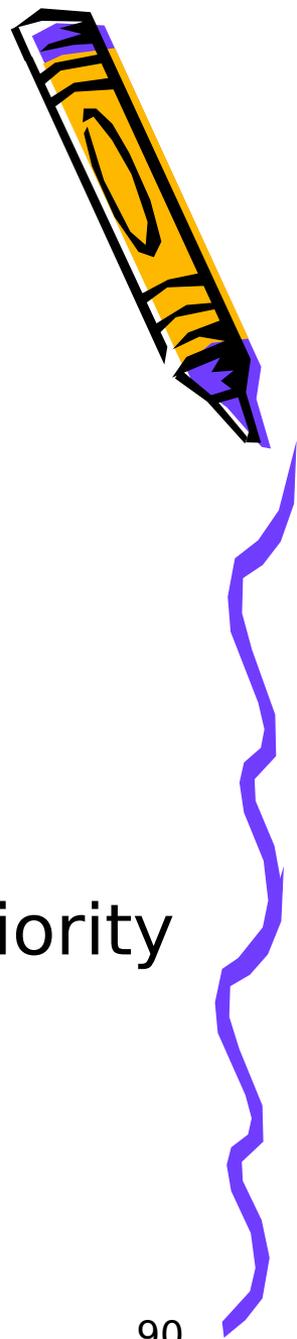
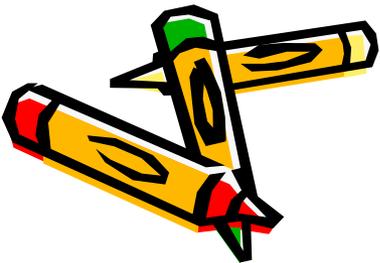


- 4 – 6 Pounds Per Year
  - Will Almost Double In Weight
  - Grow 2"/year
- Girls Usually Grow Faster Than Boys During This Stage



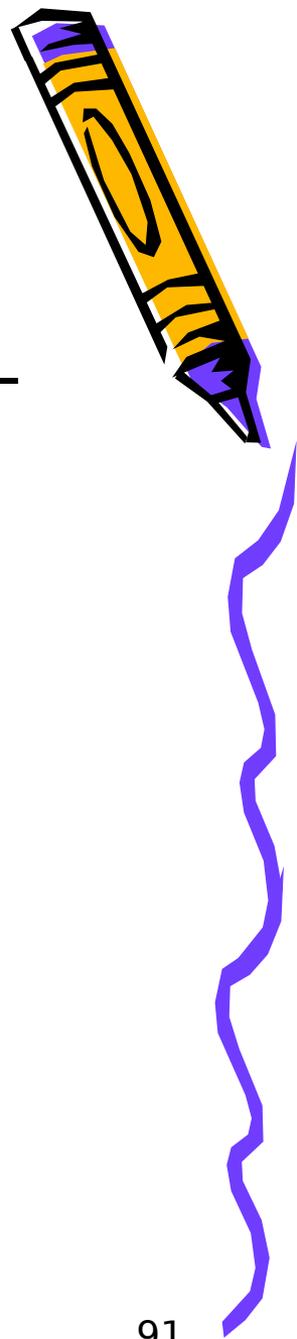
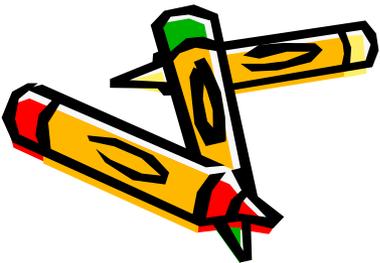
# Erikson - Industry vs. Inferiority

- Child Desires Real Achievement
  - Self Esteem Tied To Sense Of Industry
- Attitude Toward Work Develops
- All children feel some degree of inferiority regarding skills they cannot master



# Freud - Latency Period

- Relationships center around same-sex peers
  - Best friend is usually same gender
- Energies Invested In
  - Building On Existing Skills
  - Acquiring Knowledge
  - Vigorous Play



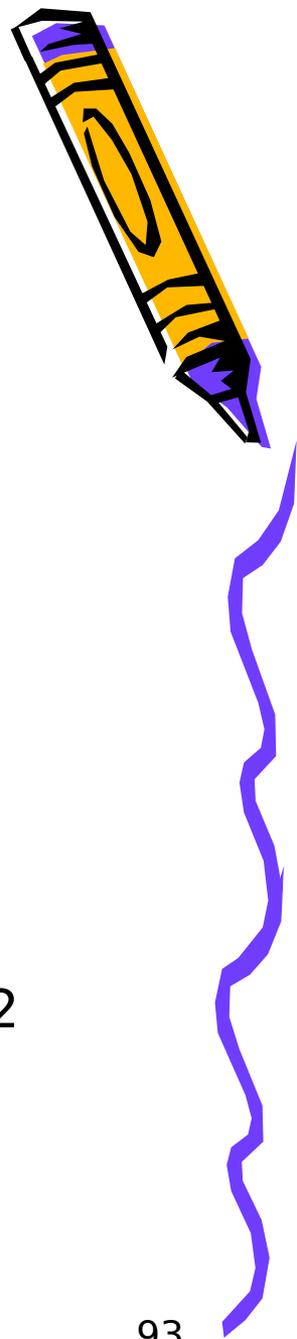
# Piaget - Preoperational Period



- Ends At 7 Years-Of-Age
- Shift from total egocentric thought to social awareness and the ability to consider other viewpoints
- Moves Into Concrete Operational Period



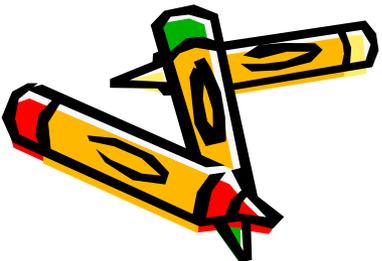
# Piaget - Concrete Operational Period



- 7 - 11 Years
- Egocentrism
- Classification & Logic
- Conservation  
- Reversibility

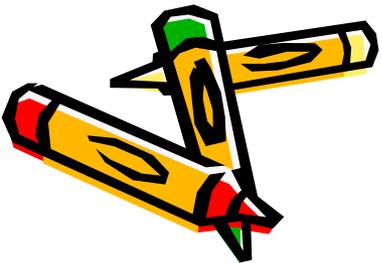


$$2 + 4 = 6 \text{ and } 6 - 4 = 2$$

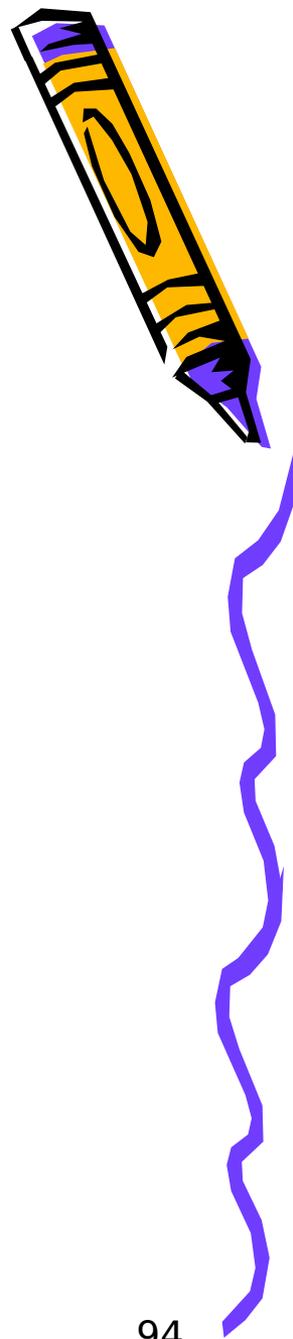


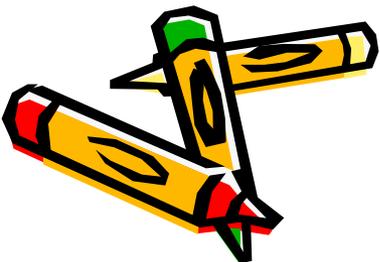
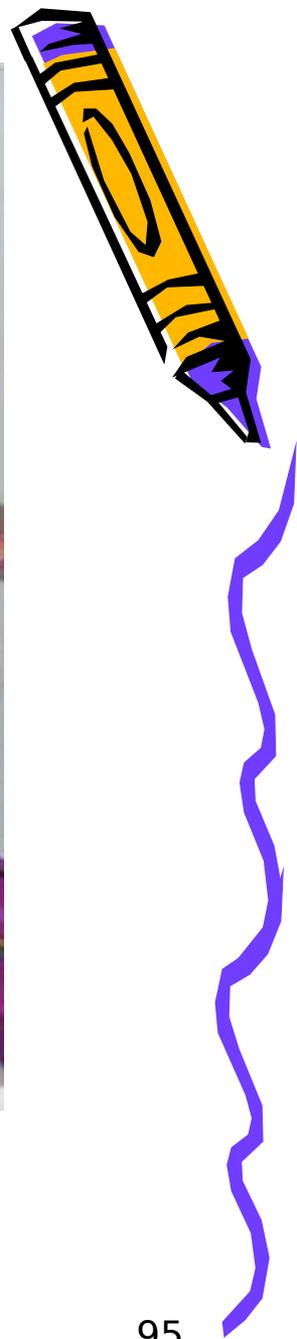


- The liquid from one of the short glasses has been poured into a taller, skinnier glass. A child that cannot **conserve** would assume the taller glass has more liquid than the shorter glass.



Piaget's Theory of Cognitive Development  
School-Age Child: 6 Years To Puberty





Piaget's Theory of Cognitive Development  
School-Age Child: 6 Years To Puberty

# Preoperational Versus Concrete Operations



“If I take medicine and it goes down to my stomach how will it help my head?”

Andrew  
Age 5  
MVA



# Preoperational Versus Concrete Operations



Dear Dr. Donohue,

I am a 4<sup>th</sup> grader. One of my classmates said he thought he had a cold because his head was hot. Why do we call it a cold when the head is hot? It just doesn't make sense.

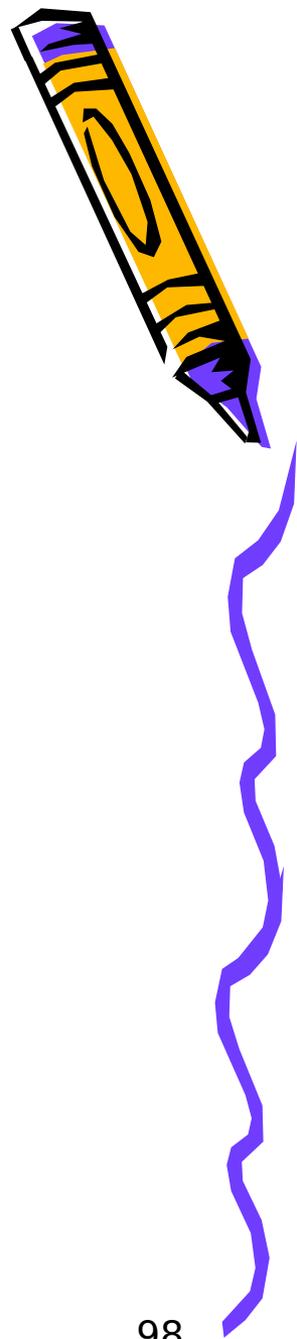
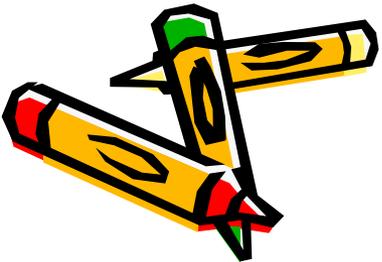
A.D.

9 or 10 years-old

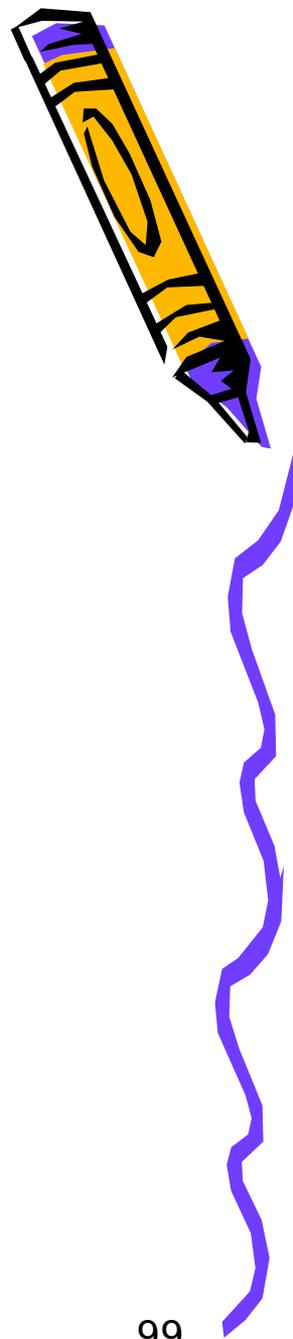


# Other Behaviors

- Adjustment to School
  - World Expands From Family To Larger Society
- Humor
- Skeptical
- Learn Parents Are Not Infallible



# School-age Play

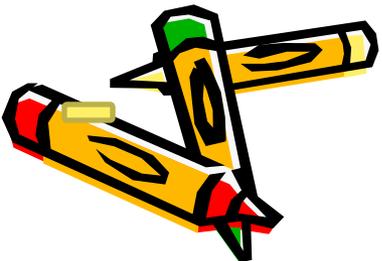


- Rules Are Very Important
- Cooperative Play
  - Together
  - Leader
  - Goal
- Team Play
- Clubs



Sticker Plot  
RULES

1. Keep club a secret.
2. Must come to as many meetings as possible.
3. Must bring sticker to every meeting and school ressec.
4. When in another house for meetings do not run in house unless told.
5. When at house don't touch or eat anything unless told.
6. If you don't come to a meeting you must make up the meeting at some one's house.
7. If you miss a meeting you can bet that the other members are still going to have the meeting.

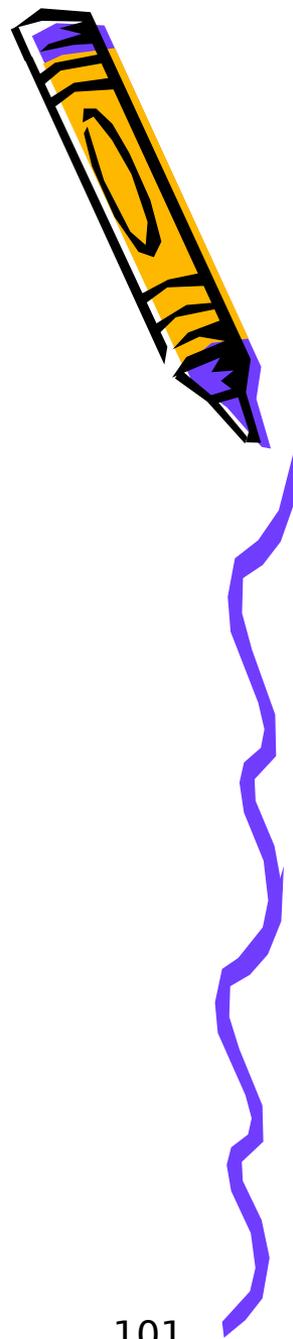




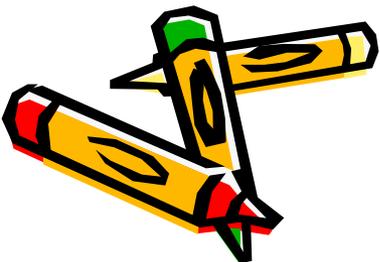
TEAMWORK  
MAKES THE  
DREAM  
WORK



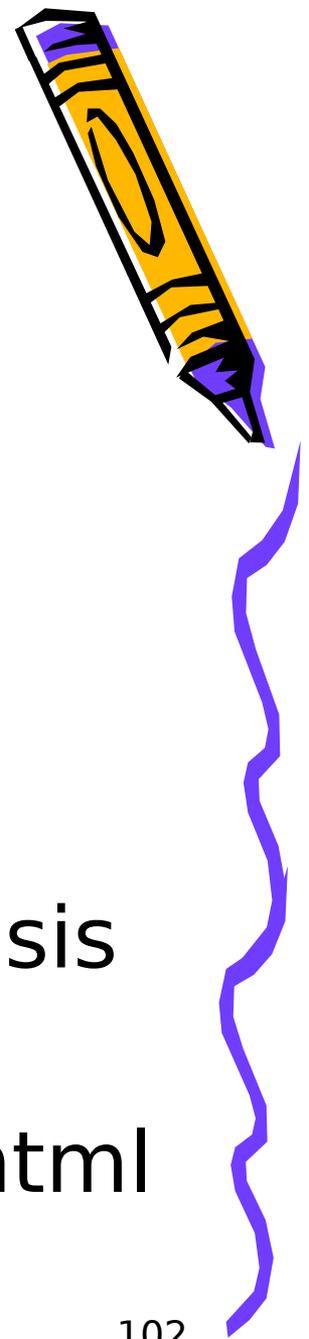
# Bullying



- Risk for long-term psychological disturbances and psychiatric symptoms
- Bullying prevention programs



“Be a buddy, not a bully.”



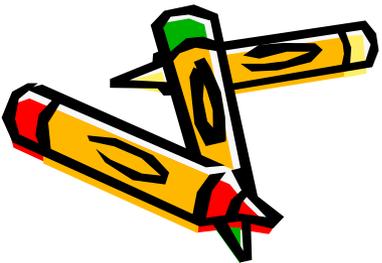
- **Is your child being bullied?**
- ■ Contact your child’s school directly.
- ■ Call the Contact Lubbock crisis line: (806) 765-8393
- ■ Visit [bullypolice.org/tx\\_law.html](http://bullypolice.org/tx_law.html)



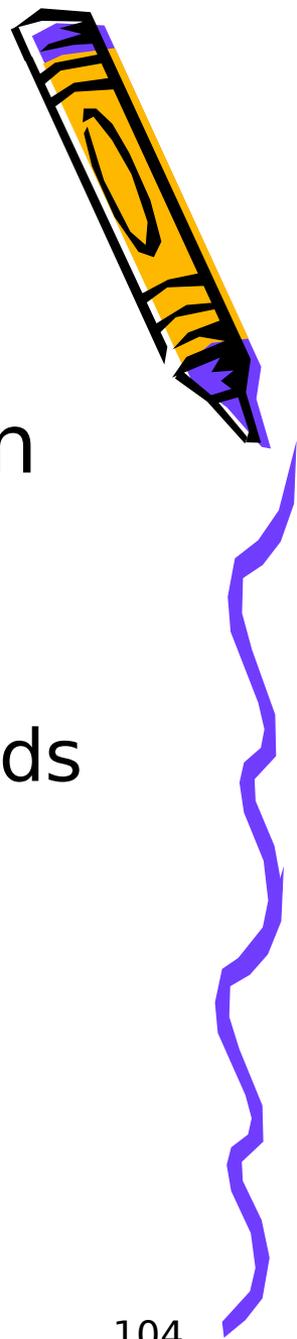
# Dental Health - School-age



- The Age Of Loose Teeth
  - Starts About 6 Years
  - Lose 20 Primary Teeth
  - Gain 22 - 26 Permanent Teeth
    - 32 Permanent Teeth



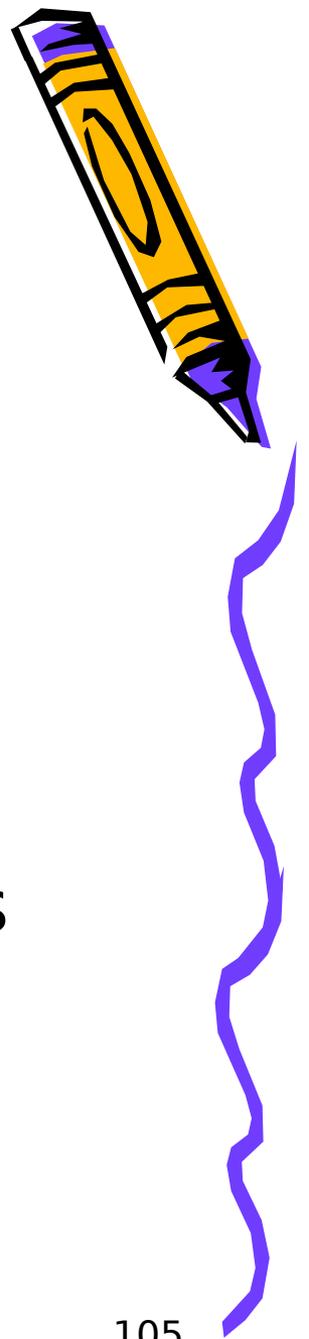
# Nutrition – School-Age



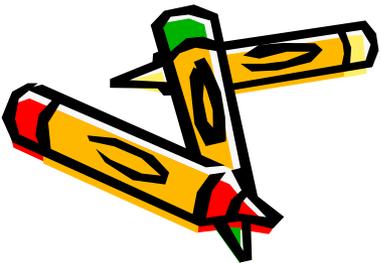
- Often Prefers Types Of Food Eaten At Home
  - May Be Resistant To New Foods
  - May Be More Willing To Try New Foods
- Food Strongly Associated With Social Interaction



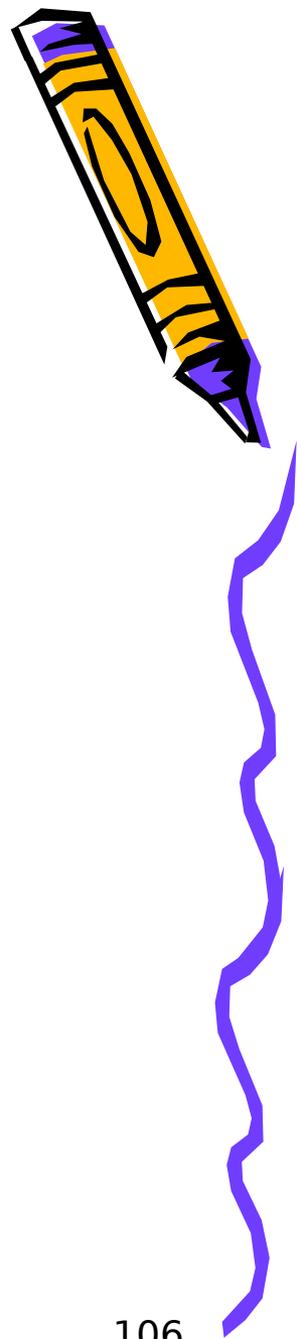
# School-age Sleep



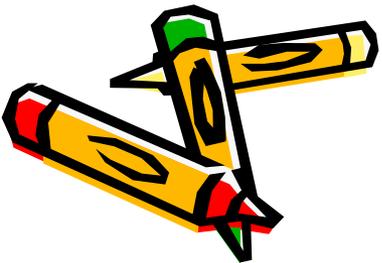
- Average 9 1/2 Hours Depending Upon Activity Level
- May Walk Or Talk In Sleep
  - Usually Decreases In Frequency As Child Nears Adolescence



# Limit Setting for School-age



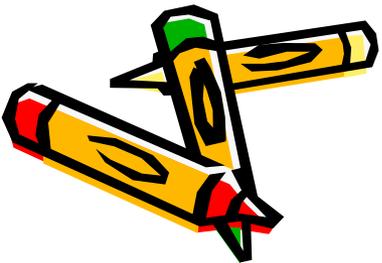
- Reasonable, Concrete Limits
- Cheating & Stealing

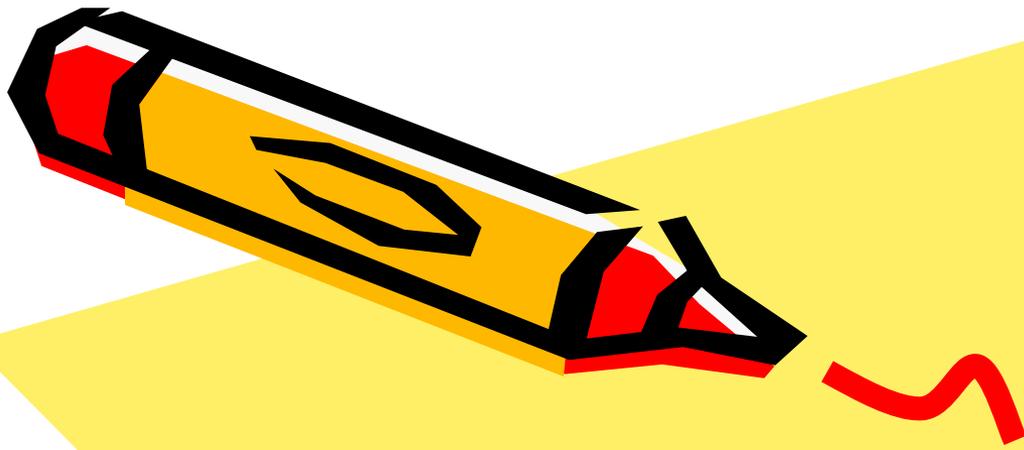


# Injury Prevention



- MVC
- Bicycle injuries
- Appropriate safety equipment for all sports





# Adolescence

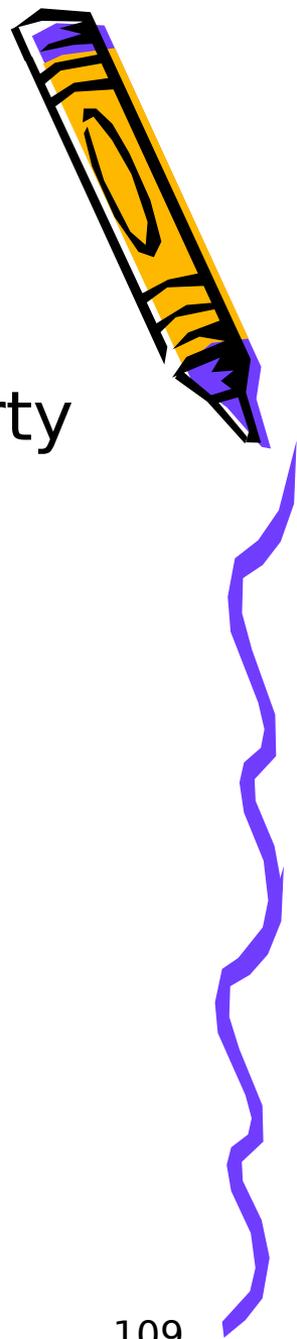
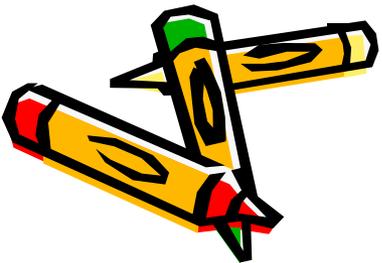
Puberty to age 20

Erikson: Identity vs. Role Confusion  
Freud: Genital Stage  
Piaget: Formal Operational

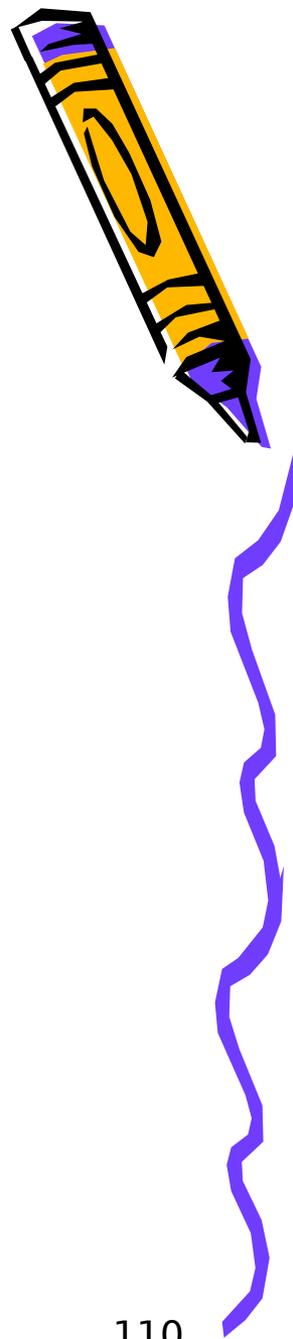


# Puberty

- Prepubescence
  - Approximately 2 Years Before Puberty
  - Start Of Physical Changes
- Puberty
  - Reproductive Organs Function
- Postpubescence
  - 1 - 2 Year Period After Adolescence
  - Skeletal Growth Complete



# Adolescent Growth Spurt

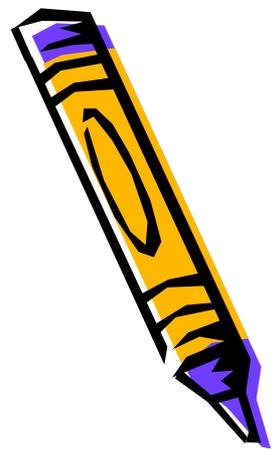
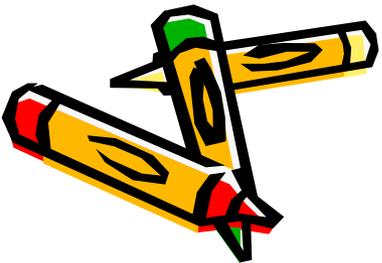


- Begins Earlier In Girls Than Boys
- Girls
  - Grow 2" - 8" Over Adolescence
  - Gain 15 - 55 Pounds Over Adolescence
- Boys
  - Grow 4" - 12" Over Adolescence
  - Gain 16 - 65 Pounds Over Adolescence



# Erikson - Identity vs. Role Confusion

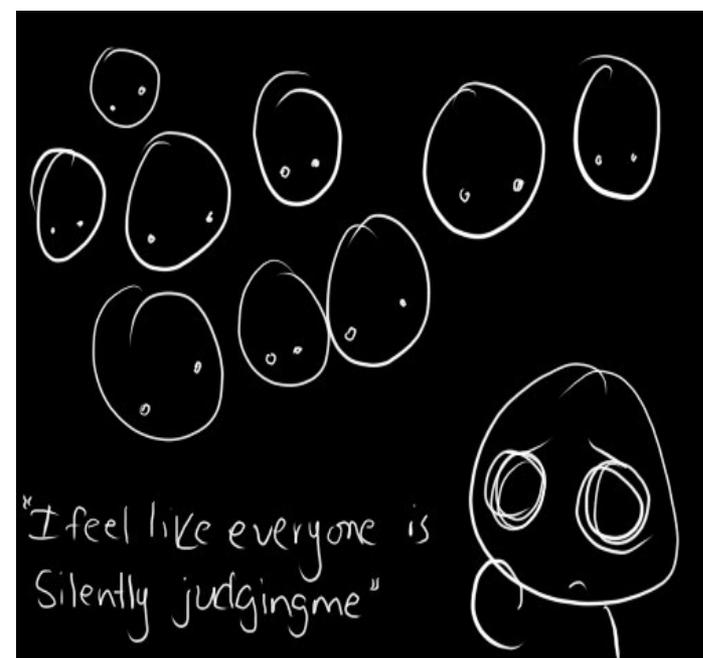
- Who Am and Where am I Going?
  - New Emotions
  - New Body
  - New Thoughts
  - New Sense Of Identity



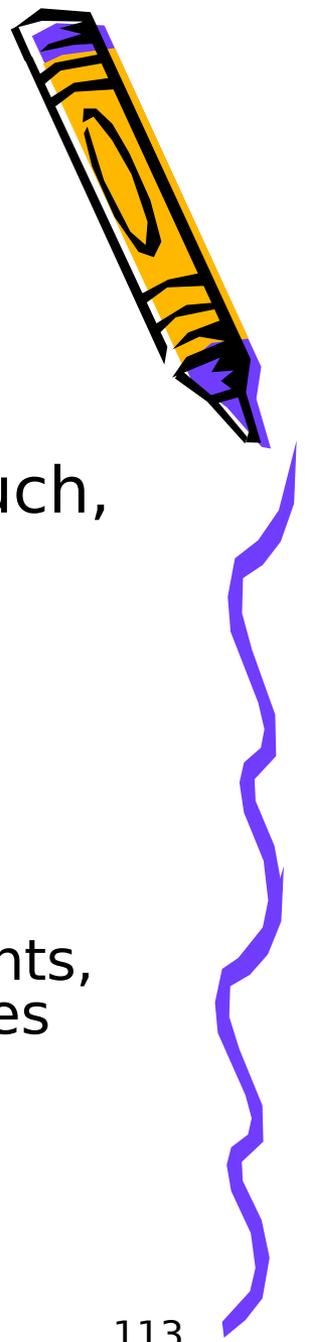
# Concepts of Self



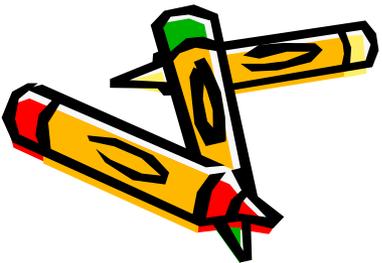
- Adolescent Egocentrism
  - Periods Of Extreme Self-Absorption
- Imaginary Audience
  - Imagines Everyone Is Focused On His/Her Behavior And Appearance
- Personal Fable
  - Belief That One's Feelings And Experiences Are Completely Unique



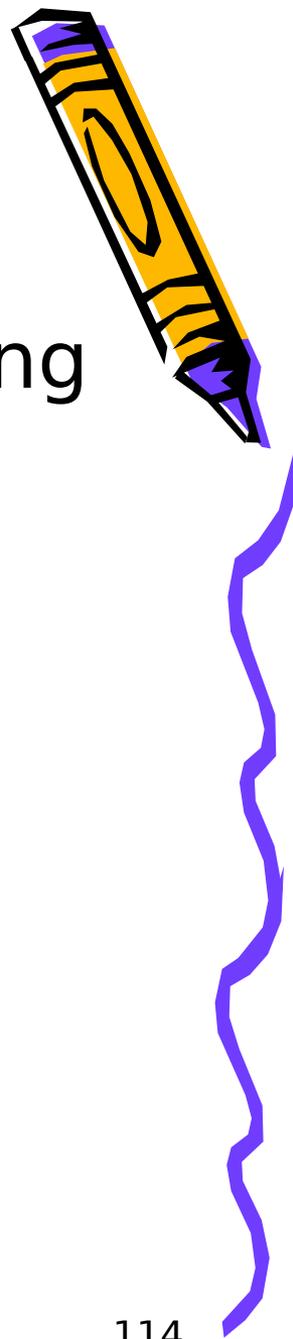
# Adolescent Brain



- Matures Back To Front
- First, Areas Controlling Vision, Hearing, Touch, Spatial (reason) Processing
- Next, Areas That Coordinate Functions
- Last, Executive Functions
  - Planning, Setting Priorities, Organizing Thoughts, Suppressing Impulses, Weighing Consequences



# Health Concerns

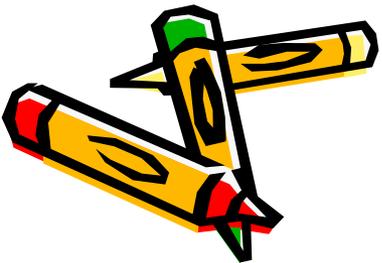


- Health Damaging Behaviors Leading Cause Of Morbidity And Mortality
- High Risk For Injury
  - Need For Independence
  - Strong Need For Peer Approval
  - Feeling Of Indestructibility
  - Need For Discharging Energy
  - Peak Incidence For Practice And Participation In Sports



# Relationship With Parents

- Struggle For Freedom
  - May Reject Parents
  - Away From Home & Family Activities
  - Increasing Amount Of Time With Peer Group
  - Confide Less In Parents
  - However, Parents Still Important



# Relationship With Best Friend



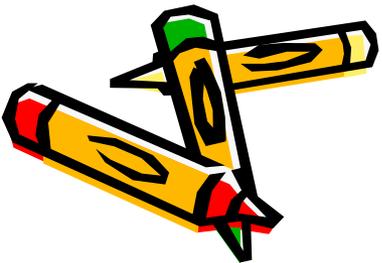
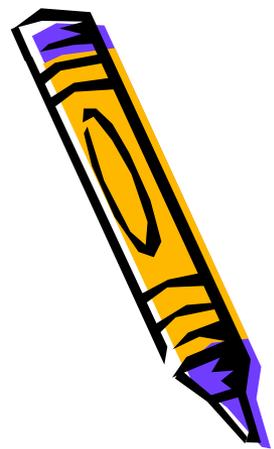
- Generally Same Gender
- Closer And More Stable Than In School-Age Years
- Benefits
  - Support
  - Caring
  - Important In Developing Intimate Relationships In Adulthood



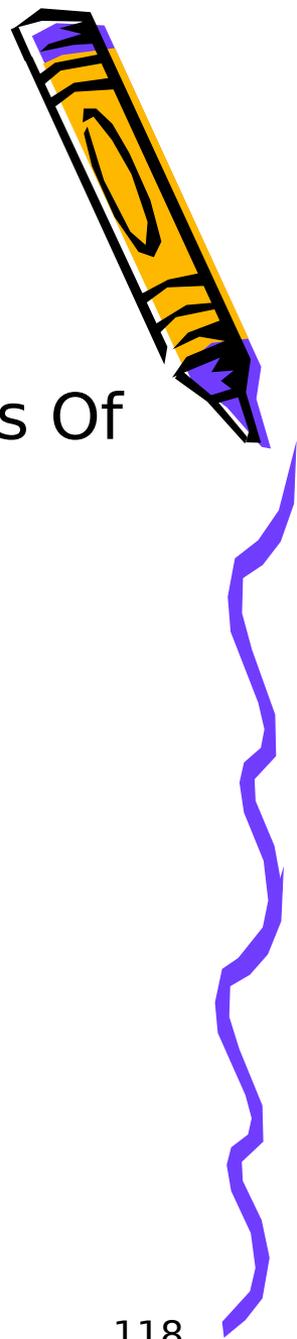
Adolescent (puberty to 20)

# Relationship With Peer Group

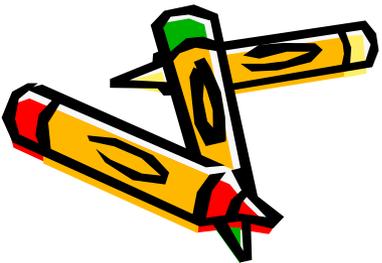
- To Belong Is Of Utmost Importance
- High Risk Behavior Is Increased In Groups



# Nutrition - Adolescent



- Well Balanced Diet With Increased Amounts Of
  - Calcium For Skeletal Growth
  - Iron For Expansion Of Muscle Mass & Blood Volume
  - Protein For Growth
- Nutritional Needs Influenced By
  - Adolescent Growth Spurt
  - Fast Foods
  - Influence Of Peer Group

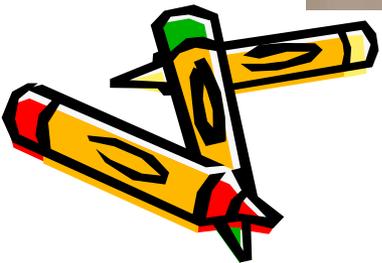
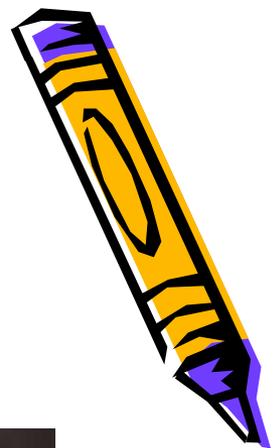


# Adolescent Sleep

- Adolescents Require ~ 9 Hours Of Sleep
- Melatonin Hormone
  - Influences Sleep
  - Levels Elevate Later And Stay Elevated Well Into The Morning During Adolescence
- Getting Up Before Biological Clock Has Buzzed
  - May Not Get Enough REM Sleep



# DONE!

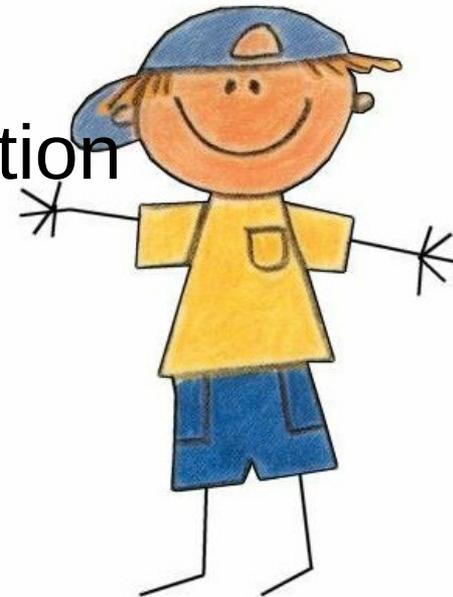


# Pediatric Assessment & Intervention



# Psychological Preparation

- Decreases anxiety
- Promotes cooperation
- Supports coping skills/may teach new ones
- Facilitates feeling of mastery in potentially stressful event
- Includes sensory procedural information
  - Imagery
  - Distraction
  - Relaxation



# Age & Developmental Explanation

- What is to be done/what is expected of child
- Short, simple, appropriate to level of understanding
- Times most conducive to learning
- Attention span
- Allow child to practice
- Stress positive benefits & what to expect after procedure



# Age & Developmental Explanation

- Information
  - Too much vs. not enough
  - Timing r/t procedure
- Sensorimotor explanation
  - Allow child to handle objects
    - Develops familiarity
    - Reduces fear



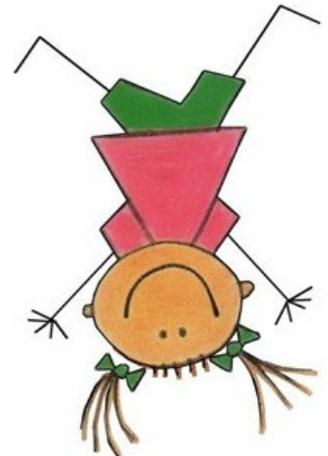
# Preparation

- Nurse
- Environment
- Child
- Parents



# After Procedure

- Praise and reward
- Allow child to verbalize
- Return to see child



# Assessment Approach

- Young infant
  - Quite voice, subtle movements
- Infant/Toddler
  - Soft voice, parent nearby, gradual approach
- Preschool
  - Simple instructions, involve in exam
- Adolescent
  - Respect privacy



# Physical Assessment

- General appearance
  - Physical appearance
  - Nutrition
  - Behavior
  - Personality
  - Interactions
  - Posture
  - Development
  - Speech





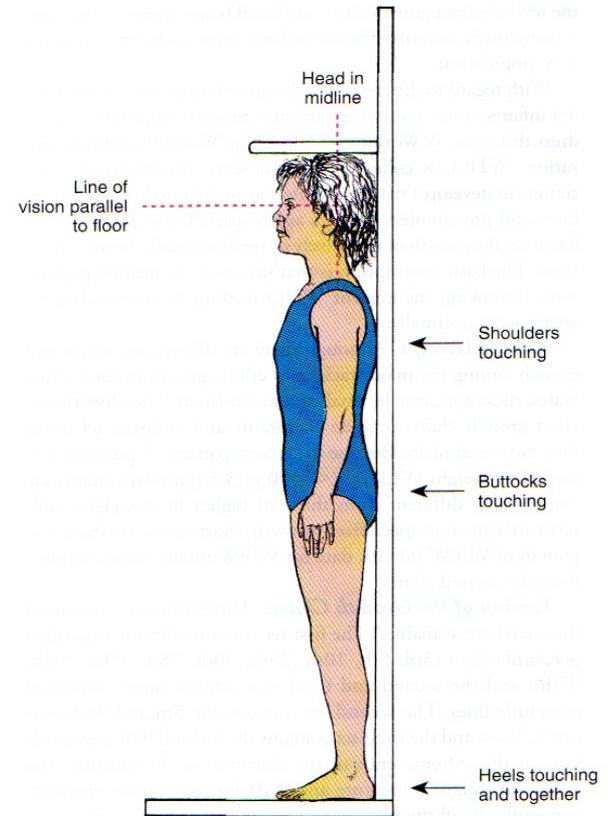
# Recumbent Length

- Birth – 2 years
- Head midline
- Grasp knees together – push until fully extended and flat
- Measure between marks



# Height/Stature

- Children  $>$  2 years
- Shoes off
- Stand tall and straight
- Head midline
- Line of vision parallel
- Back to wall/stadiometer



**Fig. 6-10** Measurement of height. (Redrawn from *Human growth and growth disorders: an update*, San Francisco, 1989, Genentech.)

Hockenberry 10<sup>th</sup> ed.

# Weight

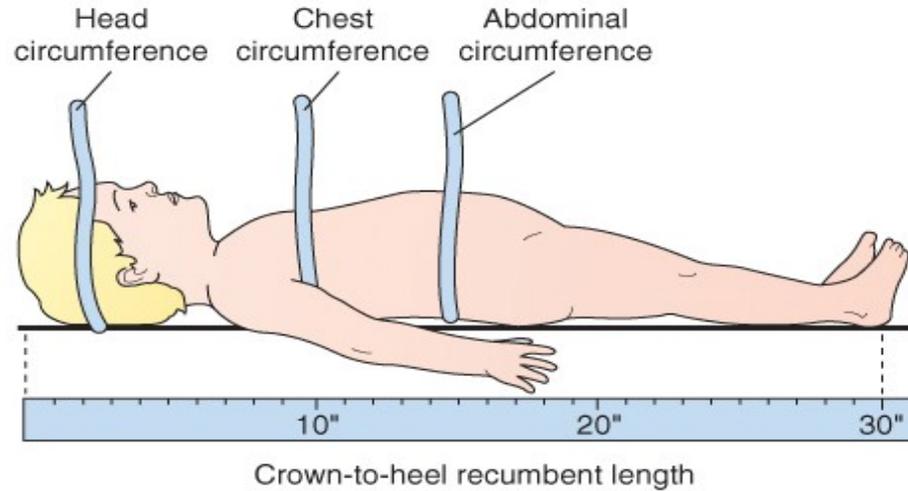
- Infants & very young children
- Weigh infants nude
- Safety



Courtesy of Paul Vincent Kuntz, Texas Children's Hospital, Houston, TX.



# Other Measurements



From Price DL: *Pediatric nursing: an introductory text*, ed 10, St. Louis, 2007, Saunders.

## Frontal Occipital Circumference (FOC)



From Seidel HM, Ball JW, Dains JE, et al: *Mosby's guide to physical examination*, ed 4, St Louis, 1999, Mosby.

# Physiologic Measurements

- Vital Signs
  - “Checking”.....Not “Taking” Vital Signs
- Compare
  - Age specific normal values
  - Previous values
- Atraumatic Care
  - 1<sup>st</sup> – respirations
  - 2<sup>nd</sup> – heart rate
  - Last – blood pressure & temperature
- Record disruptive behavior



# Normal Pulse And Respiratory Rates For Children

Age	Pulse	Respirations	Nursing Implications
Newborn	100-160	30-60	These ranges are average only and vary with the sex, age, and condition of child. Always note whether the child is crying, febrile, or in some distress.
1 - 11 mo	100-150	25-35	
1 - 3 yr (toddler)	80-130	20-30	
3 - 5 yr (preschooler)	80-120	20-25	
6 - 10 yr (school age)	70-110	18-22	
10 - 16 yr (adolescent)	60-90	16-20	

# Pulse

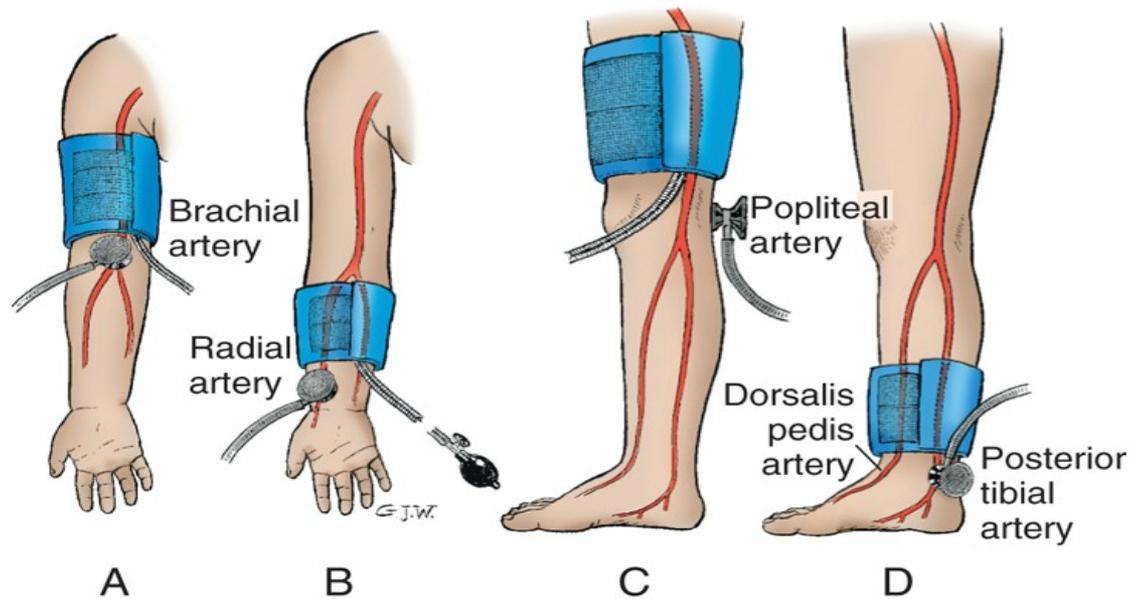
- Birth to 2 years
- Child  $> 2$  years

# Respirations

- What are you watching?
  - Birth to 7 years
  - $\geq 7$  years

# Blood Pressure

- Selection Of The Appropriate Size Cuff
  - Cuff Too Big?
  - Cuff Too Small?



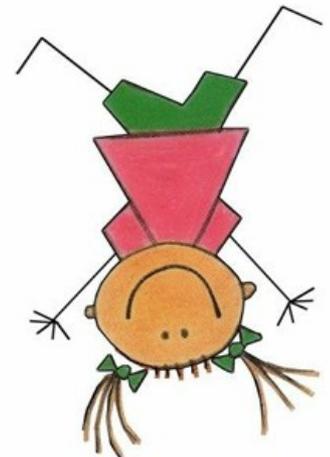
# Temperature

- Active exercise
- Stress, crying
- Environment



# Fever in Children

- Interventions
  - Pharmacologic
    - Acetaminophen
    - Ibuprofen
  - Environmental
    - 1 hour after antipyretic
  - Rest
  - Encourage fluids



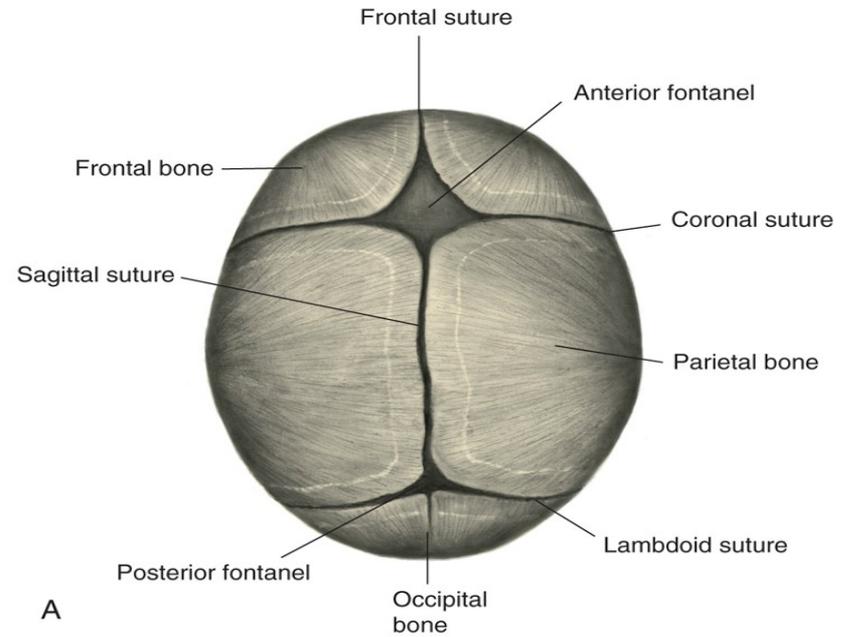
# Skin

- Color
- Texture
- Temperature
- Moisture
- Turgor
- Lesions
- Acne
- Rashes
- Hair and distribution



# Head

- General Shape/Symmetry
- Head Control/ROM
- Sutures
- Fontanelles
  - Posterior
  - Anterior



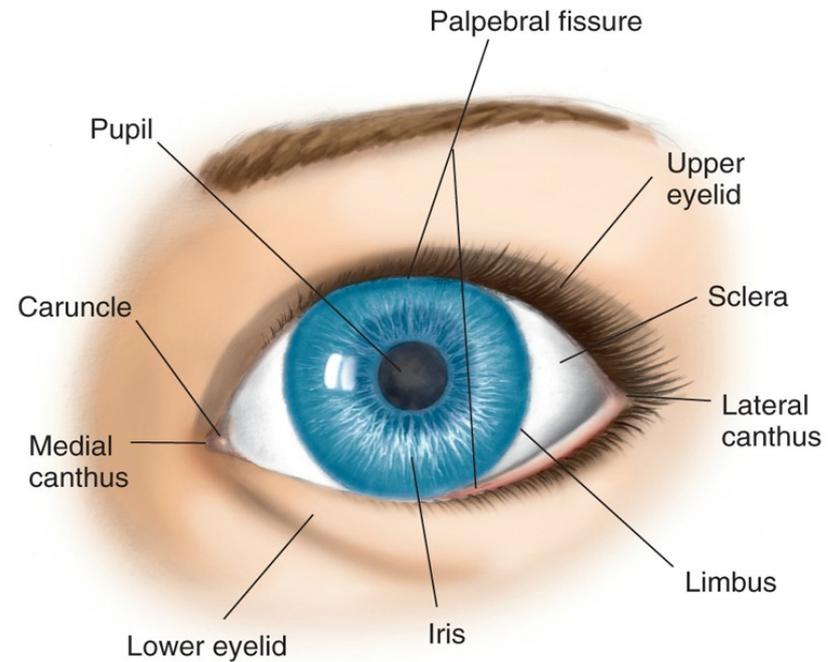
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# Eyes

- Size, Shape, And Spacing
- PERRLA
- Color



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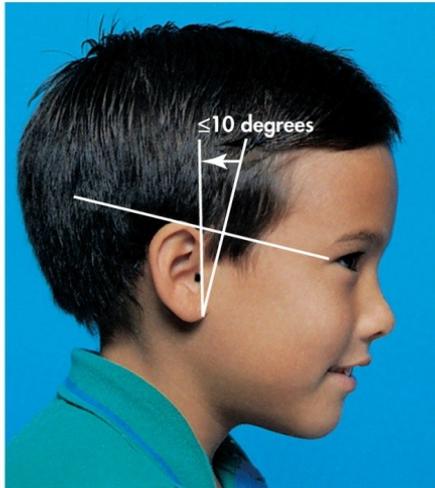
# Eyes

- By 3-4 months
  - Binocularity
- Strabismus (“cross-eye”)
  - Treatment may include
    - Glasses
    - Patching
    - Eye drops
    - Surgical intervention
  - If not detected & corrected by 4-6 years
    - Amblyopia (“lazy eye”)



# Ears

- External ear
- Eye-occiput line



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**Normal Ear Alignment**



Normally developed outer ear (pinna)



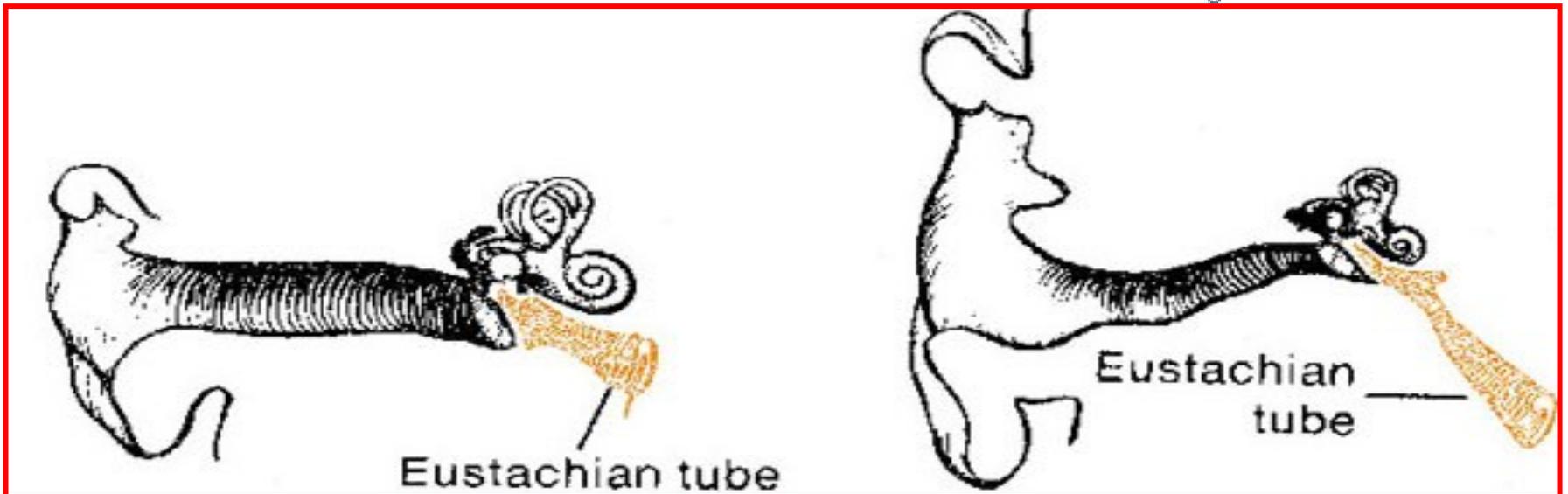
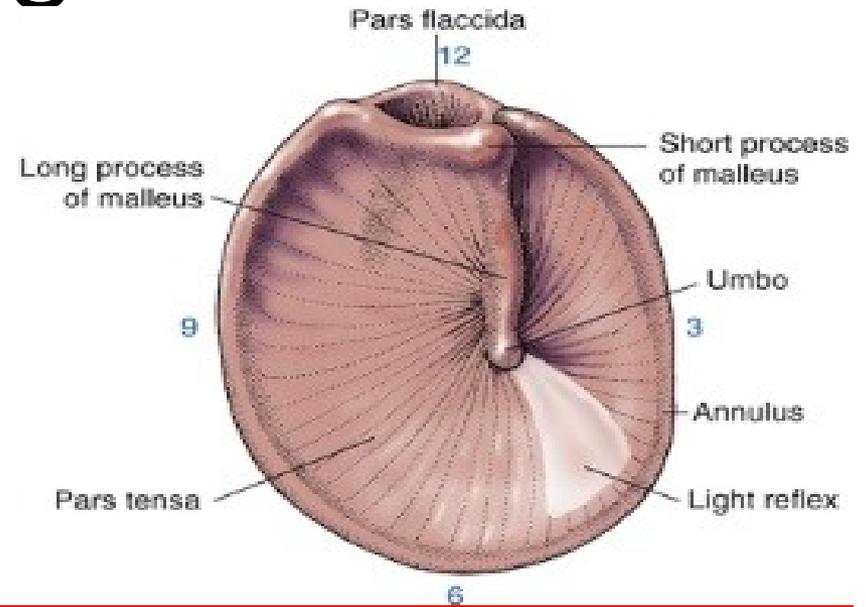
Abnormal size, shape, rotation and/or location of pinna

 ADAM.

**Low Set Ears**

# Ears

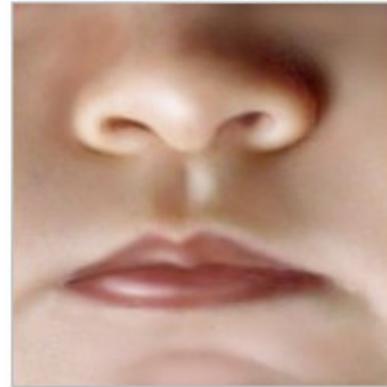
- Ear canal
- Eustachian tube
- Foreign bodies?



# Nose

- Midline And Patent
- Internal Structures

Normal nostrils

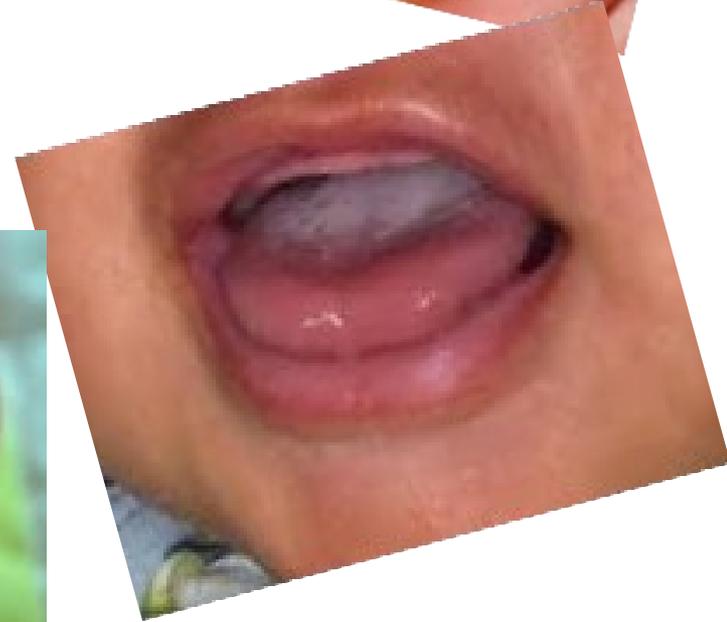


Flared nostrils



# Mouth

- Lips
- Mucous Membranes
- Gums
- Teeth
- Tongue



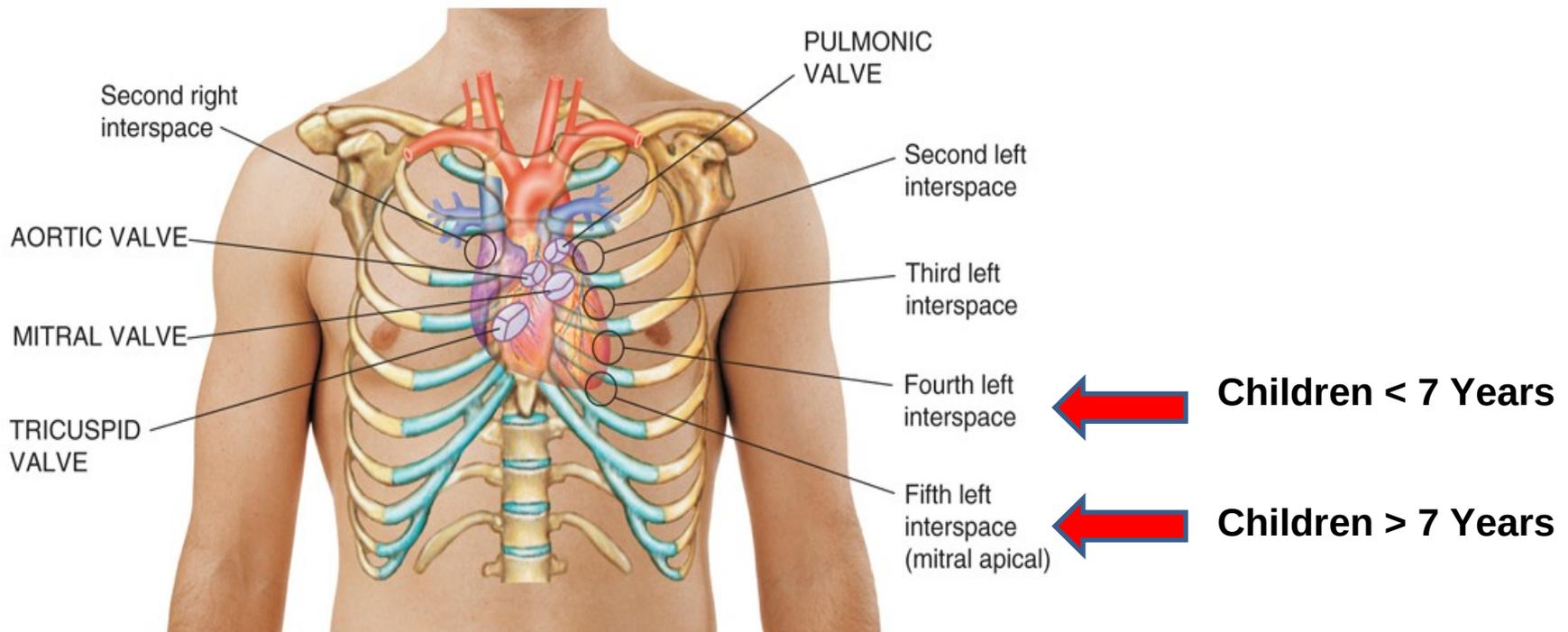
# Chest

- Inspection
  - Infants
  - With Growth
  
- Movement
  - Birth - 7 Years Old
  - $\geq 7$  Years Old



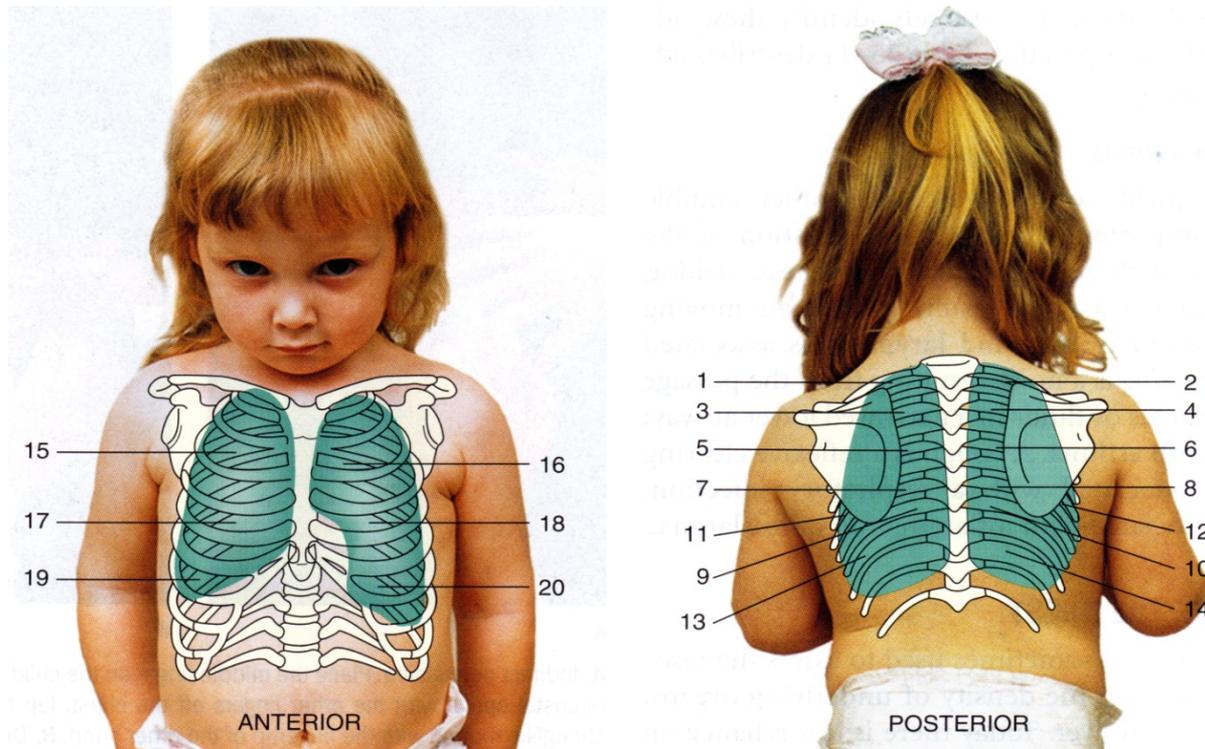
# Heart

- Apical Pulse
- Auscultation
- Capillary Refill



# Lungs

- Auscultation - Find Your Routine
- Rate
- Signs Of Respiratory Failure?



# Interventions - Oxygen Delivery

- O<sub>2</sub> Therapy
  - Blow By
  - Nasal Cannula
  - Mask



**Blow By**



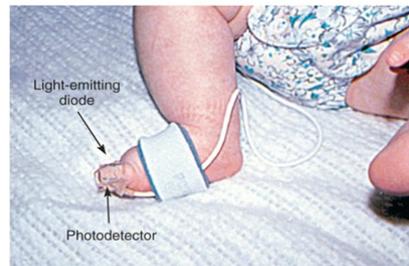
**Simple Mask**



**Nasal Cannula**



**Aerosol Mask**



**Pulse Oximeter**



**Non-Rebreather**

# Abdomen

- Inspect
- Auscultate
- Palpate



# Abdomen

- G-Button
  - Advantages
  - Disadvantages



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- Ostomies
  - Indications
  - Prepare child
  - Pediatric Appliances
  - Family Teaching



# Urine Collection

- From Diaper
  - pH, Specific Gravity, Simple Urinalysis
- From Cotton Ball(s)
  - pH, Specific Gravity, Simple Urinalysis
- Urine Collection Bags
  - Clean-Catch Specimen
  - 24 Hour Collection



# Urine Collection: Pediatric Considerations

- Toddler And Preschooler
- School-Age Child
- Adolescent



# Intake And Urine Output\_

- Wet Diapers
  - Weigh Diapers To Obtain Urine Output Volume
    - 1 gm Of Wet Diaper Weight = 1 mL Urine (1 gm = 1 mL)
  - Subtract Weight Of Dry Diaper From Weight Of Wet Diaper
  - Diapers Come In Various Sizes
- Minimum Acceptable Urine Output
  - Infants (Birth – 2 Years)
    - 1 mL/kg/hr
  - Children (2 Years And Older)
    - 0.5 mL/kg/hr

# Practice

- You Are Caring For An 8-Month-Old Who Weighs 22 Pounds
  - What Is Our Formula?
  - Calculate The Minimum Acceptable Urine Output
- 
- You Are Caring For A 3-Year-Old Who Weighs 33 Pounds
  - What Is Our Formula?
  - Calculate The Minimum Acceptable Urine Output

# IV Therapy

- Securing IV/INT Site
- Assess Site Frequently
- Avoid Use Of Scissors



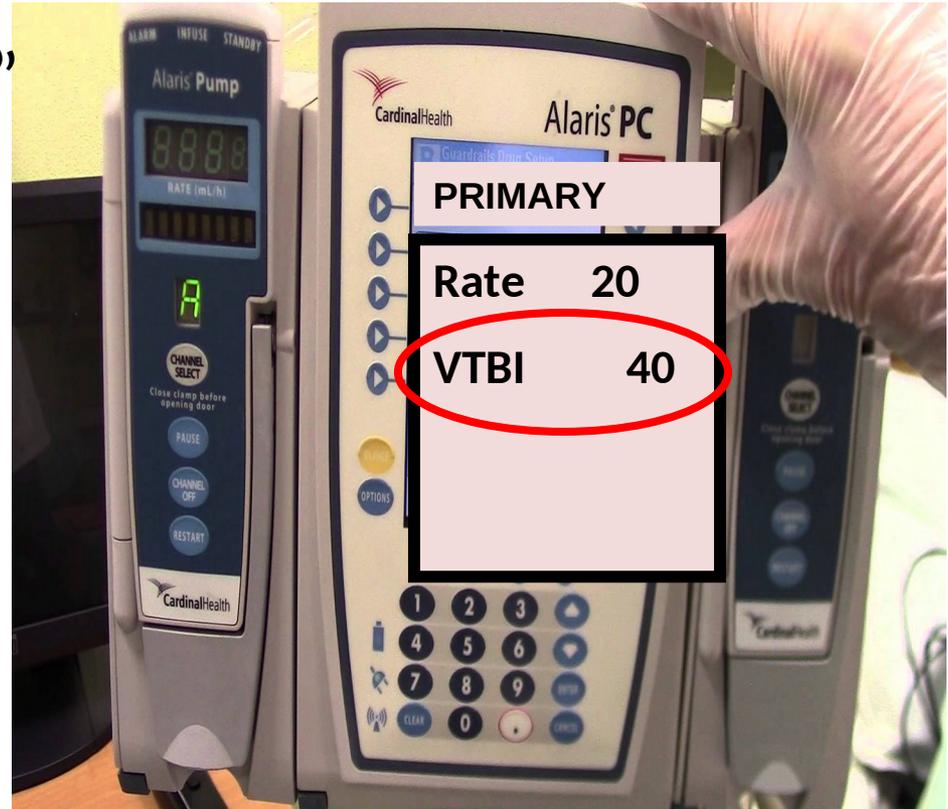
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# Pediatric Considerations & Infusion Pump

- “Volume To Be Infused”
- “Pedi” IV Sites
- IV Alarms



Burette Infusion Set

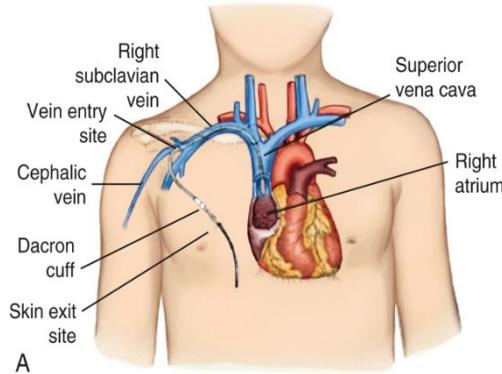


# Central Venous Access Devices

- Tunneled Catheters

- Broviac

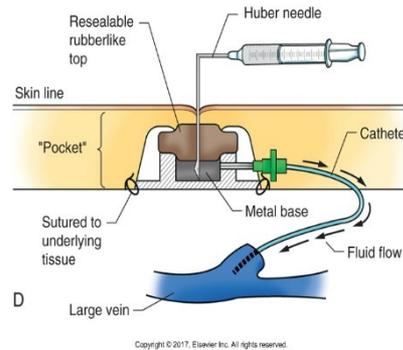
- Position
    - Dacron “Cuff”



- Implanted Ports

- Port-A-Cath

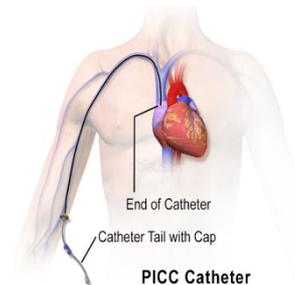
- Position
    - Huber Needle



- Peripherally Inserted

- PICC

- Position



# Maintenance Fluid Requirements

- How Do We Know How Much Fluid A Child Should Receive In 24 Hours?

– First 10 kg x 100 mL =

– Second 10 kg x 50 mL = +

– Remaining kg x 20 mL = + \_\_\_\_\_

mL/24 hrs

– Divide “Total” By 24 Hours = \_\_\_\_\_ mL/hr

# Practice

- Child's Weight = 7 kg

$$7 \times 100 = \underline{\quad} \text{ mL/24 hrs}$$

$$700 \text{ mL} \div 24 \text{ hrs} = \underline{\quad\quad\quad} \text{ mL/hr}$$

# Practice

- Child's Weight = 24 kg

$$10 \quad \times 100 = 1000 \text{ mL} \quad (1^{\text{st}} 10 \text{ kg})$$

$$10 \quad \times 50 = 500 \text{ mL} \quad (2^{\text{nd}} 10 \text{ kg})$$

$$4 \times 20 = 80 \text{ mL} \quad (\text{remaining kg})$$

$$1000 + 500 + 80 = \underline{\hspace{2cm}} \text{ mL/24 hrs}$$

$$1580 \text{ mL} \div 24 \text{ hrs} = \underline{\hspace{2cm}} \text{ mL/hr}$$

# Medication Administration - Oral

- Liquids
  - Mask Bad Taste



- Equipment
  - Oral Syringe
  - Medicine Cup
  - Empty Nipple
  - Dropper



# Medication Administration - Oral

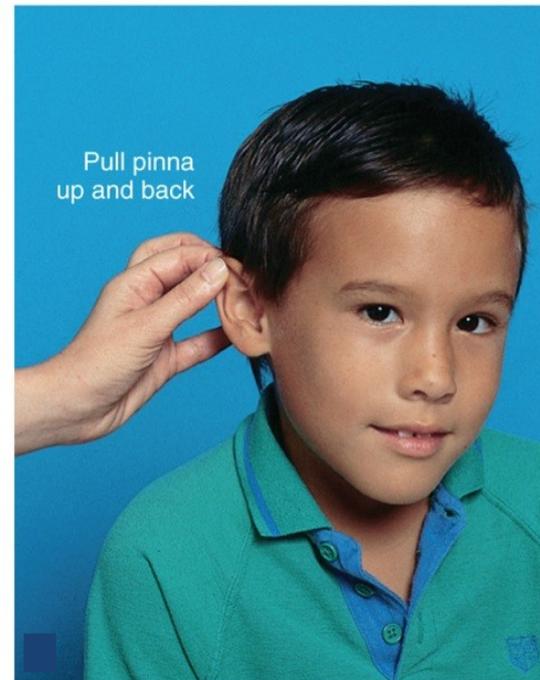
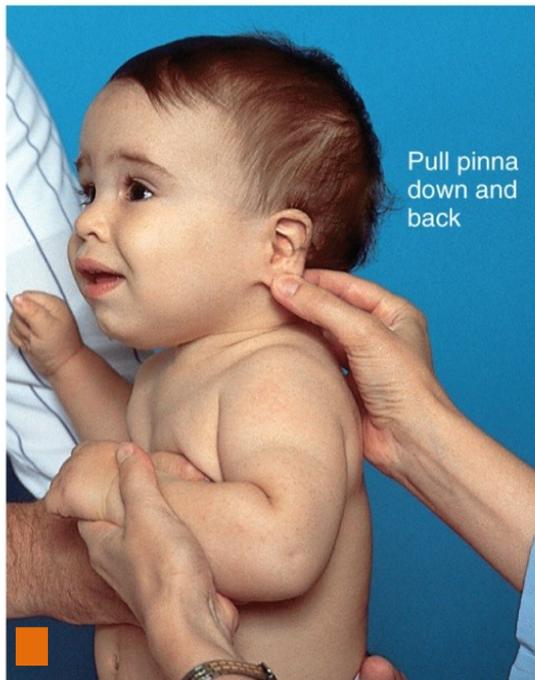
- Positioning
- Administration
  - Infants



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# Medication Administration - Otic

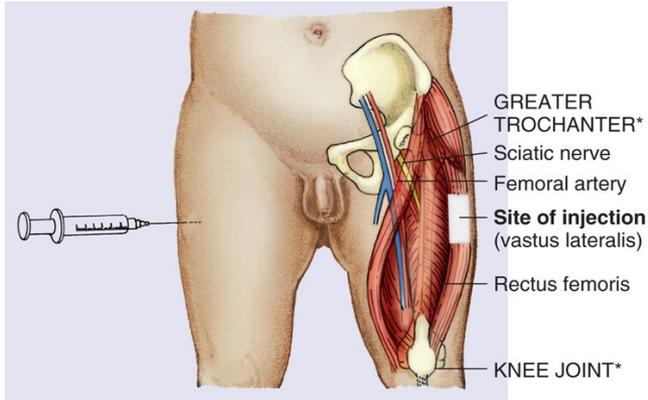
- Positioning
- Straighten External Auditory Canal
  - < 3 Yrs
  - > 3 Yrs
- Administration



# Medication Administration - IM

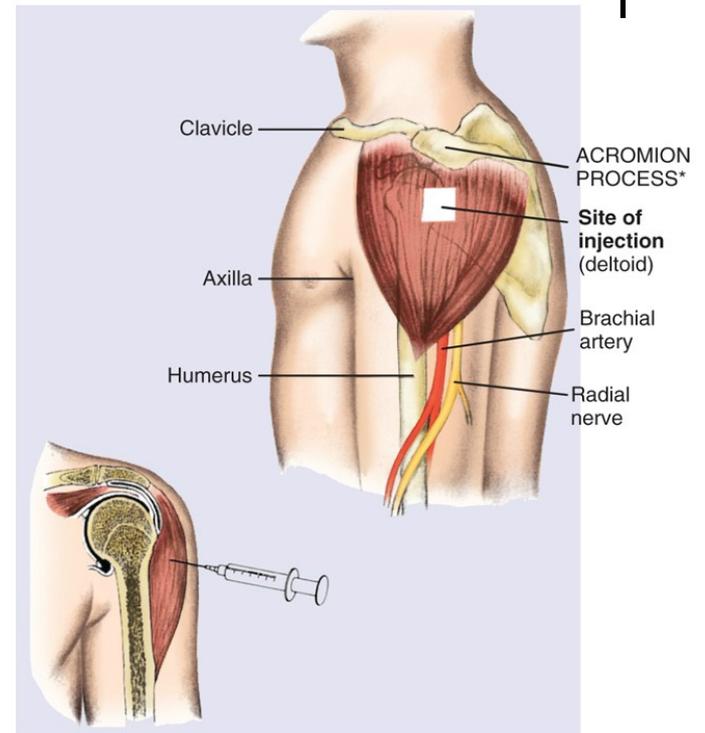
- Avoid Prolonged Worrying
- It Is Ok To Cry
- Volume
- Syringe Size
- Needle Gauge And Length

## Vastus Lateralis Injection Site



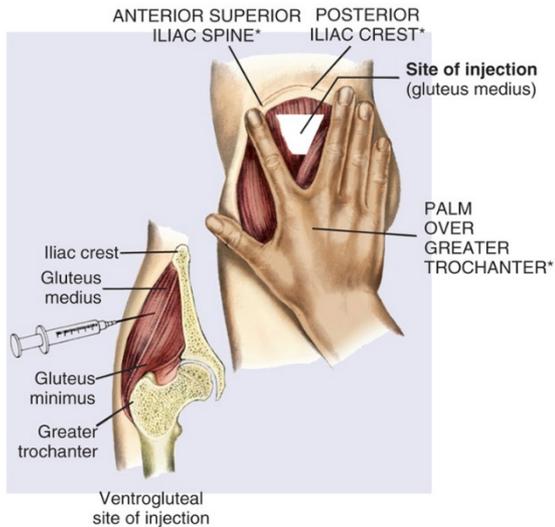
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## Deltoid Injection Site



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## Ventrogluteal Injection Site



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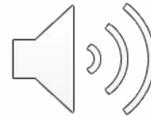
# The Art of Pediatric Nursing

## Pediatric Communication



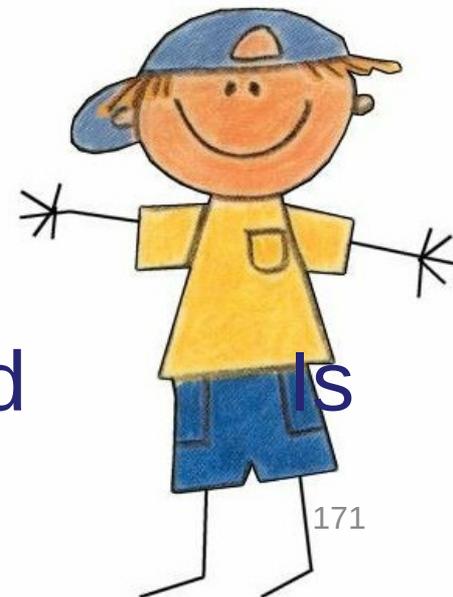
# Review

- Verbal vs. nonverbal communication
- <https://www.youtube.com/watch?v=POwC3NwuFWg>



# Communicating With Children

- Allow Child Time To Feel Comfortable
- Avoid Actions / Gestures That May Be Seen As Threatening (e.g., sudden movements, broad smiles, or extended eye contact)
- Talk To The Parent Initially If Child Shy



# Communicating With Children

- Young child –  
Transitional Object
- Assume Eye Level  
Position With Child
- Older Children Give  
Opportunity To Talk  
Without Parents  
Present



# Communicating With Children

- Speak In A Quiet, Unhurried, And Confident Voice
- Be Specific
- Use Simple Words And Short Sentences
- Words To Use And Words To Avoid



# Words and Phrases to Avoid:

## **Avoid:**

- Take, as in “take your temperature”
- Deaden
- Catheter, IV
- Monitor
- Specimen

## **Use Instead:**

- “See how warm you are”
- Numb or can’t feel
- Tube
- T.V. screen
- Sample

# Words and Phrases to Avoid:

## **Avoid:**

- Dye
- Put to sleep or anesthesia
  
- Dressing
- CT Scan
- NPO

## **Use Instead:**

- Special medicine
- Special medicine to make you sleep so you won't feel anything
- Band-Aids
- Picture
- No food or drink

# Communicating With Children

- State Directions And Suggestions Positively
- Offer A Choice Only When It Exists
- Be Honest
- Allow Child To Express Their Concerns And Fears
- Use A Variety Of Communication Techniques

# Communicating With Children

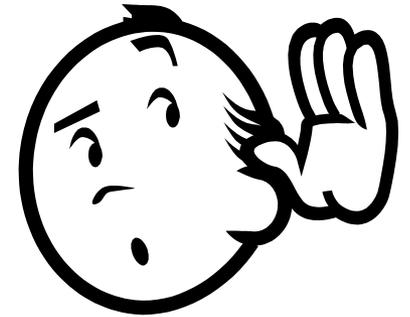
- Look For Clues About What Captures the Child's Interest Or Imagination



- Avoid Comments That Make Them Self-Conscious
- Link Information To Activities Of Daily Living

# Communicating With Children

- Practice Attentive Listening
- Don't Allow Parents To Speak Unfavorably About Their Children
- Use A Developmental Approach
- Don't be condescending
- Avoid teasing them
- Don't laugh if they are being serious



• <https://www.youtube.com/watch?v=j6wFcpGF1OA>

# The Art of Pediatric Nursing

## Family-Centered Care



# Family-Focused Care:

- **Health professionals**
  - **position of expert**
    - **direct care**
    - **tell the family what to do**
    - **intervene for the child and family**
    - **total control**



# Family-Centered Care:

- **Mutually beneficial partnership between families, nurse, and other health professionals.**
- **Focuses on the needs of all family members, not just the child's needs.**



# Why Family-Centered Care?

- **When parents stay with hospitalized children**
  - Quieter, happier, recovered sooner
  - Decreased anxiety during procedures
  - Less pain medication after surgery
  - Children cope better
  - Parents cope better during/after resuscitation



# Family As The Center

- **Always remember: They know their child better than anyone**
- **Families share knowledge**
- **Parents are the “experts” in their child’s care**
- **Family’s role**
  - **Decision makers, teachers, caregivers, advocates**
  - **help children cope/support them**
- **Illness/injury affects all members (including siblings)**



# Family As The Center

- **Examples**
  - **Provide places for family to stay**
  - **Promote sibling visitation**
  - **Provide accommodations for families to rest**
    - **Ronald McDonald House**



# Collaboration

- **Seeking “partnership” role**
- **Characterized by several features:**
  - **Communication**
  - **Active Listening**
    - **“Knowledge has never been known to enter the head through an open mouth”**
  - **Negotiation - Implies discussion**



# Communication

- **Understand the patient/family perspective**
  - “Why is her Lasix pink today? It is usually yellow.”
- **Ask: “How does your child look today?”**
- **Words to avoid**
  - “policies”, “allowed”, “mandatory”, “not permitted”
- **Words to use**
  - “guidelines”, “working together”, “welcome”



# Practice Examples

- **Assure that parents are integral in the decision-making process**
- **“Care Conferences”**
- **Parents have 24 hour access to their child**
- **Ask families to evaluate care**
- **Family Advisory Councils**
  - <https://m.youtube.com/watch?v=poB7fWP3F9U>



# Sharing Information

- **Complete & unbiased information**
  - **Diagnosis, equipment, lab results, meds, routines (mealtimes/activities)**
- **Access to information for planning & decision making**
- **Provide information for sibling**
  - **Developmentally appropriate level**
  - **Answer questions honestly**



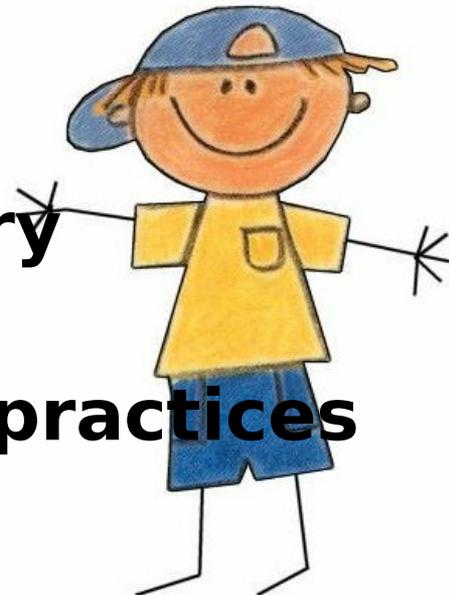
# Empowerment

- **Sharing knowledge & skills** to achieve the goal of the family caring for their child
- To equip or supply with an ability
- The interaction of professionals with families in such a way that families **maintain or acquire a sense of control** over their family lives - their strengths, abilities, and actions



# Respect for Cultural Diversity

- **Understanding cultural and religious beliefs**
  - respect and sensitivity
- **Understanding coping differences**
- **Examples**
  - Translators/interpreters
  - Written information in primary language
  - Learn about cultural healing practices
  - Explain terminology



# Broad Array of Supports

- **Parent-to-parent and family support resources**
- **Mentors to families with new chronic condition**
  - **One-to-one or group support (parents and/or child)**
    - **Anger management groups, parent support groups, sibling support groups, asthma camps, diabetes camps, etc.**



# Flexible Systems of Care

- **Choice - Maintain family routines**
  - when they take their medications or bath
- **Flexibility - Remember need for respite**
- **Facilitate “Normalization”**
  - Attending school, pursuing hobbies & recreation, independence



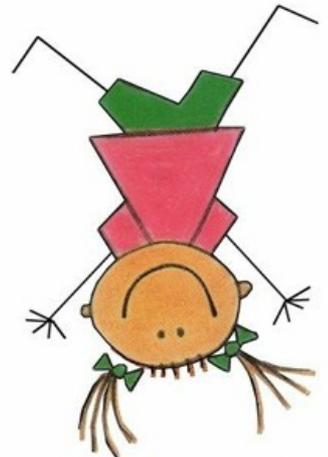
# Family Definitions

- **Types:**
  - **Nuclear Family (Traditional)**
  - **Blended**
  - **Extended**
  - **Single-parent**
  - **Binuclear**
  - **LGBT**



# Family Is Defined As:

- **“Whatever the client considers it to be”.**



# Beyond First Do No Harm

## Principles of Atraumatic Care



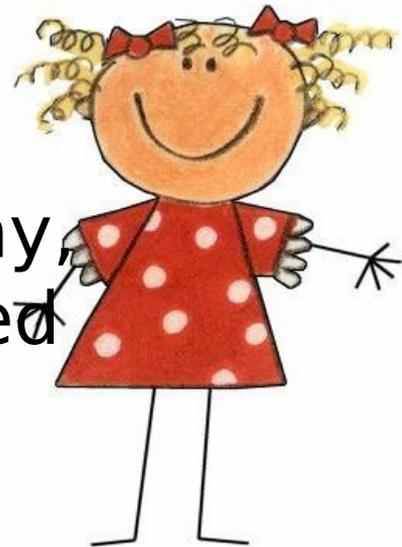
- Much of what is done to children to cure illness and prolong life is traumatic, painful, upsetting, and frightening

- #1 question in child's mind
  - "Is this going to hurt?"



# Atraumatic Care

- “The provision of therapeutic care in settings, by personnel, and through the **use of interventions that eliminate or minimize the psychological and physical distress** experienced by children and their families in the health care system”
- Concerned with the where, who, why and how of any procedure performed on a child.



# Types of Child and Family Stressors

- Physical
- Psychological
- Environmental
- Social



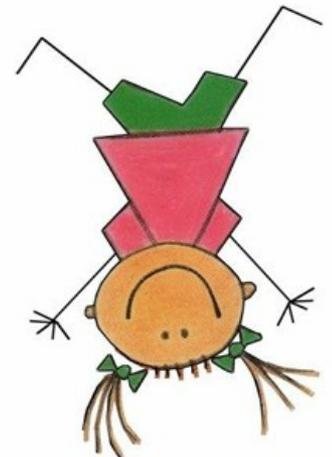
# Physical Stressors

- Pain and discomfort
  - Injections, venipunctures, intubation, suctioning, dressing changes
- Immobility
  - Restraints, bedrest, inability to get up without assistance
- Other
  - Sleep deprivation, inability to eat or drink, changes in elimination habits, temperature extremes, loud noises, bright lights or darkness



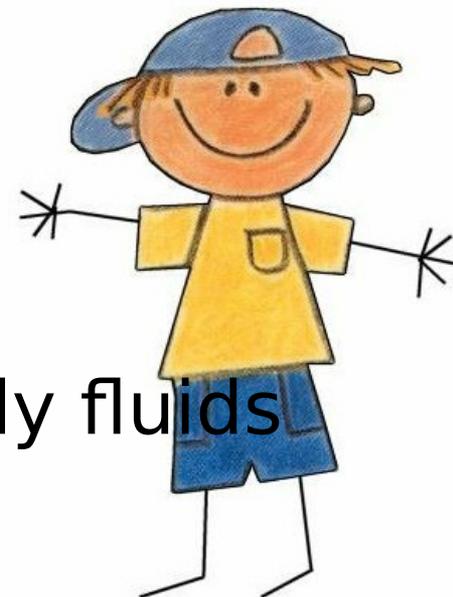
# Psychological Stressors

- Separation from child
- Lack of privacy
- Inability to communicate
  - Intubated
  - Speaks a language other than English
- Inadequate knowledge/understanding
- Severity of illness
- Parental behavior
  - Expression of concern
- Child Behavior
  - Looking very ill



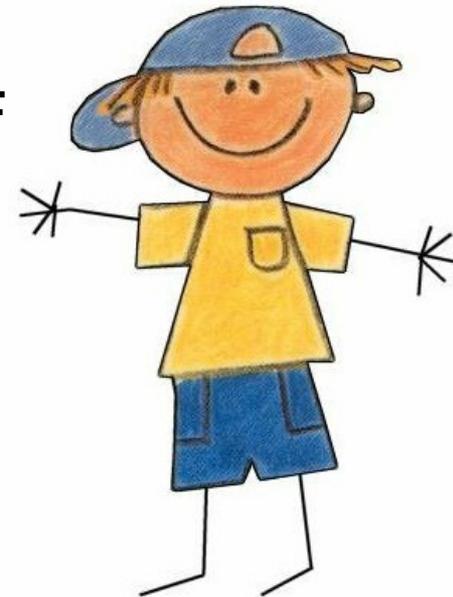
# Environmental Stressors

- Unfamiliar surroundings
  - Crowding
- Unfamiliar sounds
  - Equipment noise (monitors/suction)
  - Other people
- Unfamiliar people
  - Employees, visitors
- Unfamiliar/unpleasant smells
  - Alcohol, adhesive remover, body fluids



# Environmental Stressors

- Constant lights
- Activity related to other patients
  - Talking, laughing, crying, coughing, moaning, retching
- Sense of urgency or lack of urgency/concern among staff
- Unkind comments



# Social Stressors

- Disrupted relationships (especially with family and friends)
- Concern with missing school or work
- Play deprivation



# Care

## 1. Prevent/minimize physical stressors

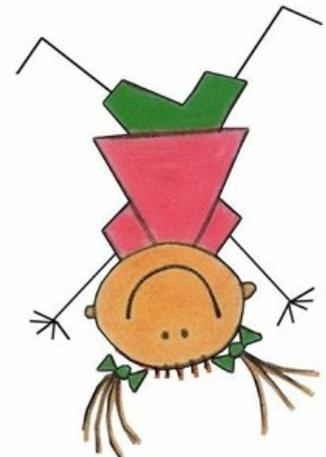
- Avoid or reduce intrusive and painful procedures
  - Rectal temperatures → tympanic or axillary
  - Circumcision → topical anesthetic or block
  - Foley → use 2% Xylocaine jelly
  - Serum bilirubin → transcutaneous sensor
  - Painful injections → smallest gauge needle, topical anesthetic
  - Painful infusions → administer slowly, warm packs to IV site



# Principles of Atraumatic Care

## 1. Prevent/minimize physical

- Avoid/reduce **stressors** other physical distress
  - Sleeplessness → allow for naps
  - Skin trauma → avoid tape
  - Restraints → comfort positions (therapeutic holding vs. papoose board)



# Principles of Atraumatic Care

## 2. Prevent/minimize parent/child separation

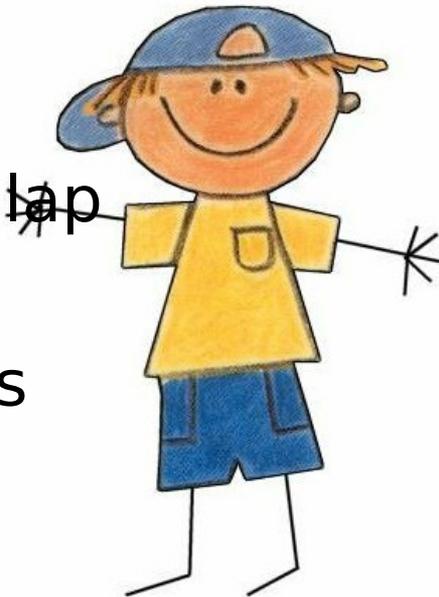
- Promote family-centered care
- Consider research findings on parents' and childrens' preferences
- Anesthesia induction & in PACU
- In Emergency Department
- During CPR
- Prepare them prior to unfamiliar treatment or procedure



# Principles of Atraumatic Care

## 3. Promote a sense of control

- Respect & elicit family's knowledge about child and health condition
- Reduce fear of unknown
  - Educate about environment & routines
  - Make environment less threatening
    - prepare meds before entering room
- Provide opportunities for control
  - Do procedures with child in parents lap
  - Allow child to have a familiar object
  - Provide choices - select food choices
  - Allow privacy
  - Respect cultural differences





# Immunizations & Communicable Diseases



# Immunizations



# IMMUNIZATIONS - OVERVIEW

## ■ Vaccines

- Stimulate immune system to produce antibodies
- Same antigens as disease but are killed or weakened (not strong enough to cause disease)
- Antibodies disappear after destroying antigen, but memory cells are formed (immunity)

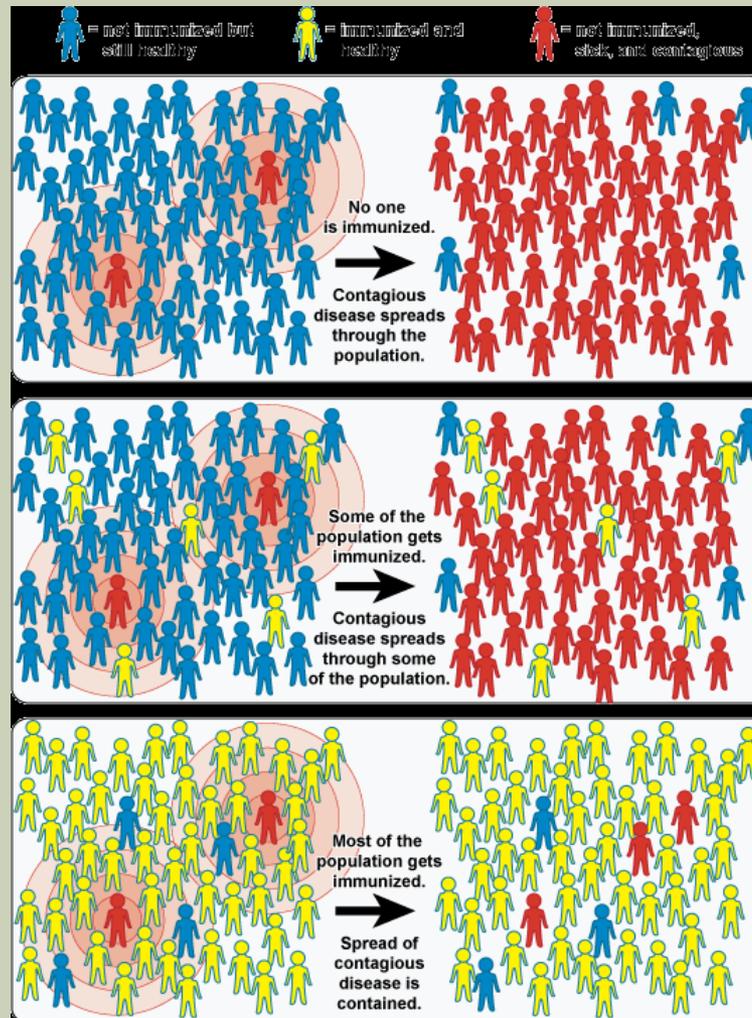
## ■ Who decides what vaccines?

- CDC-Advisory Committee on Immunization Practices (ACIP)
- American Academy of Pediatrics-Committee on Infectious Diseases

# WHY VACCINATE?

- Decrease or eliminate certain infectious diseases in society
  - Potential reemergence if adequate numbers are not immunized
- Prevent infectious diseases and their complications
  - Children with immunodeficiency
    - Receiving steroids/immunosuppressive therapy
    - Malignancy
    - Immune disorders
      - Hemolytic disease, sickle cell disease, aplastic anemia
  - Lapsed or missed immunizations
- Long-term complications from disease

# HERD IMMUNITY



# TYPES OF IMMUNITY

## ■ Active

- Produced by person's own immune system
- Usually lasts many years, often lasts a lifetime
- 2 ways to acquire active immunity
  - Survive infection
  - Vaccination

## ■ Passive

- Produced by animal or human and transferred to another human (ex. Immune globulin/antitoxin)
- Effective but disappears in weeks to months
- Most common form = maternal/infant

# ANTIBODY SOURCES

## ■ Blood Products

- Whole Blood, PRBCs (unwashed), Platelets

## ■ Immune Globulin

- Antibodies from large pools of human blood plasma

## ■ Specific immunoglobulins

- Made from donated Plasma of humans with high levels of a specific antibody

## ■ Antitoxin

- Produced in animals (usually horses)
- Antibodies against only one antigen
- Potential for serum sickness

# TYPES OF VACCINES

## ■ Live Attenuated Vaccines

- Weakened form of “wild” virus or bacterium
- Must replicate
- Usually one dose
  - Second dose recommended to provide high level of immunity
- Damage to live organism or interference with replication can cause vaccine to be ineffective
- Immune response virtually identical to natural infection
- Measles, mumps, rubella, vaccinia, varicella, zoster, yellow fever, rotavirus, intranasal influenza

# TYPES OF VACCINES

- Inactivated Vaccines
  - Produced in culture media then inactivated
  - Cannot replicate
    - Cannot cause disease
    - Require multiple doses
  - Less affected by circulating antibody
  - May not produce absolute immunity/titer diminishes over time; may require “booster”
  - Polio, hepatitis A & B, rabies, influenza, acellular pertussis, human papillomavirus, anthrax, diphtheria, tetanus, pneumococcal, meningococcal, salmonella

# HAEMOPHILUS INFLUENZAE TYPE B

- Haemophilus influenzae type b (Hib)
  - Before introduction of the Hib Vaccine, H. influenzae type b was the leading cause of bacterial meningitis and other invasive bacterial disease among children younger than 5 years of age

# PREPARATION FOR VACCINES

- Complete immunization history at every visit
  - ImmTrac
- Determine needed vaccines
- Screen for contraindications/precautions
- Discuss vaccine benefits and risks
  - Vaccine Information Statements (VIS)
- Provide after-care instructions



# IT IS THE LAW

- Give the appropriate VIS with each dose of vaccine
  - Not just the first dose
  - Multiple VIS with combination vaccines
- Give the VIS at the visit but prior to administration of the vaccine
- Document in the permanent medical record
  - Edition of the VIS
  - Date VIS provided to patient or family

# PERMANENT MEDICAL RECORD DOCUMENTATION

- Required for vaccines covered by the National Childhood Vaccine Injury Act
  - Day, month & year of administration
  - Vaccine manufacturer
  - Vaccine lot number
  - Name and title of person who administered vaccine & address of facility
  - Vaccine Information Statement
    - Date on VIS
    - Date provided to patient or parent/guardian



# PERMANENT MEDICAL RECORD DOCUMENTATION

- Route
- Site
- Informed consent
- Vaccine refusal

# IMPORTANT ISSUES

- Spacing of vaccines
  - Interval between doses of same vaccine
- Timing of antibody-containing blood products
  - Live vaccines
  - Inactivated vaccines
- Screening
  - Identify contraindications/precautions

# RECOGNIZE ADVERSE EVENTS

## ■ Local Reactions

- Usually mild and self-limited
- Pain, swelling, redness at injection site
- Generally occur within hours of injection
- Common with inactivated vaccines

## ■ Systemic Reactions

- Fever, malaise, headache, myalgia, loss of appetite
- Adverse reactions following live attenuated vaccines may be similar to mild form of disease
  - Can occur 7-21 days after vaccine administration

# RECOGNIZE ADVERSE EVENTS

## ■ Allergic Reactions

- Allergic reactions may be due to vaccine or component of vaccine
- Can be life threatening (anaphylaxis)
- Recognize signs of anaphylactic reaction
- Be prepared to treat anaphylaxis

- CDC and the American Academy of Pediatrics recommend observing the patient for 15 minutes after vaccination

# REPORT ADVERSE EVENTS

- Report any clinically significant adverse event that occurs after the administration of any vaccine licensed in the U.S.
- Report even if unsure whether a vaccine caused the event
- Vaccine Adverse Event Reporting System (VAERS)

# VACCINES ADMINISTRATION

## ■ Subcutaneous

- MMR
- Varicella

## ■ Intramuscular

- Dtap
- Hepatitis A
- Hepatitis B
- Hib
- HPV
- IPV (IM or SQ)
- PCV (IM or SQ)
- MCV (IM or SQ)

# THE CHILD WITH A BLEEDING DISORDER

- Potential for Hematoma with IM injection
- Physician aware of anticipated injection?
- When did the child with hemophilia receive their last dose of Factor replacement?
- 23-gauge or finer needle
- Firm pressure for at least 2 minutes. Do not rub or massage injection site

# NURSING CONSIDERATIONS

## Strategies to ease pain related to injections

- Provide distraction
- Parent cuddling/holding, pacifiers
- Sweet tasting solutions (oral sucrose)
- Breastfeeding
- Injection technique (aspiration may increase pain)
- Order of injections (administer most painful vaccine last)
- Tactile stimulation (rubbing) before and during injection; keep baby warm
- Tactile stimulation (rubbing) before and during injection; keep baby warm



# Communica ble Diseases



# COMMUNICABLE DISEASES

- Fifth Disease
- Roseola
- Pertussis
- Chickenpox
- Rubeola
- Mumps
- Rubella
- Scarlet Fever

# ERYTHEMA INFECTIONOSUM (FIFTH DISEASE)

## ■ Transmission

- Person to person (mainly school-aged children)
- Usually Respiratory Secretions
  - Saliva, Sputum, Nasal Secretions
- Can be contracted by blood transmission

## ■ Communicability

- Most contagious when it seems like you have “just a cold”
- Probably not contagious after the rash appears
  - Back to school or child care
- Infected persons develop lasting immunity

# ERYTHEMA INFECTIONOSUM (FIFTH DISEASE)

## ■ Signs and Symptoms

### ■ Before the Rash

- Mild, nonspecific symptoms
  - Fever, runny nose, headache

### ■ The Rash

- “Slapped Cheeks”
- Lacy red rash on trunk and extremities
  - Proximal to distal progression
  - May be mildly pruritic
- May reappear if skin is irritated or traumatized (sun, heat, cold, friction)



# ERYTHEMA INFECTIONOSUM (FIFTH DISEASE)

## ■ Complications

### ■ Polyarthropathy Syndrome

- Painful, swollen joints
  - More common in adults

### ■ Temporary halt in production of RBCs (Transient Aplastic Crisis)

- Usually affects those with
  - Sickle Cell Anemia
  - Cancer
  - Organ Transplants
  - HIV

# ERYTHEMA INFECTIONOSUM (FIFTH DISEASE)

## ■ Interventions

- Keep out of direct sunlight if possible
  - Rash fades over 1-3 weeks
  - Can reappear if exposed to sunlight or hot bath
- Antipyretics
- Antipruritics may be beneficial
- Hospitalized, immunosuppressed children
  - Droplet precautions

# EXANTHEM SUBITUM (ROSEOLA)

## ■ Transmission

- Unknown
  - Possibly respiratory secretions

## ■ Generally limited to ages 6 months-3 years

## ■ Sign and Symptoms

- Before the Rash
  - Sudden onset of high fever (104°F) for 3-4 days
    - High risk for febrile seizure
  - Child does not appear sick

# EXANTHEM SUBITUM (ROSEOLA)

- The Rash
  - Discrete, pink, maculopapular rash
  - May be described by family as heat rash
  - Drop in fever when rash appears
  - Trunk → Neck → Face → Extremities
  - Does not itch
  - Lasts 1-2 days



# EXANTHEM SUBITUM (ROSEOLA)

- Interventions
  - Antipyretics
  - Monitor for febrile seizures
  - Encourage fluids

# PERTUSSIS (WHOOPIING COUGH)

## ■ Transmission

- Direct or indirect contact with respiratory secretions
- Most contagious during the catarrhal stage, before onset of the paroxysmal cough

## ■ Signs and Symptoms

- Catarrhal Stage
  - Respiratory symptoms
    - Runny nose
    - Sneezing
    - Lacrimation
    - Mild, occasional cough
  - Low-grade fever
  - Lasts 1-2 weeks

# PERTUSSIS (WHOOPING COUGH)

## ■ Signs and Symptoms

### ■ Paroxysmal Stage

- Bursts of numerous, rapid coughs
- Sudden inspiration associated with high pitched “whoop”
- Cheeks become flushed or cyanotic
- Eyes may bulge and tongue protrudes
- May continue until thick mucous plug is dislodged
- Vomiting frequently follows attack
- Exhaustion
- More common at night
- Lasts 4-6 weeks

<https://www.youtube.com/watch?v=S3oZrMGDMMw>

# PERTUSSIS (WHOOPIING COUGH)

- Signs and Symptoms
  - Convalescent Stage
    - Coughing gradually stops
    - Single cough may remain for some time
    - Paroxysmal cough may return if child develops a respiratory infection during convalescent stage
    - Lasts 2-3 weeks

# PERTUSSIS (WHOOPIING COUGH)

## ■ Complications

- Pneumonia (most common, usual cause of death in younger children)
- Apnea (infants less than 1 year)
- Neurological (seizures, encephalopathy)
- Pressure effects of paroxysms (nose bleeds, subdural hematoma, hernia, rectal prolapse)
- Adolescents:
  - Syncope, sleep disturbances, rib fractures, incontinence

# PERTUSSIS (WHOOPIING COUGH)

## ■ Prevention

### ■ Immunization

- “aP” in DTaP (pediatric formula)
- “ap” in Tdap (adult/adolescent formula)

### ■ Active immunity after having the disease

# PERTUSSIS (WHOOPIING COUGH)

## ■ Interventions

- Droplet precautions
  - Continue isolation for 5-7 days after antibiotics
    - Erythromycin
- Continuous assessment of respiratory status
  - Use a monitor
- Remain with child during coughing spells to monitor for hypoxic and/or apneic episodes
  - Reduce factors that promote cough
- Small, frequent meals
  - Refeed a few minutes after emesis

# VARICELLA (CHICKENPOX)

- Varicella-Zoster Virus (VZV)
  - Primary infection results in chickenpox (varicella)
  - VZV can persist in sensory nerve ganglia as a latent infection after primary infection
  - Reactivation of latent VZV results in shingles (herpes zoster)
- Transmission
  - Respiratory secretions
  - Contact

# VARICELLA (CHICKENPOX)

## ■ Communicability

- HIGHLY contagious
  - Keep away from susceptible persons, even at home
- Contagious 1-2 days before rash appears
- Contagious until all lesions have crusted
- In the hospital
  - Respiratory Precautions (Airborne)
  - Contact Precautions
  - Patient assignments

# VARICELLA (CHICKENPOX)

- Before the Rash
  - Children
    - Rash is often the first sign
  - Adults
    - 1-2 days of fever
    - Malaise

# VARICELLA (CHICKENPOX)

## ■ The Rash

- Macule → Papule → Vesicle → Crust
- Head → Trunk → Extremities
  - Most Lesions Are Found On Trunk
  - Can occur on mucous membranes of oropharynx, respiratory tract, vagina, conjunctiva, and cornea
- Crops
  - Healthy Child Usually Has 200 To 500 Lesions In 2 To 4 Successive Crops
- Pruritis - It itches!!

# VARICELLA (CHICKENPOX)

- Signs and symptoms
  - Generally mild in healthy children
    - Malaise
    - Temperature up to 102°F for 2-3 days
    - Vesicular rash
    - Itching!!



From Habif TP: *Clinical dermatology: a color guide to diagnosis and therapy*, ed 5, St. Louis, 2010, Mosby.



# VARICELLA (CHICKENPOX)

## ■ Complications

- Secondary bacterial infection of skin lesions
- Pneumonia
- Central Nervous System Manifestations
  - Meningitis
  - Encephalitis

# VARICELLA (CHICKENPOX)

- Varicella & Immunosuppression
  - High risk of disseminated disease
    - May have multisystem involvement
    - Hemorrhagic
  - Most frequent complications
    - Pneumonia
    - Encephalitis
  - Children with HIV infection at increased risk for morbidity from varicella and herpes zoster

# VARICELLA (CHICKENPOX)

## ■ Varicella & Immunosuppression

- Acyclovir (Zovirax)
  - Decreased number of lesions
  - Shortens duration of fever
  - Decreased itching, lethargy and anorexia

## ■ Prevention

- Lifetime immunity after primary infection
- ACIP recommends all healthcare personnel be immune to varicella
- Immunization
  - Varicella vaccine
  - The “V” in combination vaccines (MMRV)

# VARICELLA (CHICKENPOX)

- Post-exposure Prophylaxis
  - Varicella vaccine
    - Recommended for all persons without evidence of varicella immunity after exposure to varicella
      - Not effective if administered more than 5 days after exposure
    - Used successfully to control varicella outbreaks in childcare facilities and schools

# VARICELLA (CHICKENPOX)

## ■ Interventions

### ■ Skin Care

- Oatmeal or Aveeno baths
- Generally no soap
- Keep skin clean
- Apply pressure to lesion instead of scratching
- Topical calamine
- Keep fingernails short (or mittens, etc.)
- Keep cool
- No aspirin

# RUBEOLA (MEASLES)

- Transmission
  - Respiratory tract secretions
- Communicability
  - HIGHLY communicable
  - High risk populations
    - Colleges
    - Healthcare providers
    - Those who travel

# RUBEOLA (MEASLES)

## ■ Before the Rash

- Fever
  - May peak as high as 103°F - 105°F
- The 3 C's
  - Cough
  - Coryza (runny nose)
  - Conjunctivitis (maybe)
- Koplik Spots
  - Small blue-white spots on buccal mucosa
- Photophobia (maybe)



From Habif TP: *Clinical dermatology: a color guide to diagnosis and therapy*, ed 5, St. Louis, 2010, Mosby.

Koplik Spots

# RUBEOLA (MEASLES)

## ■ The Rash

- Red Maculopapular rash
- Begins at the hairline
- Spreads downward, then distal
- Becomes confluent
- Fades in order of appearance

## ■ Associated signs and symptoms

- Anorexia
- Malaise
- Diarrhea (especially in infants)
- Generalized lymphadenopathy



# RUBEOLA (MEASLES)

## ■ Complications

- Otitis Media
- Pneumonia
  - Most common cause of death in children
- Encephalitis
  - Most common cause of death in adults
- More severe in the malnourished
  - Especially those with Vitamin A deficiency

# RUBEOLA (MEASLES)

## ■ Prevention

- Maternal immunity until 12-15 months of age
- Immunization
  - 1<sup>st</sup> “M” in MMR
- All healthcare personnel should have documented immunity

## ■ Post-exposure Prophylaxis

- Immune globulin after exposure in some cases
  - Immunocompromised persons
  - Susceptible household contacts of person w/ measles

# RUBEOLA (MEASLES)

## ■ Interventions

- Vitamin A for those with severe measles
  - World Health Organization recommends Vitamin A supplement for all children with measles
  - High doses (100-200 times the RDA)
  - May experience vomiting and headache for a few hours
- Antipyretics
- Cool Mist Vaporizer
  - Cough/Coryza (does not respond to decongestants)

# RUBEOLA (MEASLES)

## ■ Interventions (cont.)

### ■ Eye Care

- Dim lights if photophobia
- Clean eyelids with warm saline solution to remove secretions or crusts
- Monitor cornea for signs of ulceration

### ■ Skin Care

- Tepid baths (no soap)
- Keep skin clean

### ■ Airborne Precautions

# MUMPS

## ■ Transmission

- Direct or indirect contact with respiratory secretions

## ■ Signs and Symptoms

### ■ Early

#### ■ Non-specific

- Myalgia, anorexia, malaise, headache, low-grade fever

### ■ “Earache” develops within 24 hours

#### ■ Jaw line just in front of ear lobe

- Parotid gland located here

#### ■ Swelling extends to neck and face over the next few days

#### ■ Unilateral or bilateral



# MUMPS

## ■ Complications

- Most common
  - Orchitis (testicular inflammation)
- Rare
  - Pancreatitis
  - Unilateral deafness
  - Meningitis
  - Encephalitis

## ■ Prevention

- Maternal immunity until 12-15 months of age
- Immunization
  - 2<sup>nd</sup> “M” in MMR

# MUMPS

## ■ Interventions

- Droplet Precautions
- Antipyretics
- Soft or liquid foods
  - Chewing makes pain worse
- Warm or cool compresses, whichever is more comfortable
- Return to school
  - At least 5 days after onset of parotid swelling

# RUBELLA (GERMAN MEASLES)

## ■ Transmission

- Direct contact with infected person or contaminated articles
  - Respiratory (primary)
  - Blood
  - Stool
  - Urine

# RUBELLA (GERMAN MEASLES)

- Signs and symptoms
  - Children
    - Rash is usually first manifestation
  - Older children and adults
    - Prior to rash
      - Low-grade fever
      - Headache
      - Malaise
      - Lymphadenopathy
      - Upper respiratory symptoms

# RUBELLA (GERMAN MEASLES)

## ■ Signs and symptoms (cont.)

### ■ Rash

- Discrete pink-red maculopapular rash
- Begins on face then progresses head to foot
- Lasts 3 days
- Occasionally pruritic
- More prominent after hot shower or bath



<http://dermaamin.com>



From Habif TP. *Clinical dermatology: a color guide to diagnosis and therapy*, ed 5. St. Louis, 2010. Mosby.

# RUBELLA (GERMAN MEASLES)

## ■ Complications

- More common in adults
  - Arthralgia or Arthritis
  - Encephalitis
- More common in children
  - Hemorrhagic manifestations
    - Secondary to low platelets and vascular damage
      - Thrombocytopenic purpura
- Additional complications
  - Orchitis, neuritis

# RUBELLA (GERMAN MEASLES)

## ■ Prevention

- Greatest harm is to unborn baby
- Prevention of Congenital Rubella Syndrome is main objective of rubella vaccination in U.S.
- Maternal antibodies disappear between 6-9 months
- Immunization
  - “R” in MMR
- All healthcare personnel should have documented immunity

# RUBELLA (GERMAN MEASLES)

## ■ Interventions

- Droplet precautions
- Isolate children treated at home from pregnant women
- Antipyretics
- Back to school
  - 8<sup>th</sup> day after onset of rash

# SCARLET FEVER

- Group A beta-hemolytic streptococcus pyogenes
  - Same organism as strep throat
- Transmission
  - Direct or indirect contact with nasopharyngeal secretions
    - Most commonly seen in school-aged children

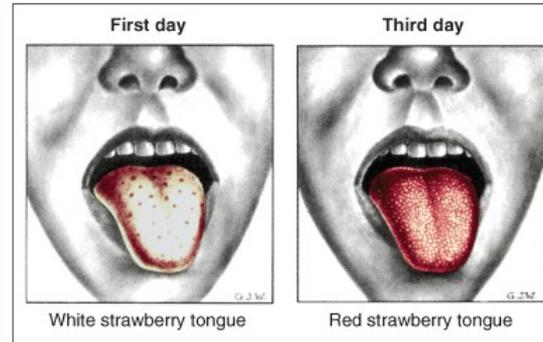
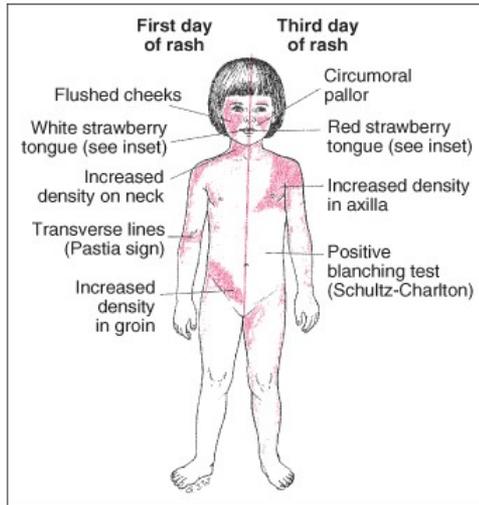
# SCARLET FEVER

- Signs and Symptoms
  - Initial
    - High fever
    - Sore throat
    - Headache
    - Malaise
  - 12-24 hours later the rash appears
    - Enanthema
    - Exanthema

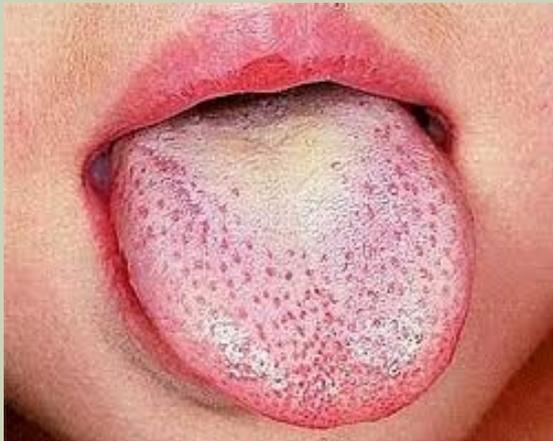
# SCARLET FEVER

## ■ Enanthema

- Tonsils are red, swollen, covered with exudate
- Throat is red and swollen
- Tongue
  - First 1-2 days - white strawberry tongue
  - 4<sup>th</sup>-5<sup>th</sup> day - red strawberry tongue
- Palate covered with erythematous pinpoint lesions



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<http://patient.info/health/scarlet-fever-leaflet>



<http://scarletfeverbykeithy.weebly.com/>

# SCARLET FEVER

## ■ Exanthema

- Flushed face with circumoral pallor
- Red pinpoint rash
  - Absent on face
  - Feels like sandpaper
  - More intense in folds of joints
  - Desquamation begins by end of first week



# SCARLET FEVER

- Complications
  - Retropharyngeal abscess
  - Acute glomerulonephritis
  - Acute rheumatic fever

# SCARLET FEVER

## ■ Interventions

- Droplet Precautions
  - Until 24 hours after starting antibiotic
    - Penicillin
      - Notify physician if fever persists after beginning antibiotic
- Bedrest during febrile period
- Encourage fluids during febrile stage
- Relieve discomfort of sore throat
- Procedures for preventing spread
  - Handwashing, discard toothbrush, avoid sharing food/drinks

# ISOLATION PRECAUTIONS (REVIEW)

- Airborne/Contact
  - Varicella (Chickenpox)
  - Rubeola (Measles)
- Droplet
  - Rubella (German Measles)
  - Erythema Infectiosum (Fifth Disease)
  - Pertussis (Whooping Cough)
  - Mumps
  - Scarlet Fever

# NURSING PRIORITIES IN CARE OF A CHILD WITH A COMMUNICABLE DISEASE

- Isolation precautions
- Provide comfort
  - Ear, nose, and throat symptoms
  - Urticaria
  - Fever
  - Pain
  - Irritability
- Family support





# Pain Assessment and Interventions

Infants & Children

# Definition of Pain

- “Localized physical suffering associated with a bodily disorder (such as disease, illness or injury)”
  - Merriam-Webster 2006
- “Pain is whatever the experiencing person says it is, existing whenever he says it does.”
  - McCaffery & Pasero: Pain: Clinical Manual

**BELIEVE THE PATIENT!**

# Acute Pain

- Sudden Onset
- Often due to injury, medical procedure, infection, immunizations
- Activates “Fight or Flight” stress response (Sympathetic response)
  - Dilated pupils
  - Increased perspiration
  - Increased heartrate
  - Increased respirations
  - Increased blood pressure

# Chronic Pain

- Persists for  $> 3$  months
- Body adapts  $\rightarrow$  decreased sympathetic response
- Absent or diminished stress response
- Types of chronic conditions in children
  - Migraines
  - Sickle cell anemia
  - Cancer
  - Many others

# Undertreatment of Pain in Children

- Non-verbal/limited ability to self report
- Lack of understanding from healthcare workers
- Underuse of observational measures
- Underuse or misuse of pain scales
- Inadequate/inaccurate assessment of pain
- Delay in treatment until physiologic responses observed
- Child with cognitive impairment

# Neonates/Infants in Pain

- Babies feel pain!
- Evaluation based on physiologic and behavioral observations
- Assessment challenging in preverbal children

## Facial Expressions of Physical Distress



# Behavioral Responses to Pain

## Neonates/Infants

- Intense/sustained cry
- Whimpering
- Grimacing
- Furrowed brow
- Quivering chin
- Eyes squeezed shut
- Mouth open & square-shaped
- Rigid or flaccid
- Changes in sleep, feeding or activity

## Young Children

- Loud crying/screaming
- Verbal expressions “ow”, “ouch”, “it hurts”
- Thrashing arms/legs
- Attempts to push away
- Lack of cooperation
- Clinging to parent/caregiver or nurse
- Restless/irritable
- Anticipation of painful procedures

# Behavioral Responses to Pain

## School-aged Children

- Possible behaviors of younger children
- Stalling behavior(s) “wait”, “I’m not ready”
- Muscular rigidity
- Clinched fists/white knuckles
- Gritted teeth
- Contracted limbs
- Body stiff
- Closed eyes
- Wrinkled forehead

## Adolescents

- Less motor activity
- Muscle tension with body control
- More verbal expressions
  - “You’re hurting me”
  - “I hurt on this part of my stomach”
  - “I have pain in my left leg when I walk”

# Myths About Children & Pain

## Myth

- Neonates & Infants do not feel pain with the same intensity as adults because their Nervous system is immature
- Infants and children have no memory of pain
- Children are not in pain if they can be distracted or they are sleeping

## Fact

- Infants feel pain. The youngest premature infant has all the anatomic & physiologic components to perceive pain and demonstrates a severe stress response to painful stimuli
- Infants cry in anticipation of immunizations
- Preterm infants have been noticed to associate the smell of alcohol with heel sticks and try to pull the foot away to avoid the pain
- Children use distraction to cope with pain but they soon become exhausted when coping with pain and fall asleep
- An infant may be experiencing pain even when lying quiet with eyes closed

# Myths About Children & Pain

## Myth

- Children tell you if they are in pain
- They do not need medication unless they appear to be in pain

## Fact

- Children can tell you where they hurt
- Children beyond infancy can accurately point to the body area or mark the painful site on a drawing
- Children do not always admit to having pain
  - To avoid an injection, due to constant/chronic pain, they believe others know how they feel (egocentricity)
  - Culture
  - Gender
- Behavioral manifestations may not reflect pain intensity. May be affected by developmental level, coping abilities, temperament

# Myths About Children & Pain

## Myth

- Parents Exaggerate or Aggravate their child's pain

## Fact

- Parents know their child better than anyone else and are able to identify when the child is in pain
- Parents want to be involved in their child's pain control
- Parents need information about assessing pain and using interventions to relieve pain
- Parental presence during painful procedures is generally desirable for the child and parent

# QUESTT

- **Q**uestion the child/parent
- **U**se pain rating scale
- **E**valuate behavior and physiologic signs
- **S**ecure family's involvement
- **T**ake cause of pain into account
- **T**ake action and assess effectiveness

# Pain Scales

## NPASS

### NPASS (Neonatal Pain, Agitation and Sedation Scale)

Assessment Criteria	Sedation		Normal 0	Pain / Agitation	
	-2	-1		1	2
<b>Crying Irritability</b>	No cry with painful stimuli	Moans or cries minimally with painful stimuli	Appropriate crying Not irritable	Irritable or crying at intervals Consolable	High-pitched or silent-continuous cry Inconsolable
<b>Behavior State</b>	No arousal to any stimuli No spontaneous movement	Arouses minimally to stimuli Little spontaneous movement	Appropriate for gestational age	Restless, squirming Awakens frequently	Arching, kicking Constantly awake or Arouses minimally / no movement (not sedated)
<b>Facial Expression</b>	Mouth is lax No expression	Minimal expression with stimuli	Relaxed Appropriate	Any pain expression intermittent	Any pain expression continual
<b>Extremities Tone</b>	No grasp reflex Flaccid tone	Weak grasp reflex ↓ muscle tone	Relaxed hands and feet Normal tone	Intermittent clenched toes, fists or finger splay Body is not tense	Continual clenched toes, fists, or finger splay Body is tense
<b>Vital Signs HR, RR, BP, SaO<sub>2</sub></b>	No variability with stimuli Hypoventilation or apnea	< 10% variability from baseline with stimuli	Within baseline or normal for gestational age	↑ 10-20% from baseline SaO <sub>2</sub> 76-85% with stimulation - quick ↑	↑ > 20% from baseline SaO <sub>2</sub> < 75% with stimulation - slow ↑ Out of sync with vent

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(Rev. 8/14/01)

Premature  
Pain  
Assessment

+ 3 if < 28 weeks gestation / corrected age  
+ 2 if 28-31 weeks gestation / corrected age  
+ 1 if 32-35 weeks gestation / corrected age

# Pain Scales

## Wong-Baker FACES Pain Rating Scale



0  
No hurt



1 or 2  
Hurts  
little bit



2 or 4  
Hurts  
little more



3 or 6  
Hurts  
even more



4 or 8  
Hurts  
whole lot



5 or 10  
Hurts  
worst

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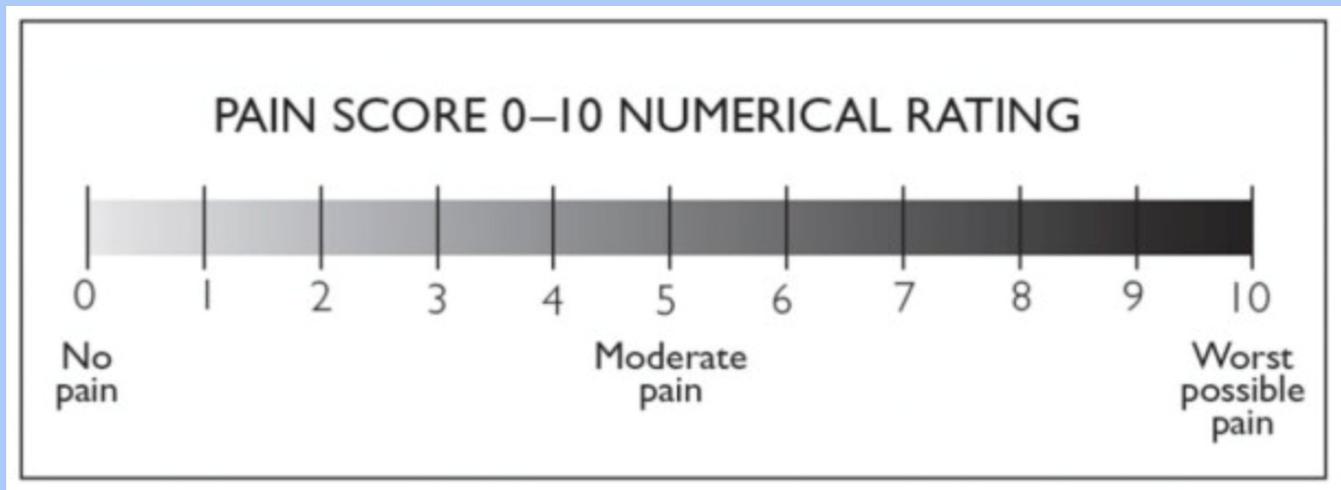
# Pain Scales

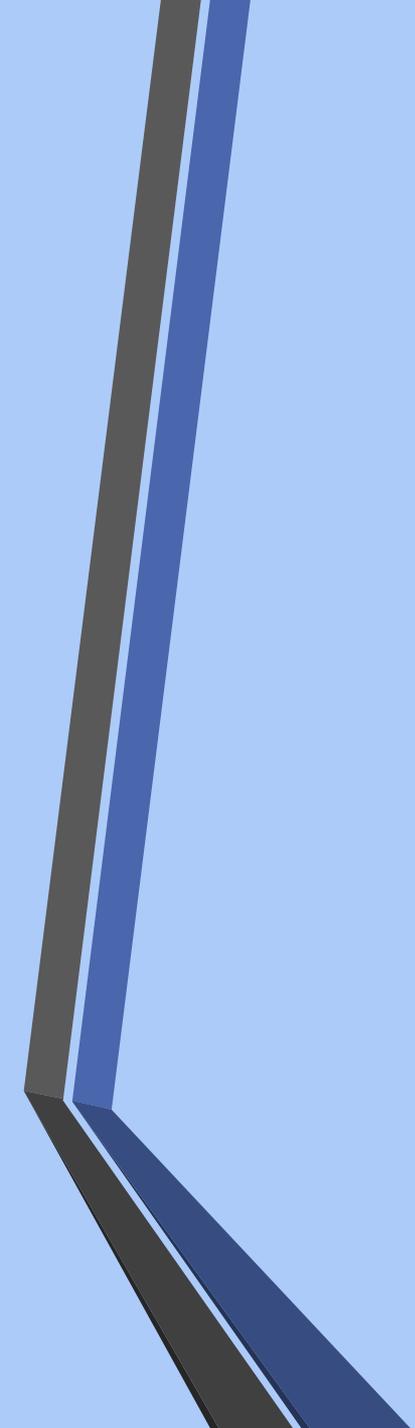
## FLACC

CATEGORIES	0	1	2
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant quivering chin, clenched jaw
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking, or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting back and forth, tense	Arched, rigid or jerking
Cry	No cry (awake or asleep)	Moans or whimpers; occasional complaint	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging or being talked to, distractible	Difficult to console or comfort

Each of the five categories (F) Face; (L) Legs; (A) Activity; (C) Cry; (C) Consolability is scored from 0-2, which results in a total score between zero and ten.

# Pain Scales Verbal/Numeric





# Nonpharmacologic and Pharmacologic Pain Intervention

# Nonpharmacologic Intervention

- Helps reduce the perception of pain
  - Provides a sense of control – makes pain more tolerable
  - Decreased anxiety
  - Enhance the effectiveness of analgesics
  - Learn the intervention prior to need
- “Parents are the single most powerful nonpharmacologic method of pain relief available to children.”

# Nonpharmacologic Interventions

- Distraction
  - Movies, games, conversation, books, stories
  - [https://www.youtube.com/watch?v=vdjk\\_9nUaZI](https://www.youtube.com/watch?v=vdjk_9nUaZI)
- Hypnosis
  - [https://www.youtube.com/watch?v=cyApK8Z\\_SQQ](https://www.youtube.com/watch?v=cyApK8Z_SQQ)
- Massage
- Heat/Cold
- Relaxation - breathing
- Swaddling
- Holding/Rocking
- Nonnutritive sucking
- Guided imagery
- Bubbles
- Music
- Playroom activities
- Child Life Specialist
- Buzzy

# Pharmacologic Intervention Non-Opioids

- Mild to moderate pain
- Targets the Parasympathetic Nervous System
- “Ceiling Effect”
- Most Common
  - Acetaminophen (Tylenol)
    - IV Acetaminophen (Ofirmev)
  - Ibuprofen (Motrin)

# Pharmacologic Intervention

## Opioids

- Moderate to severe pain
- Targets Central Nervous System
- No “ceiling effect”
- Most effective
  - morphine sulfate (Morphine)
  - fentanyl citrate (Sublimaze) – 100 times more potent than morphine
  - hydromorphone hydrochloride (Dilaudid) – 6 times more potent than morphine

# Opioids – Side Effects

- Respiratory Depression
- Sedation
- Nausea/vomiting
- Constipation
- Pruritis
- Confusion/hallucinations
- Urinary retention
- Drug tolerance – require larger dose to maintain original effect
- Long-term use requires tapering (methadone)
- Extremely low risk of real addiction if given appropriately to treat pain (<1%)

# Pharmacologic Interventions Adjunct Therapy

- Anticonvulsants
- NSAIDs
- Antidepressants
- Sedatives
- Muscle Relaxants
- Antianxiety Medications
- Steroids

# Therapeutic Range

- Safe starting dose
- Titrate upward to achieve optimal pain relief
- May have different safe starting ranges based on diagnosis

# Routes of Administration

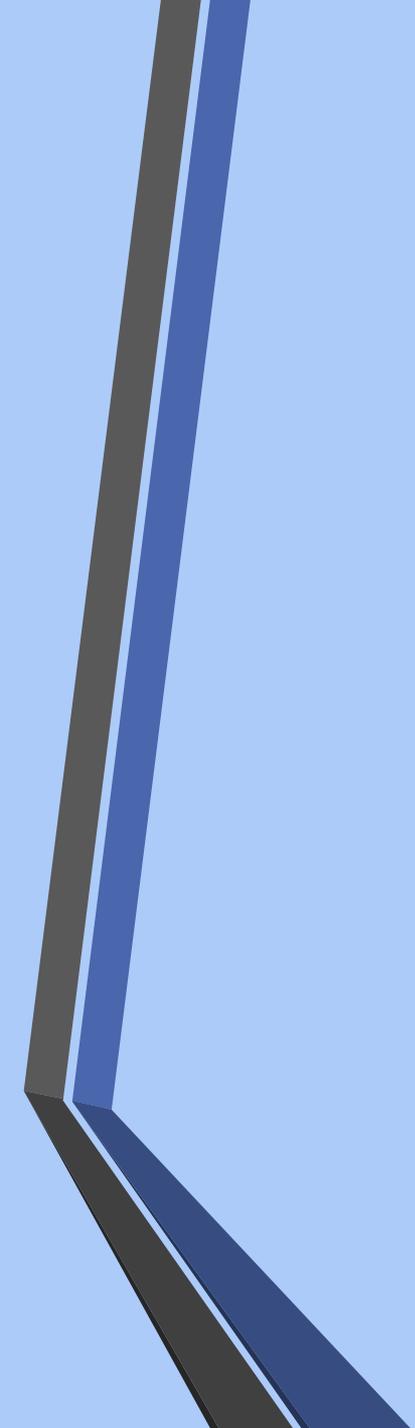
- Oral
  - Liquid/suspension
  - Tablet/capsule
  - Lollipop
- Intravenous
  - Bolus
  - Continuous
  - PCA – children as young as 7-8 years old
    - Family controlled analgesia – controlled by patient or parent/caregiver

# Routes of Administration

- Topical
  - EMLA
  - Pain ease
- Transdermal
  - Fentanyl – children > 12 years old
- Rectal
  - Alternative to oral/parenteral (child with persistent vomiting)
  - Traumatic/generally disliked by children
  - Absorption affected by stool

# Routes of Administration

- Intramuscular
  - Not recommended for pain control
  - Possible tissue damage
  - Wide fluctuation in absorption
  - Shorter duration
  - More expensive than oral
  - Time consuming for staff/delay of pain relief for child
- Other
  - Intranasal
  - Epidural
  - Inhalation (nitrous)



**ANY QUESTIONS?**

# Gastrointestinal Problems in Children



# Distribution of Body Fluids

- Distribution of water changes with growth
- In infants, water & electrolyte imbalances occur more frequently & more rapidly



# Factors in Fluid Loss



- Insensible fluid loss
- Body surface area
- Basal metabolic rate
- Kidney function
- Fluid requirements



# Disturbances of Fluid & Electrolyte Balance

## Water Intoxication

- Possible causes
  - Ingestion of electrolyte-free water\*
  - Too rapid dialysis
  - Tap water enemas
  - Incorrectly mixed formula\*
  - Hypotonic IVF

## Dehydration

- Infants at high risk
  - High metabolic rate
  - Thirst mechanism not well developed
  - Greater baseline fluid requirements
  - Improperly mixed formula
  - High ratio of surface area to volume

\*most commonly seen

# Dehydration & Body Weight

- Weight is the most important determinant of total body fluid loss in infants & young children



# Clinical Manifestations

- Depends on the degree of dehydration
- Earliest detectable sign is usually tachycardia
- Compensatory mechanisms



## Enteral (PO) Rehydration

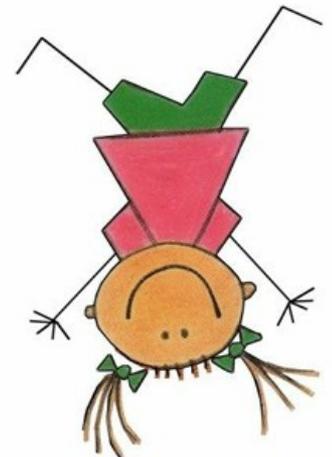
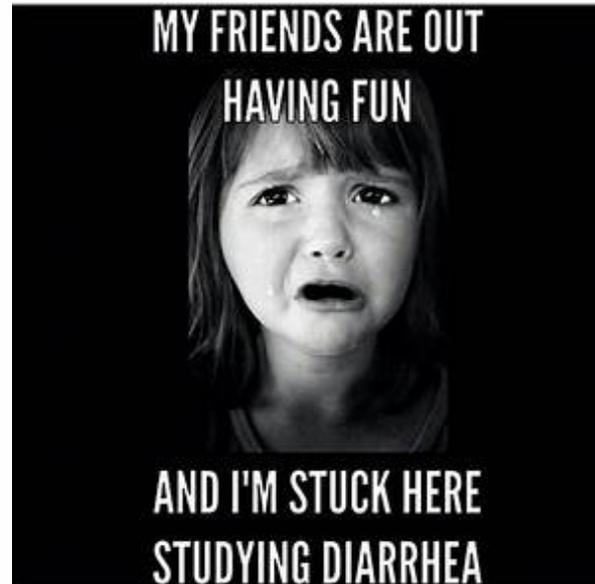
- mild/moderate
- ORT over 4 to 6 hours = success:
  - replacement of continuing losses
  - Provide at least minimum fluid requirements

## Parenteral (IV) Rehydration

- severe
- child is unable to keep enough fluids and electrolytes down to:
  - meet daily physiological needs
  - to replace previous deficits
  - to replace ongoing abnormal losses

# Gastrointestinal Dysfunction

- Diarrhea
- Constipation
- Hirschsprung Disease
- Gastroesophageal Reflux (GER)

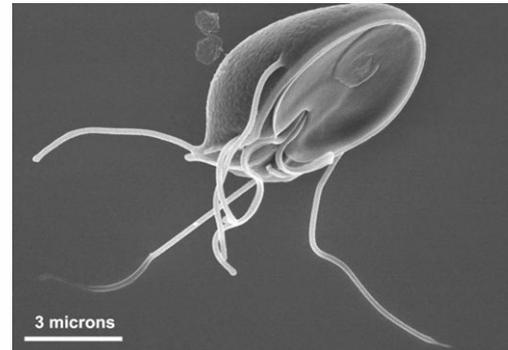


# Diarrhea

- Acute
  - Self-limiting
  - <14 days
- Chronic
  - >14 days



# Giardiasis

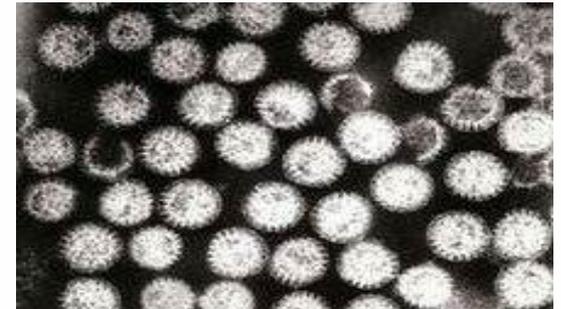


- Protozoa
  - cysts are ingested & eventually excreted in stool
- Mode of Transmission
  - person-to-person
  - improperly prepared infected food
  - contaminated water
  - Animals
- Diagnosis
- Treatment



# Rotavirus

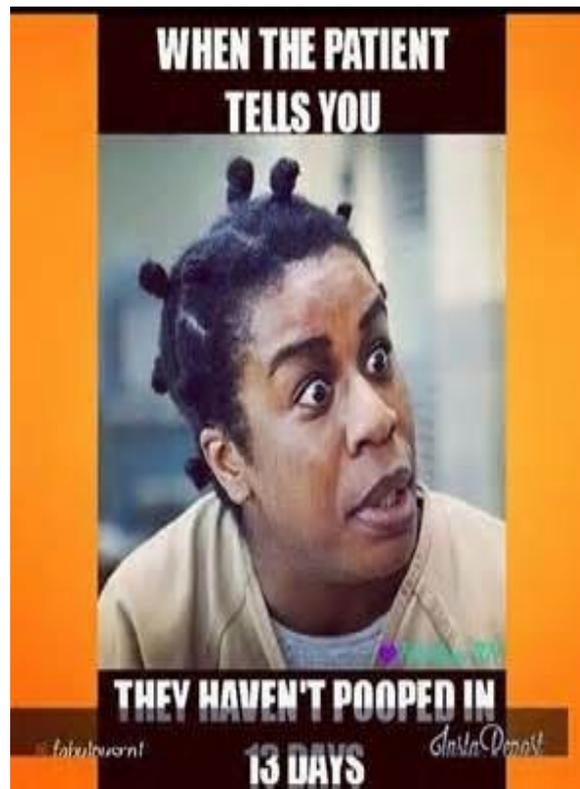
- Immunization  
- oral
- Mode of  
Transmission
- Symptoms
- Diagnosis



# Constipation

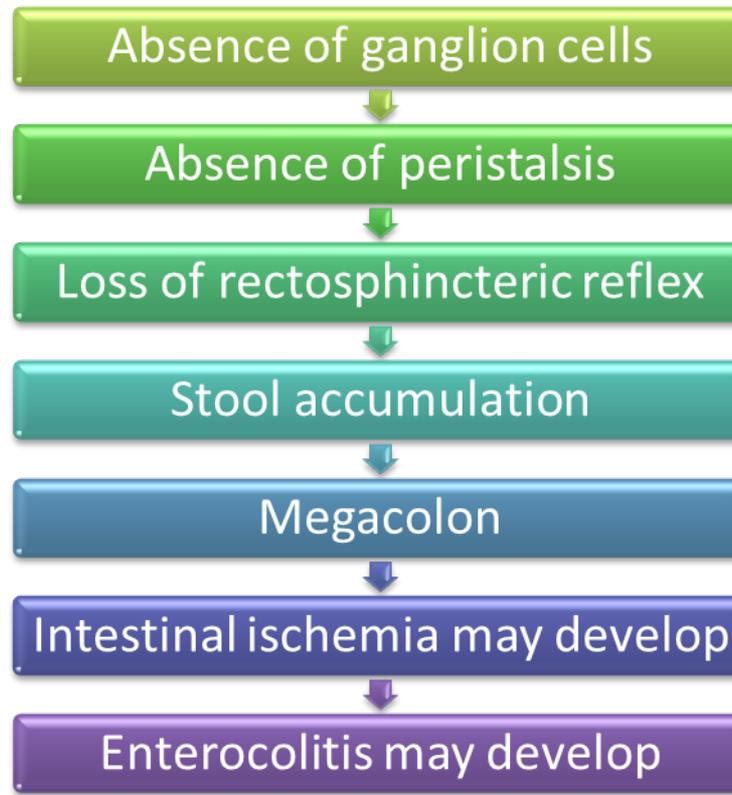
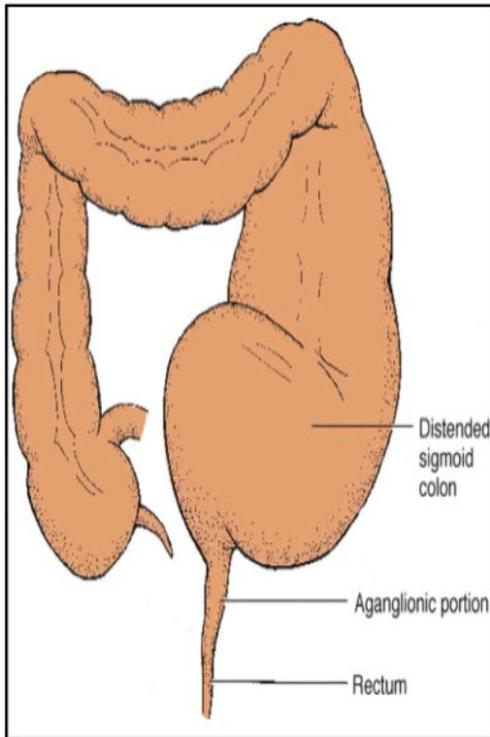
- Definition:

A decrease in bowel movement frequency or trouble defecating for more than 2 weeks



# Hirschsprung Disease

- AKA Congenital Aganglionic Megacolon



# Hirschsprung cont'd

- Clinical manifestations

- Failure to pass meconium within first 24-48 hours
- Abdominal distention
- Vomiting
- Constipation, diarrhea, and/or ribbon-like, foul smelling stools
- Easily palpable stool mass

- Treatment

- Surgery
- <https://youtu.be/9QjZe6zZpRA>

- Pre/post op considerations



**NOTHING  
PER  
RECTUM**

# Gastroesophageal Reflux

- The transfer of gastric contents into the esophagus
- Etiology
  - Approximately 50% of infants younger than 2 months of age
  - Usually outgrow by 12-18 months of age
- Diagnosis
  - History & Physical Assessment
  - Upper GI series
  - 24 hour intraesophageal monitoring
  - Endoscopy with biopsy



# Clinical Manifestations

## **Preverbal child**

- Choking with feeding
- Spitting up/vomiting  
-regurgitation
- Irritability
- Arching of back
- Hematemesis
- Weight loss  
-Failure To Thrive
- Respiratory

## **Child/Adolescent**

- Heartburn
- Abdominal pain or non-cardiac chest pain
- Chronic cough
- Dysphagia
- Recurrent pneumonia

# GER cont'd

- Complications:
  - Esophagitis, recurrent pneumonia, apnea, anemia, Barrett's esophagus
- Treatment:
  - Small, frequent feedings
  - Thicken milk
  - Position
  - Medication
  - Surgery



# Treatment - Medications

- H2 Antagonists

- Reduce/suppress the secretion of gastric acid by selectively blocking H2 receptors

## Proton Pump Inhibitors (PPI)

- Reduce/suppress gastric acid secretion and can stimulate an increase in lower esophageal sphincter tone

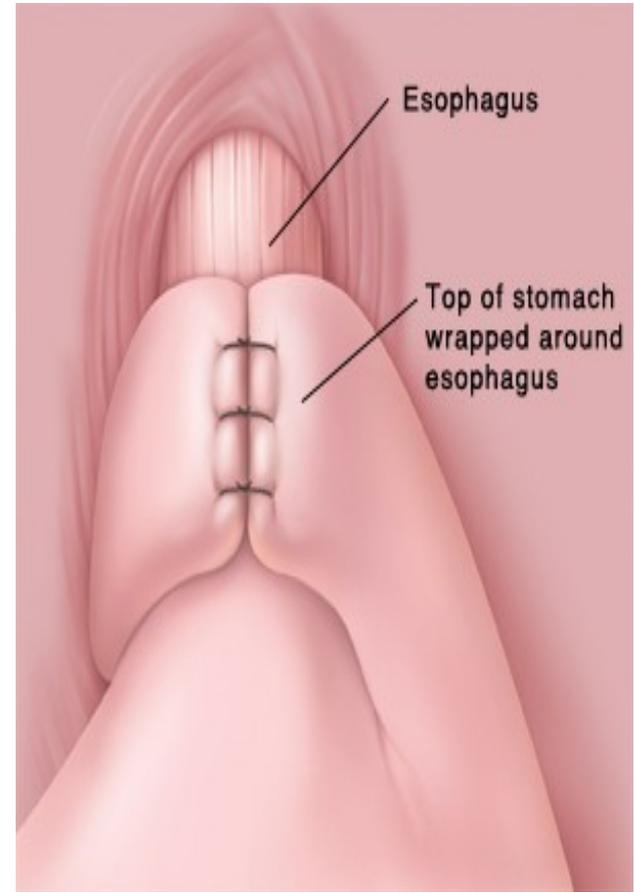
- Prokinetic Agents

- Increases rate of gastric emptying



# Treatment-Surgical

- Reserved for pts with severe complications
- Nissen Fundoplication
  - fundus of the stomach is placed behind the esophagus; encircles the distal esophagus
  - Post operative care
    - Ng tube (Notify MD)
    - Monitor for gastric distention



# Structural Defects

## Cleft Lip & Cleft Palate

- Defect in cell migration resulting in failure of the maxillary & pre-maxillary processes to merge between the 4<sup>th</sup> & 10<sup>th</sup> weeks of embryonic development
- Results in incomplete closure of the lip and/or palate
- Multidisciplinary team



# Etiology

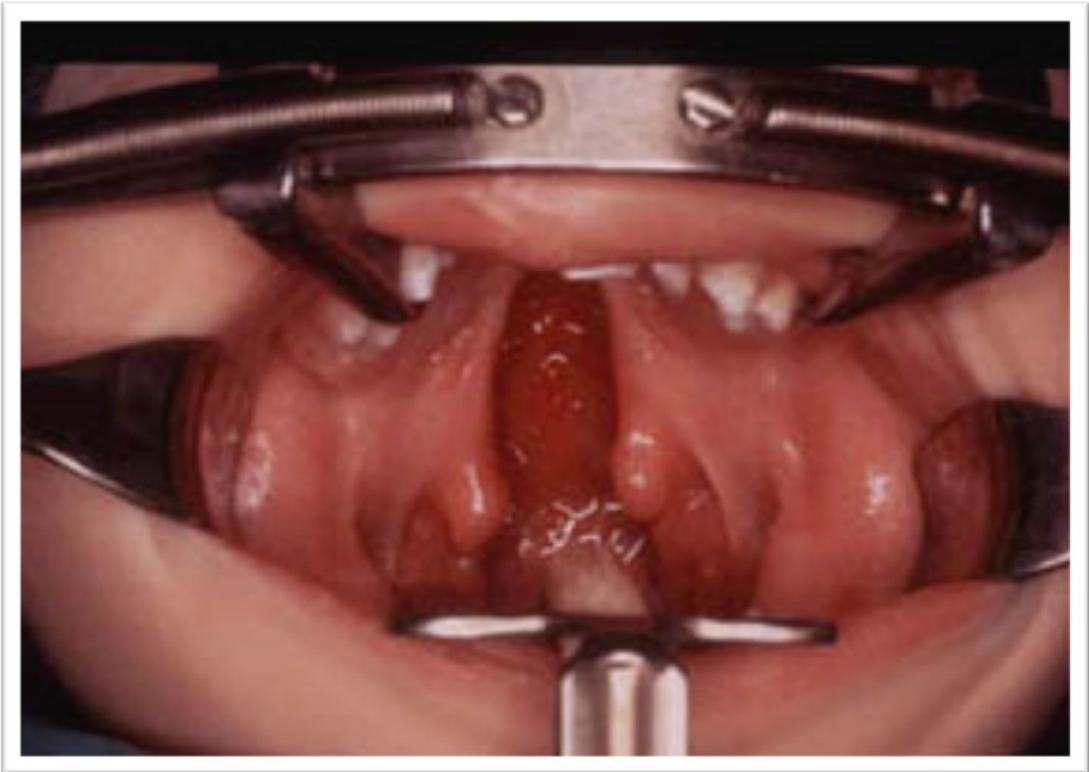
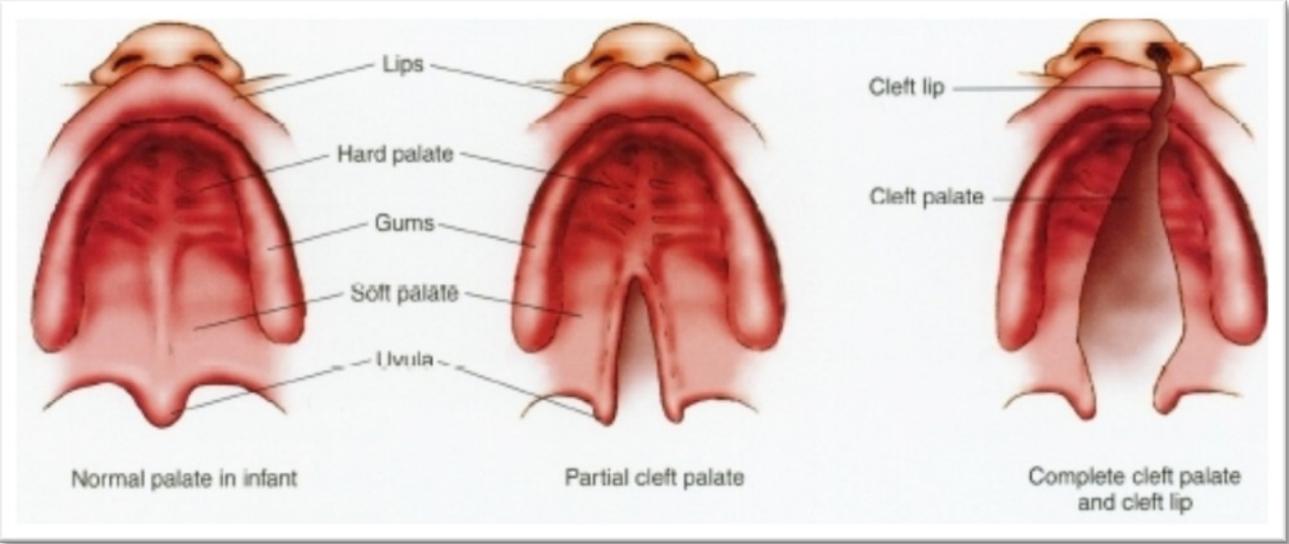
- Associated with:
  - multifactorial inheritance
  - alcohol
  - smoking
  - anticonvulsants (Dilantin)
  - isotretinoin (Accutane)
  - steroids
  - retinoids
  - folate deficiency



# Immediate Problems

- Reaction of the parents
- Feeding
  - alteration in the infant's ability to suck
  - begin breastfeeding ASAP
  - if breastfeeding is not possible...
    - Use large soft nipples with soft holes
      - lambs nipple
      - Breck feeder
      - Asepto syringe
  - burp often





# Surgical Repair

- Cleft Lip
  - 2-3 months
- Cleft Palate
  - Before 12 months

## Postoperative Care

- Do not place objects in mouth
- Resume feeding
- Pain control
- Maintain restraints
- Reduction of tension on suture line



1



2

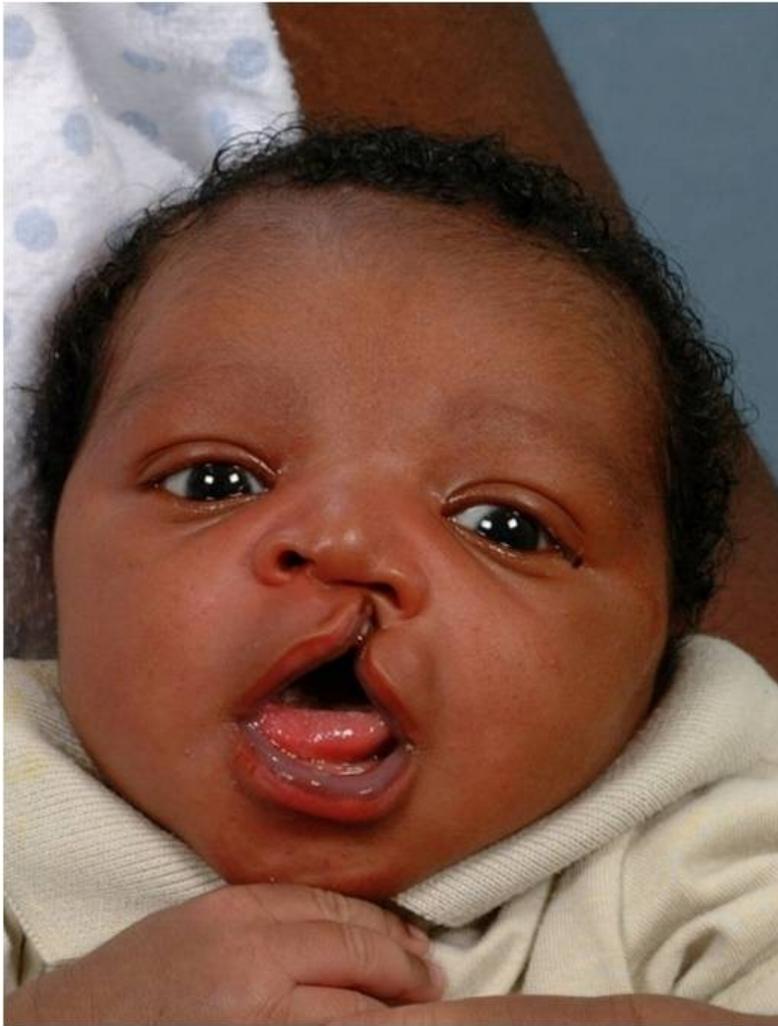


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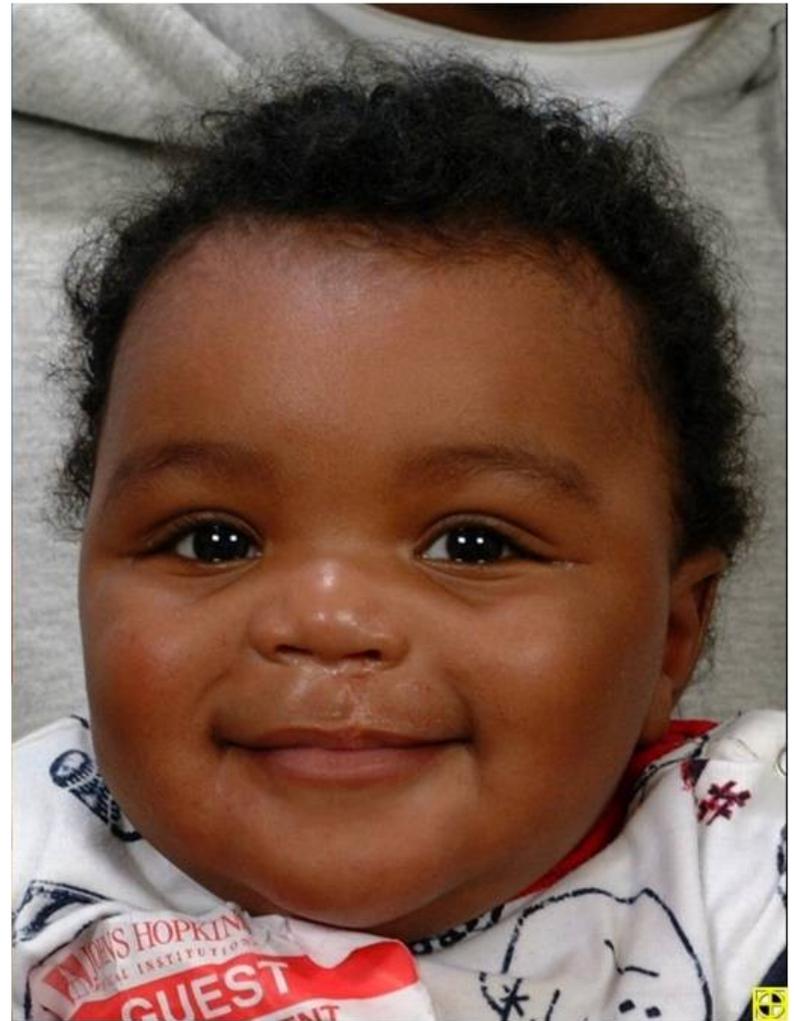


4





**Before**



**After**

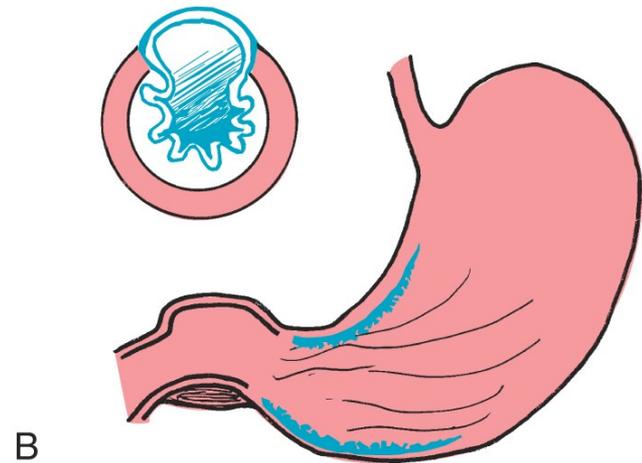
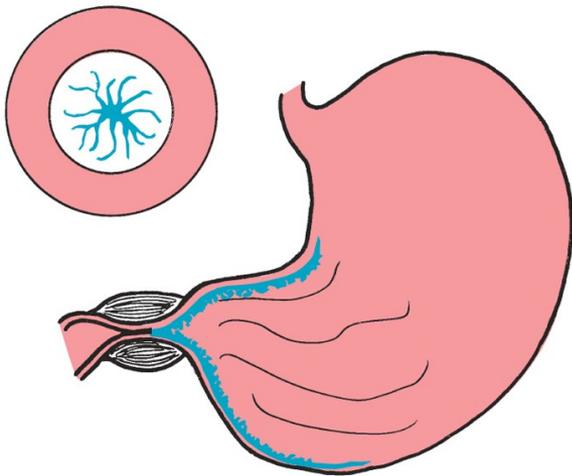
# Obstructive Disorders

- Hypertrophic Pyloric Stenosis
- Intussusception



# Hypertrophic Pyloric Stenosis

- Narrowing of the pyloric canal producing outlet obstruction



Thickening of the pylorus muscle



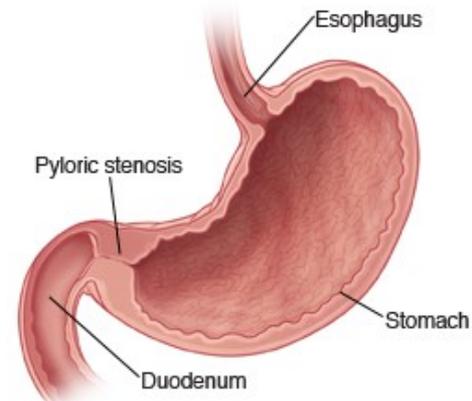
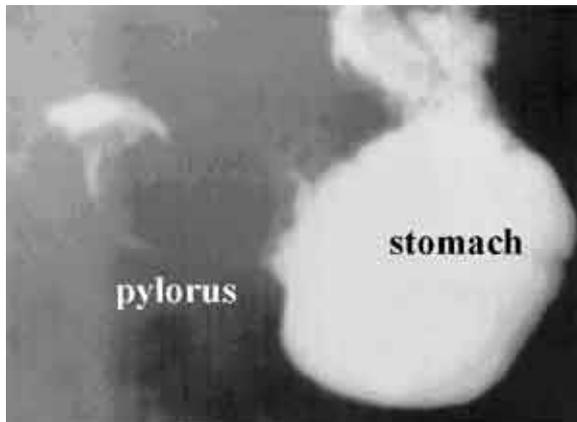
Elongation & narrowing of pyloric channel



Partial obstruction of lumen



Edema and inflammation eventually lead to complete obstruction



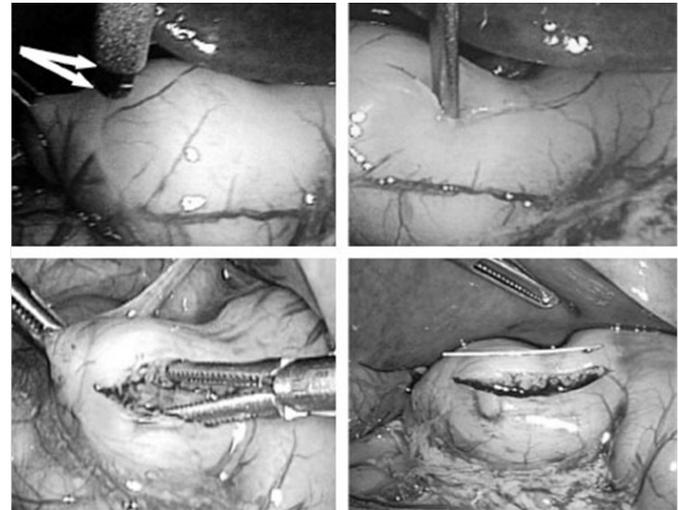
# Clinical Manifestations

- Olive-like mass in upper abdomen
- Vomiting after feedings
  - Eventually projectile vomiting
- Dehydration
- Chronic hunger - Growth failure



# Diagnosis & Treatment

- Diagnosis:
  - ultrasound to confirm
- Treatment:
  - Pyloromyotomy
    - longitudinal incision through the circular pylorus muscle



# Pre-op Nursing Considerations

- Rehydrate
- Correct electrolyte imbalances
- NPO
- NGT

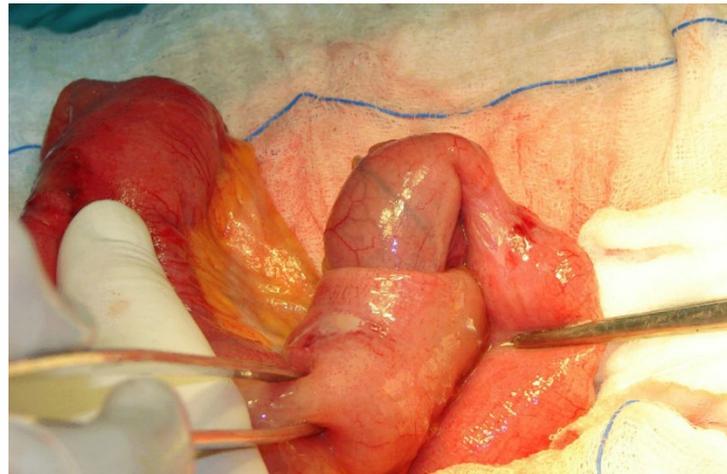
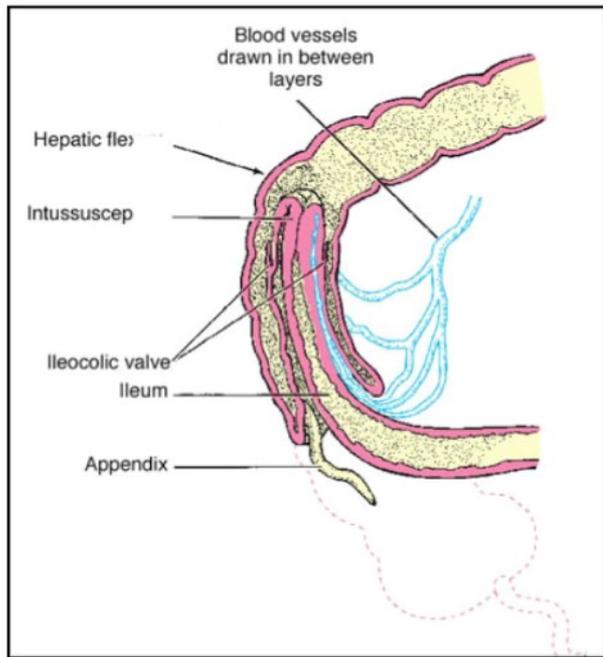
# Post-op Nursing Considerations

- Monitor for vomiting
- Monitor I&Os and continue IVF
- Pain management
- Feedings



# Intussusception

- Occurs when one segment of bowel telescopes into another segment



<https://www.youtube.com/watch?v=Q4jHzNWM-aQ>

Segment of bowel telescopes into another bowel segment



Bowel mesentery is compressed & angled



Lymphatic & venous obstruction



Edema increases



Pressure within the area of intussusception increases



When the pressure equals the arterial pressure, arterial blood flow ceases



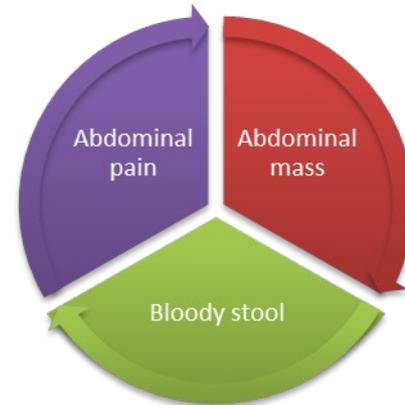
Ischemia



Pouring of mucous into the intestine

# Clinical Manifestations

- Acute, severe, intermittent abdominal pain
- Tender, distended abdomen
- Palpable mass in RUQ
- Empty RLQ
- Vomiting
- Lethargy
- Red, currant jelly-like stool



# Therapeutic Management

- Air pressure enema
- Saline enema

## Surgical Intervention

- Manual reduction
- Removal of dead tissue if needed

## Pre & Post-op Interventions

- Same for any abdominal surgery
- Stool monitoring





# Endocrine Dysfunction in Children

# Endocrine System Overview

- Controls & Regulates Metabolism
  - Energy production
  - Growth
  - Fluid & electrolyte balance
  - Response to stress
  - Sexual development

# Growth Hormone Deficiency

- Clinical Manifestations
  - Normal growth during 1<sup>st</sup> year
  - Slowed growth curve after 1<sup>st</sup> year - below 3<sup>rd</sup> percentile
  - Height may be retarded more than weight
  - Skeletal proportions normal for age
  - Primary teeth appear at normal age; permanent teeth delayed
  - Teeth overcrowded/malpositioned due to underdeveloped jaw
  - Delayed sexual development

# Growth Hormone Deficiency

- Diagnosis
  - Family history
  - Physical exam
  - X-rays/MRI
  - Endocrine studies
  - Growth chart
  - Genetic testing



Retrieved from  
<https://journals.lww.com/neurotodayonline/blog/breakingnews/Pages/post.aspx?PostID=350>

# Growth Hormone Deficiency

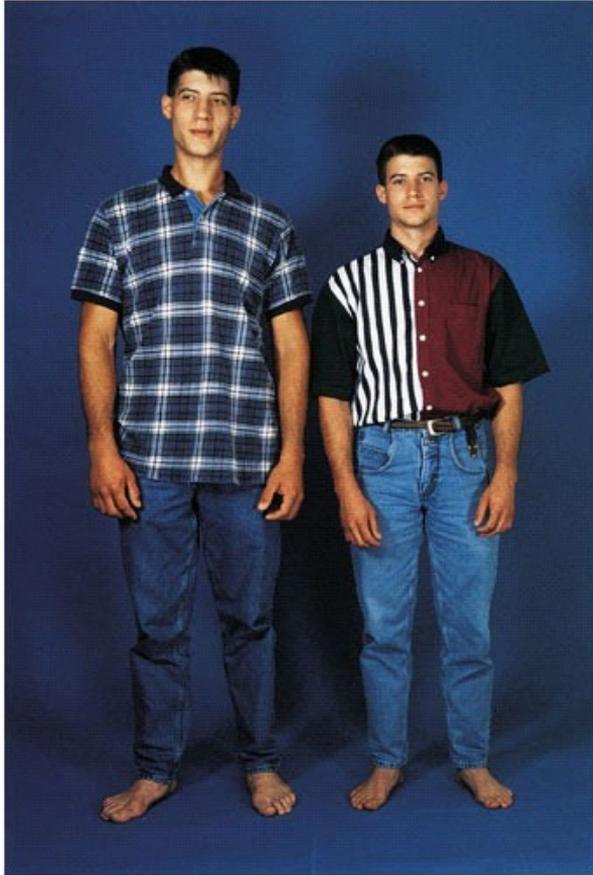
- Therapeutic Management
  - Correct underlying disease process
  - Growth Hormone replacement (80% successful)
    - Biosynthetic growth hormone
    - \$10,000 - \$60,000/year, often partially covered by insurance

# Growth Hormone Excess

- Clinical Manifestations
- Oversecretion of Growth Hormone **Before** closure of growth plate
  - Proportional overgrowth of the long bones
    - Individual reaches height of 8 ft. or more
  - Rapid & increased muscle development
  - Weight increase in proportion with height
  - Proportional head enlargement
    - Delay in fontanel closure in young children

# Growth Hormone Excess

- Clinical Manifestations
  - Oversecretion of Growth Hormone **After** closure of growth plate
    - Growth in transverse direction
      - Acromegaly
        - Overgrowth of head, lips, nose, tongue, jaw, and paranasal and mastoid sinuses
        - Separation and malocclusion of teeth in enlarged jaw
        - Disproportion of face
        - Increased facial hair
        - Thickened, deeply creased skin
        - Increased tendency toward hyperglycemia & DM



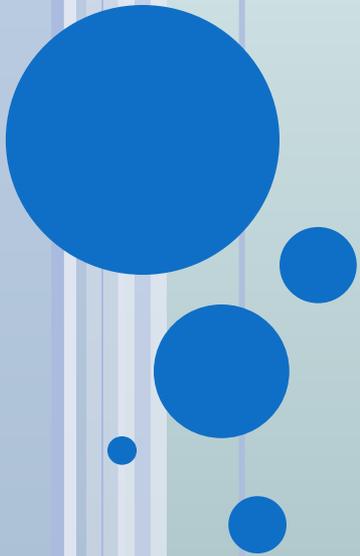
A 22-year-old man with gigantism due to excess growth hormone is shown to the left of his identical twin. The increased height and enlarged foot of the affected twin are apparent. Their clinical features began to diverge at the age of approximately 13 years. (Harrison 2005)

Retrieved from [group14.pbworks.com/W/page/16025094/pituitary%20gigantism](http://group14.pbworks.com/W/page/16025094/pituitary%20gigantism)

# Growth Hormone Excess

- Diagnosis
  - History of excessive growth
  - Increased levels of GH
  - Normal bone age
  - Enlargement of bones
  - Endocrine studies
- Therapeutic Management
  - Removal of tumor/lesion if present
  - External irradiation or radioactive implants
  - Pharmacologic agents

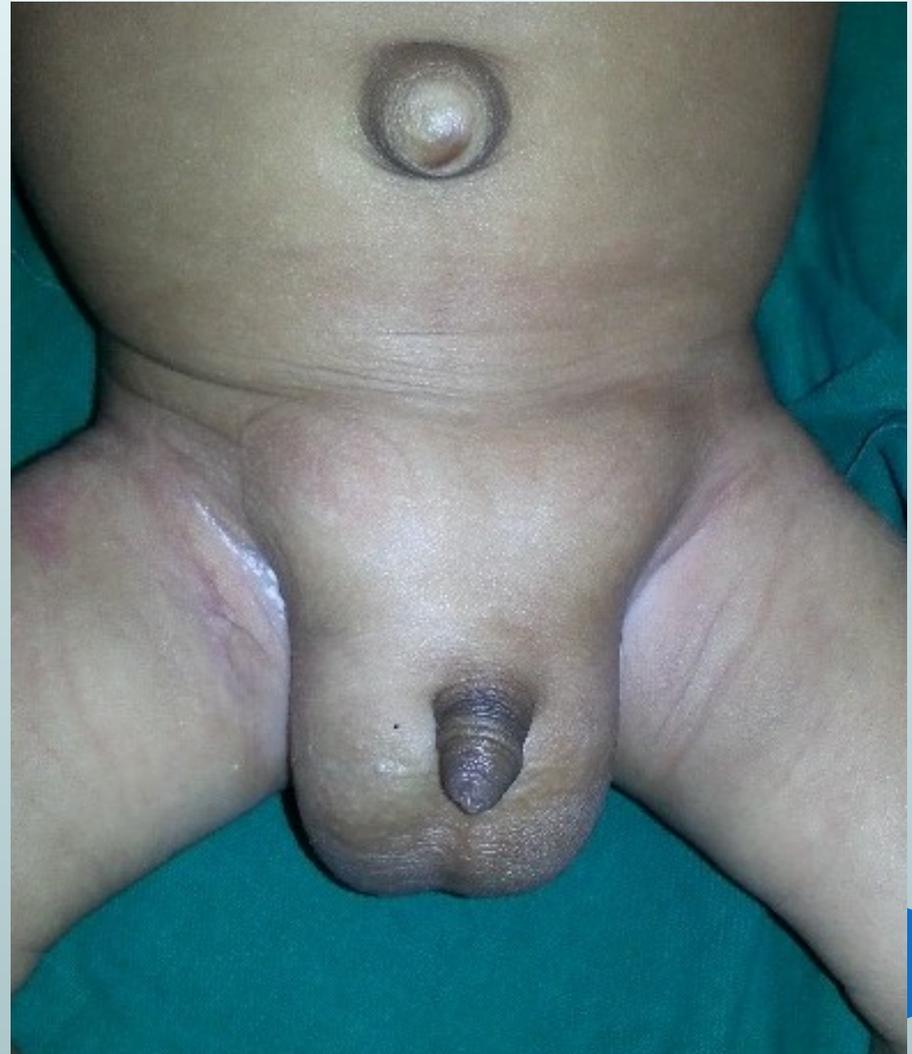
# **GENITOURINARY PROBLEMS IN CHILDREN**



# EXTERNAL DEFECTS

## INGUINAL HERNIA

- Protrusion of abdominal contents through inguinal canal into scrotum
- Treatment: surgical closure of defect



# EXTERNAL DEFECTS

## HYDROCELE

- Fluid in scrotum
- Typically self-resolving
- Surgical repair if not resolved by 1 year



# HYPOSPADIA

## S

- Urethral opening located below or behind glans penis or anywhere along ventral surface of penile shaft
- No circumcision until surgical evaluation because foreskin may be needed in the repair
- Treatment: surgical correction



# CRYPTORCHIDISM

- Failure of one or both testes to descend normally through inguinal canal into scrotum
- Treatment: orchiopexy



# Skin Disorders in Children



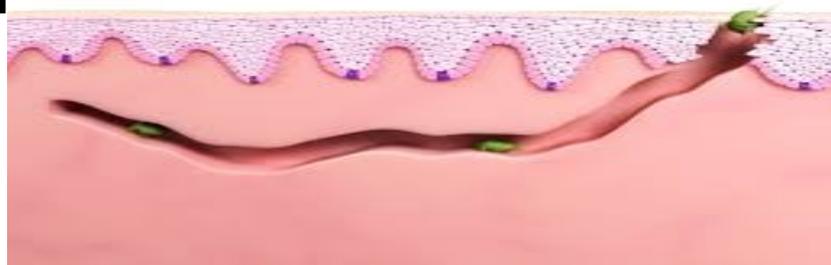
# Sarcoptes scabiei (Scabies)

- Skin infestation with microscopic mite
- Spread by direct contact with infected



Electron micrograph of scabies mite

<http://www.dermisil.com/products/what/scabies.sp>



# Sarcoptes scabiei (Scabies)

## ■ Symptoms

- Severe pruritis; especially at night
- Small, tiny lesions develop into blisters
- Usually on hands or feet

## ■ Treatment

- Whole family
- Scabicide - Permethrin (Elimite)
- Treat personal items
- Lotions
- Topical steroid for itch
- Antibiotics- secondary infections



# Pediculosis capitus (head lice)



- Very common, parasitic infestation
- Very contagious, very annoying
- Person to person contact
- Object to person contact
- Not carried by animals



# Pediculosis capitus (head lice)

- Adult Louse

- Small, grayish-tan, wingless insect
- Visible
- Can live up to 48 hours away from a human host
- Life span of female is 1 month
- Use **claws** to hold to hair shaft



# Pediculosis capitus (head lice)

---

## Symptoms:

- May note small, red lesions
- Persistent pruritis
- Nits on hair shafts
- Visible adult lice
- Regional lymphadenopathy
- Secondary infection

## Treatment:

- Medicated shampoos
- Mechanical removal of nits
- Wash all linens
- Vacuum/ dry clean non-laundry items
- Seal non-washable items in plastic bags for 14 days
- Repeat treatment in 7 days
- Treat secondary infection as needed 366

# Musculoskeletal Dysfunction in Children





# Legg-Calvé-Perthes Disease

*“Avascular necrosis of the femoral head”*

- Unknown etiology
- Affects hip where femur & pelvis meet in the joint
- Blood supply temporarily interrupted to femoral head and begins to die
- Affects children 2 - 12 years old
  - Most common in boys 4 - 8 years old (4:1)

## *Four Stages*

### **I: Necrosis**

**Aseptic necrosis or infarction of the femoral capital epiphysis with degenerative changes which produces flattening of the upper surface of the femoral head**

### **II: Fragmentation**

**Capital bone resorption & revascularization with fragmentation (vascular resorption of the epiphysis)**

### **III: Reossification**

**New bone formation, seen as calcification & ossification as increased density**

### **IV: Remodeling**

**Gradual reformation of the femoral head, hopefully with a spherical form**



*Legg-Calvé-Perthes disease involving the patient's left hip.  
The other hip is normal.*

# Assessment & Diagnosis



- Slow Onset
  - limp
  - pain
  - joint stiffness with limited ROM
- History
- Physical assessment
- X-rays
- MRI

# Interventions



- Initial therapy
  - rest/activity restrictions
  - reduce inflammation and irritability of the hip
  - limited or non-weight bearing
    - crutches
    - physical therapy
    - traction
- Non-surgical containment (“conservative”)
  - abduction brace, cast, harness sling
  - longer recovery period
- Surgical reconstruction and containment
  - Shorter recovery period



**Scottish Rite Orthoses**

**Spica Cast With Hip Abductor**



# Prognosis



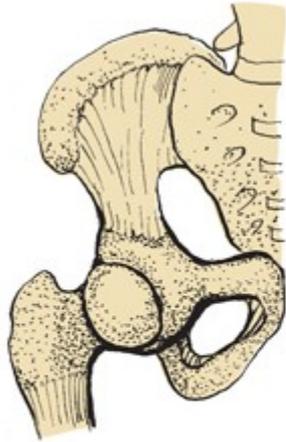
- Self-limiting
- Outcome influenced by
  - early treatment
  - child's age
- Possible long-term complications



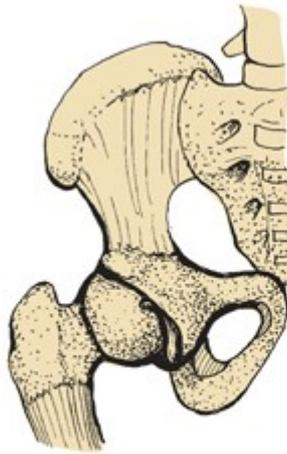
# Developmental Dysplasia of the Hip (DDH)

- Disorders related to abnormal development of the hip
  - fetal life, infancy, or childhood
  - head of femur seated improperly in the acetabulum
- Unknown etiology
- More common in first born children, females, positive family history, breech delivery, large birth weight, oligohydramnios

# Degrees of DDH



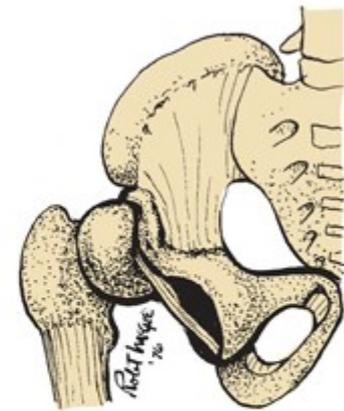
Normal



Dysplasia



Subluxation



Dislocation

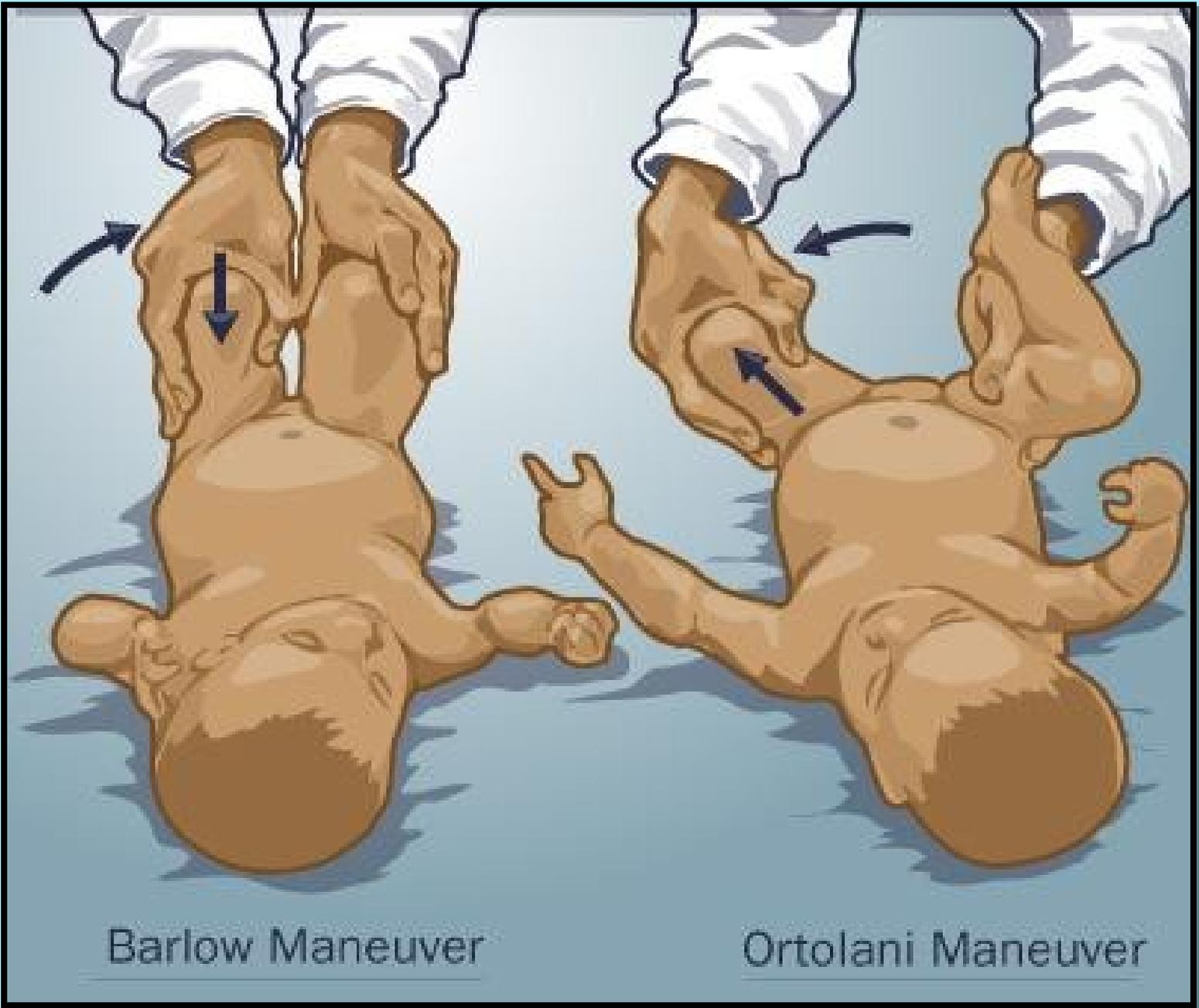
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# Assessment



- Newborn to 8 - 12 weeks
  - positive Barlow test
    - Adducting the thigh
    - Palpable “clunk” of femoral head dislocating from acetabulum
  - positive Ortolani test
    - Abducted while lifting leg anteriorly
    - Palpable “clunk” as dislocated femoral head reduces into acetabulum

These tests **MUST** be performed by an experienced provider.  
If performed too vigorously in the first 2 days of life,  
persistent dislocation may occur.

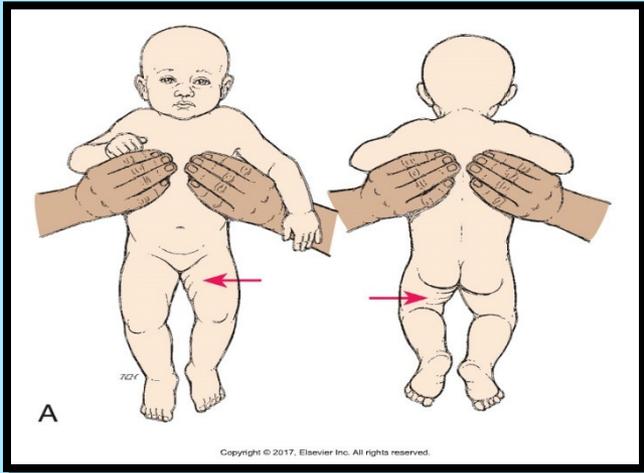


# Assessment

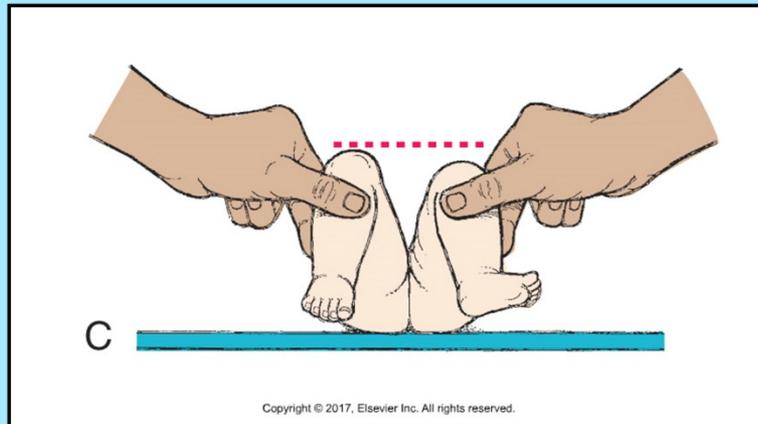


- Infants
  - limited abduction of hips
  - asymmetry of gluteal and thigh folds
  - positive Galeazzi (Allis) sign
    - shortness of the femur with the hips and knees flexed
  - leg length discrepancy

# Asymmetry of Gluteal & Thigh Folds



# Galeazzi (Allis) Sign

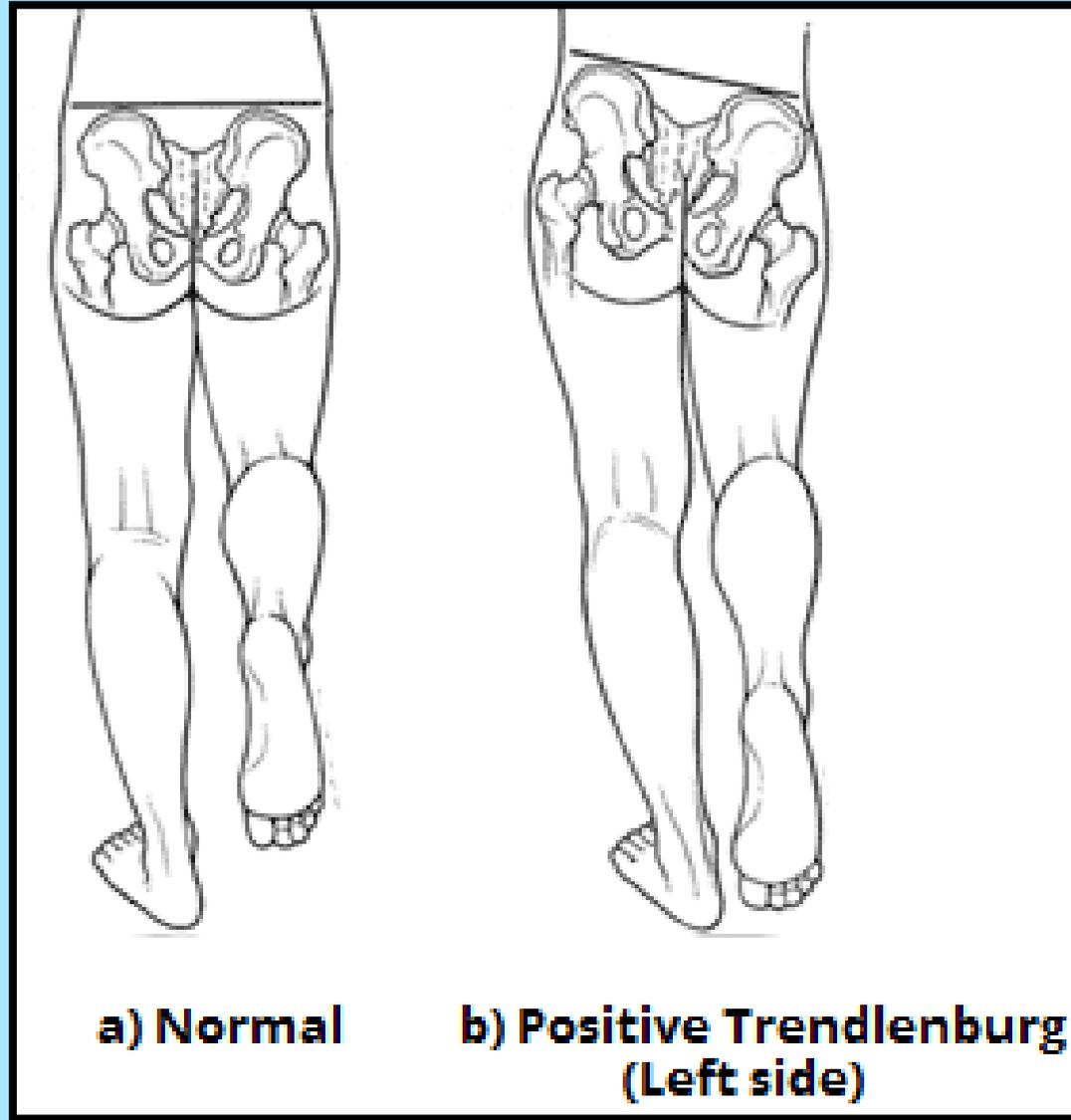


# Assessment



- Older Infants and Children
  - positive Trendelenburg sign
    - child stands on one foot at a time
    - when weight is on affected hip, pelvis tilts downward on normal side instead of upward as it should
  - leg length discrepancy
  - telescoping mobility of joint
  - marked lordosis and waddling gait (bilateral dislocations)

# Trendelenburg Sign



# Diagnosis

- Physical assessment
- X-ray
- Ultrasound



# Interventions



- Birth - 6 months

- Pavlik harness

- maintains flexion and abduction of hips
    - worn continuously for 3 - 6 months

- Pavlik Education

- Application and maintenance of device
      - fit of harness
      - skin care
    - Encourage parents to hold infant with harness
    - Involve infant in activities with others

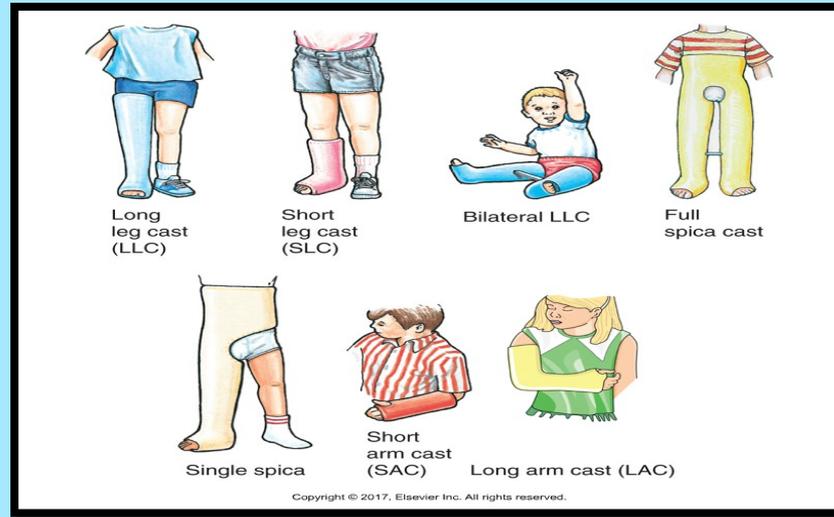


# Interventions



- Ages 6-24 months
  - Bryant traction
  - Surgical reduction (open vs closed)
  - Spica cast
  - Hip abduction orthosis
- Children Older than 24 Months
  - Surgical open reduction
  - Spica cast
  - Flexion-abduction brace
  - Rehab

# Casts





**Pediatric Hematology / Immunology**

# Sickle Cell Anemia

Autosomal Recessive Genetic Disorder

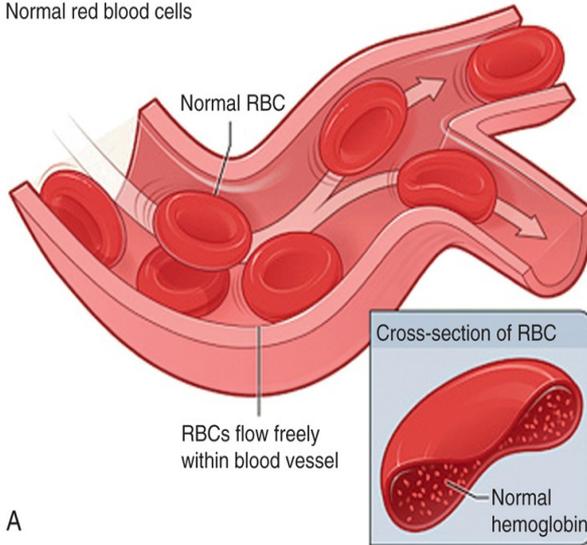
Normal Adult Hemoglobin A (HgbA) Is Partly Or Completely Replaced By Abnormal Sickle Hemoglobin (HgbS)

Results In Occlusion Of Small Blood Vessels, Ischemia, And Damage To Affected Organs

# “Sickling”

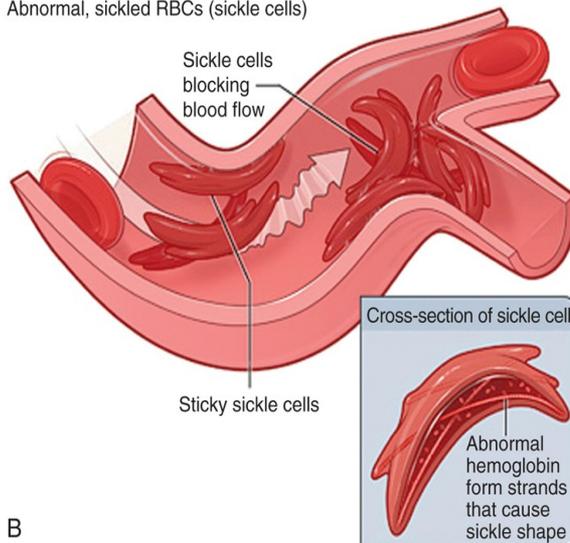
- HgbS changes molecular structure to form long, slender crystals
  - Distorts RBC membrane
  - RBC changes from pliable disk to crescent- or sickle-shaped
  - “Sickled” RBC life span: <40 days
    - Leads to chronic anemia
- Triggers to “sickling”
  - Dehydration
  - Acidosis
  - Hypoxia
  - Temperature changes
  - Infection

Normal red blood cells



From National Heart, Lung, and Blood Institute: *What is sickle cell anemia?* Bethesda, MD, August 2008, Author.

Abnormal, sickled RBCs (sickle cells)



From National Heart, Lung, and Blood Institute: *What is sickle cell anemia?* Bethesda, MD, August 2008, Author.

# Effects Of “Sickling”

Abnormal adhesion, entanglement, and enmeshing of rigid sickle-shaped RBCs



Inflammatory process



Intermittent blocking of microcirculation



Vaso-occlusion



Absence of blood flow to adjacent tissues



Local hypoxia



Tissue ischemia and infarction





# Diagnostic Testing

- Prenatal
  - Chorionic villus sampling from prenatal tissue
  - Amniocentesis
- After birth
  - Newborn screening
  - Sickledex (sickle turbidity test)
    - If positive, hemoglobin electrophoresis



# Clinical Manifestations

- Generally no symptoms until  $\geq 6$  months old
  - HgbF does not sickle
- General signs
  - Chronic hemolytic anemia
    - Frequent infections
    - Fatigue
    - Delayed physical growth

# Sickle Cell “Crises”

- Acute exacerbations
  - Vaso-Occlusive crisis
  - Splenic sequestration crisis
  - Hyperhemolytic crisis
  - Aplastic crisis



# Vaso-Occlusive Crisis

## “Classic” or Acute Signs

- Acute Pain
- Fever
- Severe abdominal pain
- Painful edematous hands and feet
  - Hand-Foot Syndrome (infants)
- Arthralgia
- Leg ulcers (adolescents)
- Cerebrovascular accident (CVA)



# Vaso-Occlusive Crisis

## *Chronic Signs*

- Splenomegaly → autosplenectomy
- Hepatomegaly → liver failure
- Kidney abnormalities → hematuria, inability to concentrate urine, enuresis, possible renal failure
- Bone changes → osteoporosis, skeletal deformities
- Retinal detachment, blindness



# VOC: Crisis Management

- Hydration
  - Electrolyte replacement
  - Strict I & O
- Analgesics
  - Warm compresses
- Blood transfusion
- Antibiotics
- Hydroxyurea

# VOC Pain Management

- Mild to moderate pain
  - Tylenol
  - Ibuprofen
- Severe pain
  - Opioids

Oral or IV

Administer on  
schedule!

Use PCA if  
appropriate

*Nursing Alert: Meperidine is  
contraindicated*



# Childhood vs. Adult Cancers

- Childhood cancers typically faster growing
- Lifestyle-related behaviors have little to no effect on childhood cancer
- Little information to support a strong environmental role



# Cardinal Symptoms of Cancer in Children

- Unusual mass or swelling
- Unexplained paleness & loss of energy
- Sudden tendency to bruise
- Persistent, localized pain or limping
- Prolonged, unexplained fever or illness
- Frequent headache, often with vomiting
- Sudden eye or vision changes
- Excessive, rapid weight loss

# Leukemia

- Characterized by a proliferation of abnormal white blood cells
- Most common form of cancer in children
- Most common type
  - Acute lymphoblastic leukemia (ALL)
- Treatment: Chemotherapy (primarily)

# Clinical Manifestations

- Minor infection that fails to completely disappear
  - Infection, fever (r/t neutropenia)
  - Pallor, fatigue, weakness, lethargy (r/t anemia)
  - Bleeding, bruising, petechiae (r/t thrombocytopenia)
  - Joint or bone pain (r/t leukemic infiltration of bone marrow)
  - Enlarged lymph nodes, hepatosplenomegaly
  - Anorexia, weight loss
  - Headache, vomiting (if CNS involvement)

# Diagnosis & Testing

- Suspected from
  - History & Physical manifestations
  - Labs including CBC with differential
- Definitive diagnosis
  - bone marrow aspiration (BMA) and biopsy
  - LP



# Treatment & Prognosis

- Chemotherapy
- Higher leukocyte count at diagnosis = worse prognosis
- Approximately 20% relapse within first year
- 5-year survival rate = 85-90%
- Secondary malignancies may occur later in life

# Risk Of Infection

- Review
  - Neutrophils - fight bacterial infections
  - Each chemotherapy agent that causes bone marrow suppression has a point of nadir
  - Bone marrow suppression at its greatest, neutrophil count at its lowest
  - Nadir is individual for each drug
    - Usually 7 - 14 days
- Based on Absolute neutrophil count (ANC)
  - Calculating ANC
    - Neutrophils (Seg + Bands) X WBC X 10
  - ANC < 1500 warrants evaluation
  - ANC < 500 places child at greatest risk for infection



# Infection Prevention

- Monitor for signs and symptoms of infection
- Private room with restricted visitors
- Reverse/protective isolation is prescribed
- No fresh fruits or vegetables
- Pets at home?
- No live vaccines
- Administer prescribed prophylactic medications
  - Antibiotics
  - Antifungals

# Risk for Bleeding

- Monitor for signs of bleeding
- Avoid unnecessary skin punctures
- Use aseptic technique
  - For fingersticks, venipunctures, IM injections
- Meticulous mouth care
  - Soft toothbrushes, toothette
- Avoid activities that might cause injury or bleeding
  - No contact sports
- Nosebleeds
- Platelets
  - For active bleeding episodes
- No ibuprofen or aspirin



# Nausea & Vomiting

- Serotonin-receptor antagonists before chemotherapy
  - Schedule instead of PRN
  - Ondansetron (Zofran)
  - Granisetron (Kytril)
- Avoid foods with strong odors



# Anorexia/Loss of Appetite

- Avoid pressure to eat
- Do not let food become a control issue
- Small, frequent meals & nutritious snacks
  - May need to fortify foods or use supplements

# Alopecia

- Hair regrows in 3 - 6 months
  - May be different color and texture
- Protect head from cold and sun
- Cotton cap, scarf, hat, or wig
- Scalp hygiene





**END OF LIFE CARE**



# Child's Developmental View Of Death

- Infants and toddlers
  - no concept of death
- Preschoolers
  - Death as temporary, a departure, a kind of sleep
- School Age
  - Death is irreversible but not necessarily inevitable and may fear mutilation
- Adolescents
  - Death is inevitable, irreversible

# Nursing Care

- Assess level of pain / administer pain med
- Provide soothing sounds, avoid excessive light
- Limit care to essentials
- Ensure pleasant smell, touch, temperature
- Encourage parent involvement in care
- Encourage child to talk about feelings
- Explain all procedures/therapies

# Nursing Care

- Structure hospital/home environment to allow for max self control/independence
- Frequent/timely updates on child's status
- Encourage family's assistance with care
- Encourage family to be honest with child's questions about dying
- Provide privacy when communicating bad news
- Facilitate appropriate spiritual care

# Nursing Care

- Stay with the family
- Accept family's grief reactions
- Avoid artificial consolation
- Allow parents to be with the child at the moment of death
- Remember siblings

