ADOLESCENT PEDIATRICS
OUTLINE

• Definition
• Pubertal Changes
• Sexual maturity rating (SMR)(Optional)
• Stages of Adolescence
• Factors affecting the adolescent development
DEFINITION

• Adolescence is that period of life of an individual when the society no longer recognizes him/her as a child but not as yet an adult
• Term is derived from Latin word ‘adolescere’ that means ‘to grow’
• WHO/ UN defined age groups
  Adolescents 10-19 years
  Youth 15-24 years
  Young People 10-24 years
DEVELOPMENT IN ADOLESCENCE

According to World Health Organization, adolescence is a phase which involves

– Progression from appearance of secondary sexual characteristics to sexual and reproductive maturity (puberty)
– Development of adult mental processing and identity
– Transition from total social-economic dependence to relative independence
PUBERTY

Progression through puberty is predictable
Major variations seen in:
  Onset
  Timing
  Tempo
  Magnitude of changes
MAJOR PHYSICAL CHANGES OF PUBERTY

• Major changes in genital system (primary and secondary sex characteristics)
• Gain 25% of final height (distal growth may precede that of proximal parts by three to four months)
• Doubling of lean and non-lean body mass (gain 50% of the ideal body weight)
• Doubling of the weight of the major organs; central nervous system maturation (without increase in size)
• Maturation of facial bones
• Marked decrease in lymphoid tissue
PUBERTY TRIGGERS

- Controversial
- Genetic and environmental influence (nutrition, stress, exercise, climate)

Possibilities:
- Central Nervous System maturation
- Critical body weight
- Body fat to total body weight
- Adrenal maturation
HORMONAL CHANGES IN PUBERTY

Increase in:

• Gonadotropins (FSH & LH)
• Sex hormones
• Adrenal Gland sex steroids
• Growth Hormone and Insulin-like Growth factors
• Thyroid hormone production remains
NORMAL PUBERTY

• Begins at
  10yrs (range 8-13yr) in Girls
    First sign is breast bud development
  12 yrs (range 9-15yr) in Boys
    First sign is testicular enlargement

• Duration
  3-3.5 Yrs.
SEQUENTIAL CHANGES OF PUBERTY

Adolescent Male
• Early testicular growth
• Pubarche
• Testicular and penile growth
• Nocturnal emissions
• Height velocity peaks
• Marked voice changes
• Facial hair growth
• Final pubertal changes
SEQUENTIAL CHANGES OF PUBERTY

Adolescent Female
- Breast bud (thelarche)
- Pubic hair development (pubarche)
- Peak height velocity
- Menarche
- Final pubertal changes
TANNER STAGING OF SMR

Tanner staging is important as it:

• Delineates current stage of puberty
• Assesses progression
• Predicts development changes e.g.
  - Peak Height Velocity:
    SMR 2 & 3 (Females) vs SMR 3 & 4 (Males)
  - Menarche: SMR 3 & 4
  - Gynecomastia (Males): SMR 2 & 3
<table>
<thead>
<tr>
<th>Stage</th>
<th>Breast</th>
<th>Pubic Hair</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>None</td>
<td>None</td>
<td>Birth to 15 years</td>
</tr>
<tr>
<td>II</td>
<td>Breast Bud (thelarche): Areolar hyperplasia with small amount of breast tissue</td>
<td>Long downy pubic hair near the labia; may occur with breast budding or several weeks to months later (pubarche)</td>
<td>6 – 15 years</td>
</tr>
<tr>
<td>III</td>
<td>Further enlargement of breast tissue and areola</td>
<td>Increase in amount of pubic hair with more pigmentation</td>
<td>8 – 15 years</td>
</tr>
<tr>
<td>IV</td>
<td>Double Contour form: Areola and nipple form secondary mound on top of breast tissue</td>
<td>Adult type but not distribution</td>
<td>9 – 17 years</td>
</tr>
<tr>
<td>V</td>
<td>Larger breast with single contour form</td>
<td>Adult distribution</td>
<td>10 – 18 years</td>
</tr>
<tr>
<td>Stage</td>
<td>Testes</td>
<td>Penis</td>
<td>Pubic Hair</td>
</tr>
<tr>
<td>-------</td>
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</tr>
<tr>
<td>I</td>
<td>No change (4ml)</td>
<td>Prepubertal 2.5 cm or less</td>
<td>None</td>
</tr>
<tr>
<td>II</td>
<td>Enlargement of testes, ↑ stippling and pigmentation of scrotal sac</td>
<td>Minimal or no enlargement</td>
<td>Long, downy hair often occurring several months after testicular growth; variable pattern noted with pubarche</td>
</tr>
<tr>
<td>III</td>
<td>Further enlargement (6 – 8 ml)</td>
<td>Significant penile enlargement especially in length</td>
<td>Increase in amount, now curling</td>
</tr>
<tr>
<td>IV</td>
<td>Further enlargement (10 – 12 ml)</td>
<td>Further enlargement especially in diameter</td>
<td>Adult type but not distribution</td>
</tr>
<tr>
<td>V</td>
<td>Adult size (min: 12 ml, avg 18.6 ± 4 ml)</td>
<td>Adult size</td>
<td>Adult distribution</td>
</tr>
</tbody>
</table>
DISORDERS OF PUBERTY

• Delayed puberty:
  - Failure of thelarche by 13y
  - Failure of menarche by 15y
  - Failure of testicular growth by 14y

• Precocious puberty:
  - Thelarche before 8y
  - Menarche before 10y
  - Testicular growth before 9y
STAGES OF ADOLESCENCE

• Early Adolescence: 10-13 years  SMR 1-2
• Middle Adolescence: 14-16 years  SMR 3-4
• Late Adolescence: 17-19 years  SMR 5
• Changes occur in physical, psychological & social domains
EARLY ADOLESCENCE PHYSICAL CHANGES

- Breast development
- Testes enlarge & nocturnal emission
- Growth spurt: gawky look
- Pubic & axillary hair
- Pimples
- Short sight may manifest
- Voice cracking
EARLY ADOLESCENCE PSYCHOLOGICAL CHANGES

- Concrete operational thinking
- Formal logical thinking may begin
- Magical thinking
- Self-conscious
- Interest in sex
EARLY ADOLESCENCE RELATIONSHIP CHANGES WITH FAMILY, PEERS & SOCIETY

• Seek independence
• Intense peer involvement
• Socialize in same sex peer groups
• Role models other than family members
MIDDLE ADOLESCENCE PHYSICAL CHANGES

• Height peaks
• Muscle mass increases
• Body shape changes
• Body odor & acne increases
• Facial hair
• Clear vaginal discharge
• Menarche
MIDDLE ADOLESCENCE PSYCHOLOGICAL CHANGES

- Questions & analyzes extensively
- Identity crisis
- Self centered
- Abstract thinking
- Concerned with attractiveness
- Increased day time drowsiness
- Gauge skill & opportunities at school
MIDDLE ADOLESCENCE RELATIONSHIP CHANGES WITH FAMILY, PEERS & SOCIETY

• Interest in opposite sex
• Peer group approval important
• Experimentation
• Struggle for greater autonomy: strained parent-adolescent relationship
LATE ADOLESCENCE

- Final stages of growth
- Idealistic & independent
- Members of religious/political groups
- Understand adult rights & responsibilities
- Intimacy & possible commitment
IMPORTANCE OF STAGES

• Tracking growth and development
• Assess normal & abnormal behavior
• Anticipatory guidance & counselling to prevent high risk behavior especially in middle adolescence when experimentation is at its peak
• Parental counselling e.g. mild mood swings and anger outbursts are normal in early adolescence
FACTORS AFFECTING ADOLESCENT DEVELOPMENT

- Socio economic condition
- Community
- Family
- Peer groups
- Education opportunities
- Employment issues
VULNERABLE GROUPS

• Poverty- Poor access to health care and education, early initiation into employment
• Illiterate & School Drop Outs- Prone to high risk behavior and juvenile delinquency
• Working- Unhealthy working conditions, prone to exploitation, poor access to education & health care
• Street Adolescent- High risk behavior
• Rural Adolescent- Poor access to health care
• Institutionalised- Prone to abuse & exploitation
THANK YOU