



ASSESSMENT OF GROWTH & DEVELOPMENT

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ASSESSMENT OF GROWTH:

- Growth can be measured in a number of ways... Growth can be evaluated by means of;
- Nutritional anthropometry- eg. Weight, height, head & chest circumferences.
- Tissue growth assessment- eg. Skinfold thickness.
- Bone age
- Dental development
- Histological and bio chemical means.

NUTRITIONAL ANTHROPOMETRY:

- **WEIGHT:**

- An average birth weight- 2.5-3kgs
- Doubles by – 5months
- Triples by - 1year
- 4 times(quadrupled) by- 2 years.
- 5 times by- 3years.
- Weight gain is rapid in boys and girls during puberty
- Weight of children may be checked by using mechanical as well as digital weighing scales.
- **If the value is less than 0.15 it indicates malnutrition.**





Body Mass Index

- BMI is an indicator of nutritional status. It is used to determine if children are overweight, obese or underweight.
- BMI – weight in kg/ (Height in meter)² X 100.

HEIGHT:

- Height is an indicator of skeletal growth. It is the measurement taken when the child stands upright.
- At birth- 50cm
- At 3 months- 60cm
- At 9 months- 70cms
- 1year- 75cms
- At 2years- 90cms
- Birth height doubles by- 4years (100cm).
- Afterwards the child gains about 5cm every year till 10 years of age.





LENGTH:

- Height measured in supine (lying) position is called length.





HEAD CIRCUMFERENCE:

- Head circumference is measured by using a tape until the child is 3 years
- Normal head circumference of newborn- 33-35cms.
- At 3 months- 40cms
- At 1year- 45cms
- At 2 years- 48cms
- At 5 years- 50cms.
- If the head growth exceeds 1 cm in 2 wks during the first 3months, hydrocephalus may be suspected.



It is measured by placing the tape measure over the eyebrows or supra orbital ridges and pinna of the ears anteriorly and over the occipital prominence posteriorly.



CHEST CIRCUMFERENCE:

- The chest circumference at birth is 31-33cm.
- Head and chest circumferences are equal at 1-2 years of age and during childhood chest circumference exceeds head circumference by 5-7cm.

Chest circumference

- Measure chest circumference with paper or steel tape around chest at nipple line and under tips of scapulas at back





ABDOMINAL CIRCUMFERENCE

- It is measured by lacing the tape measure at the level of umbilicus at right angles to the vertebral column.
- It is not measured as a routine.
- It is measured for children who have chronic intestinal problems.

Abdominal Girth



Abdominal girth should be measured over the umbilicus whenever possible.



TISSUE GROWTH ASSESSMENT:

- **MIDARM CIRCUMFERENCE:**
- IS AN INDIRECT MEASURE OF MUSCLE MASS.
- It helps to assess the nutritional status of the child.
- Normal is above 13.5
- Moderate PEM -12.5-13.5
- Severe PEM - <12.5

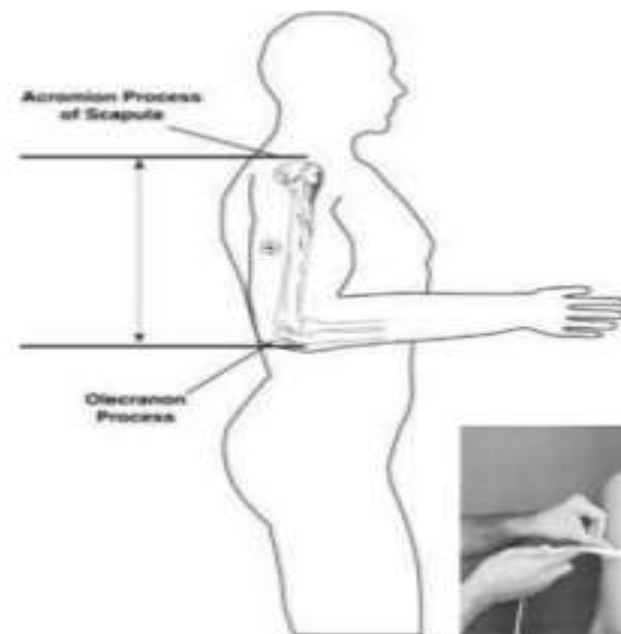
MID-ARM CIRCUMFERENCE (MAC)

Locate the midpoint of the arm.

- Non-dominant arm elbow flexed at 90deg with palm facing upwards
- Measurer stands **behind** the subject & locates the **lateral tip of the acromion** and the most **distal point on the olecranon** process
- Place a tape measure so that it passes between these 2 landmarks and mark the midpoint

Measure the midarm circumference

- The subject stands erect with arms hanging freely at the sides and the palms facing the thighs
- Place the tape measure perpendicular to the long axis of the arm at the **marked midpoint** & measure the **circumference to the nearest mm.** (e.g. 18.1 cm)
- Provide the actual MAC in cm.

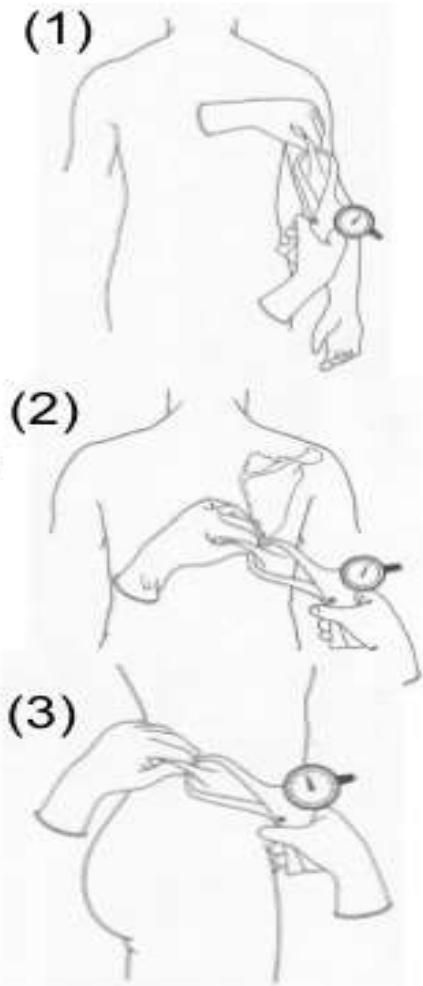


SKIN FOLD THICKNESS:

Measurement sites

The most commonly used sites are:

- Triceps skinfold (1): Mid-point of the back of the upper arm
- Biceps skinfold: Front of the upper arm, above the center of the cubital fossa
- Subscapular skinfold (2): below and laterally to the angle of the shoulder blade, with the shoulder and arm relaxed. The skinfold should angle 45° from horizontal, in the same direction as the inner border of the scapula
- Suprailiac skinfold (3): mid-axillary line superior to the iliac crest. Picked up obliquely just posterior to the midaxillary line and parallel to the cleavage lines of the skin
- Midaxillary skinfold: picked up horizontally on the midaxillary line, at the level of the xiphoid process





Time of eruption and shedding of primary teeth

| NAME | ERUPTION OF TOOTH | | SHEDDING OF TOOTH | |
|-----------------|-----------------------|----------------------|-----------------------|----------------------|
| | Age in months | | Age in years | |
| | Lower (mandibular) | Upper (maxillary) | Lower (mandibular) | Upper (maxillary) |
| Central incisor | 6 | 7 1/2 | 6 | 7 1/2 |
| Lateral incisor | 7 | 9 | 7 | 8 |
| Canine(Cuspid) | 10 | 18 | 9 1/2 | 11 1/2 |
| First molar | 12 | 14 | 10 | 10 1/2 |
| Second molar | 20 | 24 | 11 | 10 1/2 |



Eruption of permanent teeth

Time of Eruption of Permanent Teeth(Age in years)

| Name | Lower (Mandibular) | Upper (Maxillary) |
|--------------------------|-----------------------|----------------------|
| Central incisors | 6-7 | 7-8 |
| Lateral incisors | 7-8 | 8-9 |
| Canine(cuspid) | 9-10 | 11-12 |
| 1 st premolar | 10-12 | 10-11 |
| 2 nd premolar | 11-12 | 11-12 |
| 1 st molar | 6-7 | 6-7 |
| 2 nd molar | 11-13 | 6-12 |
| 3 rd molar | 17-21 | 17-21 |