**Table 1.1:** Vital signs in children (normal values)

| *Age* | *Temp.°C* | *Pulse* | *Respiration* | *BP* |
|---|---|---|---|---|
| Newborn | 36–37 | 140 | 40 | 60/40 |
| 1 year | 36.5–37.5 | 120 | 30 | 70/50 |
| 5 years | 37 ± 0.2 | 100 | 20 | 90/50 |
| 10 years | 37 ± 0.2 | 90 | 18 | 100/70 |
| Over 10 years | 37 ± 0.2 | 80 | 18 | 110/80 |

### Alertness

Note: Alertness, interest in surroundings, apathy.

### Coma

It is a state of profound and prolonged unconsciousness from which the individual cannot be aroused except for a short period.

### Stages

**Stage 1 (stupor):** Patient can be aroused for brief period, during which he may make, voluntary and verbal responses.

**Stage 2 (light coma):** Patient cannot be aroused in spite of painful stimuli. Semi-purposeful movements may be noticed.

**Stage 3:** Painful stimuli fail to produce response, decerebrate posturing.

**Stage 4:** The patient is flaccid and apneic, brain stem functions are lost though a few spinal reflexes may be intact.

### Nutrition

Note: Nutritional status, loss of subcutaneous fat, asthenia, cachexia, obesity.

### Odour

Note: The odours. Some of them are characteristic, e.g. fruity smell of diphtheria, smell of ingested toxin (kerosene, etc.)

### Gait

See the gait during walking-scissors gait (spastic cerebral palsy), waddling duck-like (proximal myopathy), ataxic, hemiplegic, high stepping, limping, equinus gait, etc.

### Head

Note: Size, shape, uniformity, abnormal swelling or depression, fontanelle, palpation and auscultation (Fig. 1.3).

### Size and Shape

Confirm microcephaly, macrocephaly or normal by head circumference measurement. Shape may be normal or abnormal. Abnormalities, may be:

a. Flat occiput: When children lie in one position as in newborn or mentally retarded children.
b. Prominent occiput as in trisomy.
c. Frontal bossing, e.g. in rickets.
d. Acrocephaly: Top of the head is pointed (Alport syndrome).
e. Brachycephaly: It is a short wide head.
f. Plagiocephaly: One side is rounded more than the other as in craniostenosis.
g. Trignocephaly: Metopic suture is pointed.
h. Hot cross bun appearance: Cranial bossing, rounded prominences in the center of parietal and frontal bones cause the head square in shape as in rickets, so four prominences or bosses are separated by grooves. It gives hot cross bun appearance,
i. Scaphocephaly: Head is elongated antero-posteriorly.

Abnormal swellings or depression, e.g. cyst, hematoma, etc. are noted.

### Lymph Glands

Cervical, axillary and inguinal lymph glands should be palpated and described its location, size, shape, consistency, temperature, tenderness, edge, pulsation and their discreteness.

## OTOSCOPIC EXAMINATION OF EARS

Ear must be examined to visualize the tympanic membrane, the pinna of the ear is pulled with thumbs and index finger of one hand and back in older children and downwards in infants and newborn. The hands holding the otoscope should rest against the cheek of the child. Restrain the child before examination.

## BONES AND JOINTS

Look for chest deformity, localized swelling, sternal tenderness, joint swelling, tenderness, mobility, size and symmetry of limbs.

Look for any deformity such as bowed leg, knock knee, telepes, club foot (Fig. 1.17). Bowed legs are normally seen during first 2 years of life. While sight knock knees are common up to 2–12 years of age.

### Spine

Curvature (kyphosis, scoliosis), tenderness range of movements should be looked.

## GENITAL AND SEXUAL MATURITY

Assess sexual maturity and look for any genital abnormality (Fig. 1.19).

**Fig. 1.19:** Congenital left-sided hydrocele.

## ANTHROPOMETRIC EXAMINATION

### Weight

Recording of weight is essential for calculation and assessment of nutrition, calculation of drug dosage and early detection of malnutrition (Fig. 1.20).


**Fig. 1.20A and B:** Weight recording.

iii. Spleen tip may be felt during first 3 months of life.

For description, abdomen is divided in compartments as seen in Fig. 1.32.

### Inspection

Normally, abdomen has a full contour. In early life it may be little protuberant because of the physiological lumbar lordosis and thin musculature of abdominal wall.

Abnormally, it may be scaphoid, flat or protuberant, causes of protuberant abdomen are:

1. Flatus (gas), fluid (ascites), faeces, fat, in obese children.
2. Due to laxity of abdominal wall rickets, celiac disease and hypothyroidism.
3. Intestinal obstruction.
4. Hirschsprung's disease.

*Flat abdomen:* Normally in thin children, malnutrition, failure to thrive and anorexia nervosa. In newborn, flat abdomen is suggestive of diaphragmatic hernia. Complete absence of muscles seen in Prune-Belly syndrome.

### Localized Swelling

See any localized, e.g. linear, spleen enlargement, pyloric stenosis lump, Wilm's tumour etc.

### Abnormal Pulsation

Pulsation at epigastrium may indicate pulsations of the liver or enlargement of right ventricle or in thin subject.

### Movements

See movements of abdominal wall. Diminished or absent in guarding of muscles as in peritonitis. Paradoxical (collapsing in inspiration) in diaphargmatic paralysis.

### Striae

White striae indicate recent weight loss or steroid therapy, purplish in Cushing's syndrome or slate colored discoloration in Addison's disease.

### Distended Veins

Seen at epigastrium in obstruction of inferior vena cava. Blood flow is below upward while in portal hypertension direction of blood flow is away from umbilicus (Fig. 1.33).

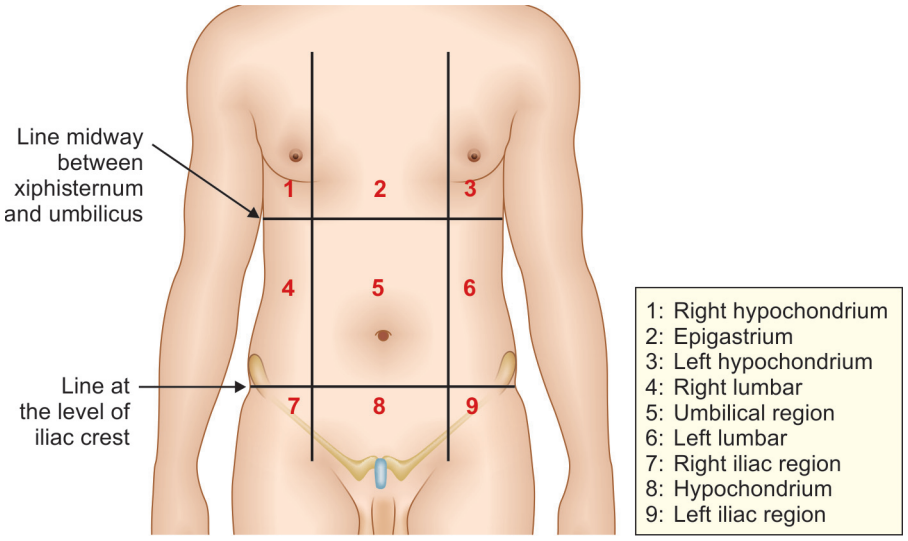


**Fig. 1.32:** Abdomen is divided into nine regions.

### Delusions and Hallucination

False belief is called delusion while hallucination is false signal or impression from the organ of special senses.

## CRANIAL NERVES

### Cranial Nerve I (Olfactory Nerve)

In children, testing of smell is very difficult. Ask child to close his eyes. Present some common objects for smell, e.g. toothpaste, coffee, tea. In infants, change of facial expression is only clue. Exclude chronic rhinitis before testing.

### Cranial Nerve II (Optic Nerve)

i. Vision
ii. Acuity
iii. Field
iv. Fundus.

#### *Vision*

i. Make a menacing gesture as if we are going to poke the eye. A consistent blink response indicates cortical vision while inconsistent blink response means vision is intact but interpretation of vision is defective (parietal lobe lesion).
ii. If child follows a moving light or objects, intact cortical vision is confirmed.

#### *Visual Acuity*

a. In toddler, rough assessment of visual acuity is done by looking his response to small common objects.
b. After the age of 5 years, simplest is the vision screening by 'EV chart or in elder by Snellen chart.

#### *Field of Vision*

Formal perimetry is possible at school age and if children are cooperating with perimetry gross evaluation is possible as soon as infant follows object and develops visual fixation. common test object, e.g. colorful toy (red black) brought to the eye from sides separately. Note if the child responds for approached object from one side and not from other side.

In another test when child is looking towards examiner's eye placed at some level, examiner takes his hands to the periphery of the visual field with index finger extended and diagonally opposite direction. He fixes one of the fingers and then asks the child to show which finger moved. This is repeated at different points in the perimeter of the field.

#### *Fundus Examination*

Better done at last. Better pupillary dilatation is done by instillation of 10% phenylephrine eye drops for 5 minutes. Examine with ophthalmoscope. See optic disc which is relatively pale in infants, distinct is white with sharp distinct margins in optic atrophy. Disc is dirty pale with blurred margins in post-papilledematous optic atrophy.

Look for papilledema, papillitis, chorioretinitis, hypertensive retinopathy, retinal hemorrhage, cherry red spot, retinitis pigmentosa, choroidal tubercles.

### Color Vision

It is difficult to evaluate below 3 years. Give common numbers 'Xs' or 'Os' and triangles, ask him to name or trace. Elder children are tested with modified Ishihara chart. Defective color vision may be due to optic nerve lesion.

### Oculomotor (Third Nerve)

It supplies all the extraocular muscles of the eye except external rectus and superior oblique. Look for following signs for its testing (Table 1.6).

i. Diplopia
ii. Ptosis
iii. Dilated and fixed pupil. Loss of light and consensual reflex. Pupil is larger in size in children than the adult and its diameter up to 5 mm is normal.
iv. The eye is displaced outwards and downwards.