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Modern Subjects

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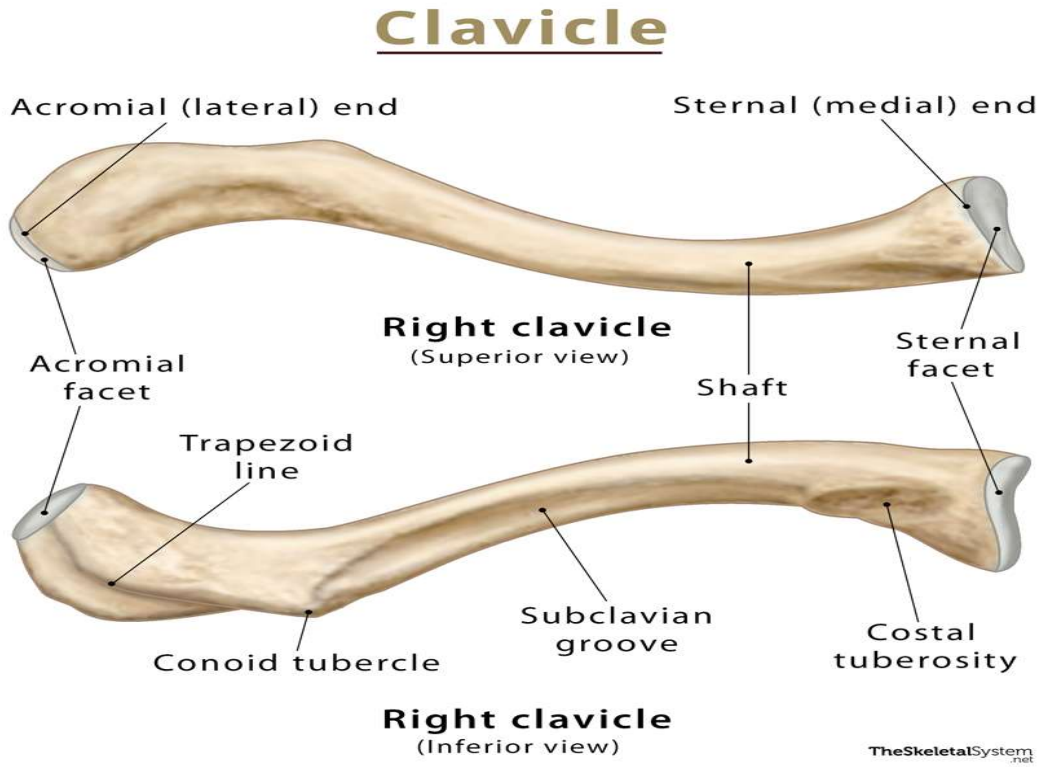
- Physiology
- Pharmacology
- Pathology
- Surgery
- ENT & Ophthalmology
- Gyne & Obs.
- Pediatrics

By
Dr. Shakti Raj Rai
9452376134

ANATOMY

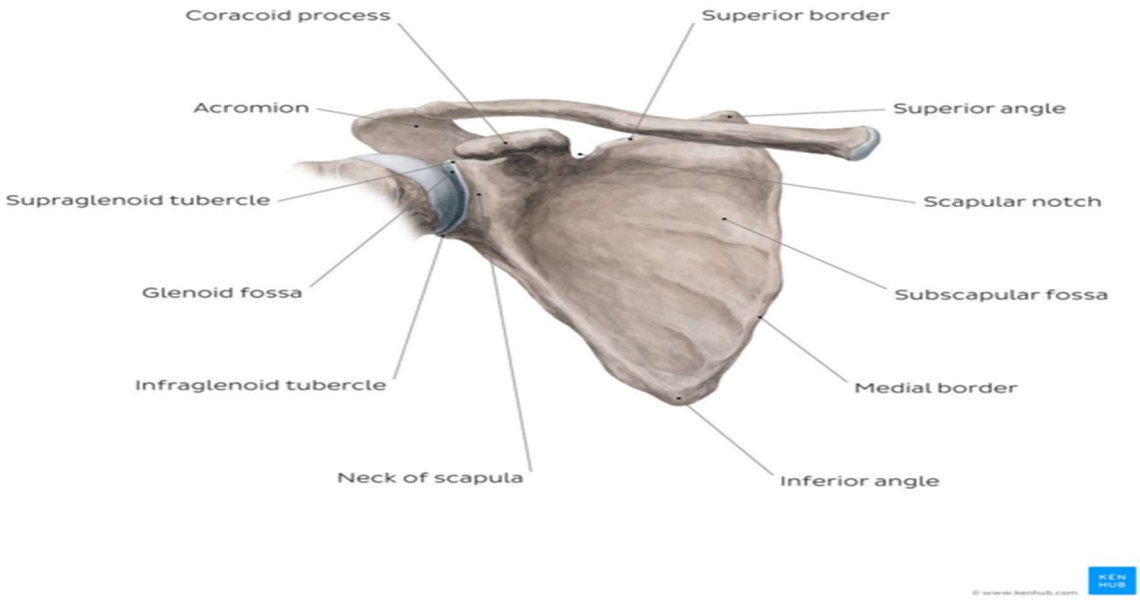
Dr. Shakti Raj Rai

Bones of Upper Limb – Clavicle (also called collar bone)
It is the first bone to start ossifying
It can be divided in to lateral 1/3 (flat) and medial 2/3 (cylindrical)
Anterior Border – deltoid tubercle
Lower Surface of Posterior Border – conoid tubercle, lateral to it is trapezoid line.
Common Site of Fracture – medial and outer 1/3rd



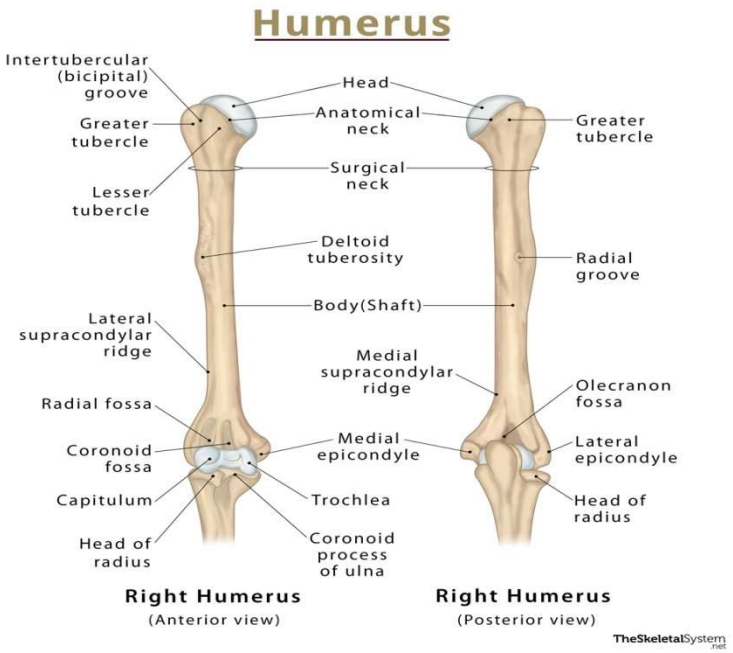
SCAPULA

Triangular shaped bone.
Anterior surface (costal surface) is smooth, posterior surface (dorsal surface) has a projection known as spine.
Glenoid Cavity – pear shaped – articulate with head of humerus
Have acromion and coracoid process.
Sprengel's Shoulder: scapula is placed higher than normal
Winging of Scapula: medial border is prominent due to paralysis of Serratus Anterior



HUMERUS

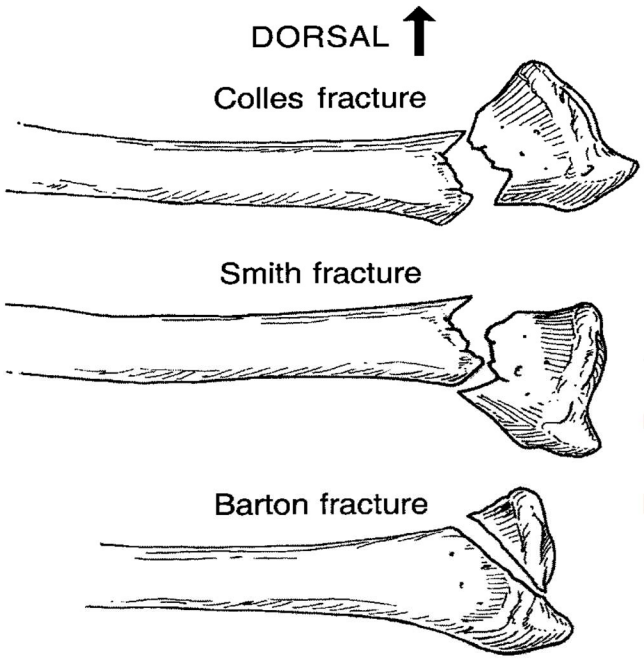
Anatomical neck	Junction of head with upper end
Surgical neck	Junction of upper end with shaft- related to axillary nerve
Anterolateral surface	V shaped – deltoid tuberosity
Radial groove	Radial nerve and profunda brachii
Lateral surface	Capitulum – articulate with radius
Medial surface	Trochlea – articulate with ulna



RADIUS

Colles fracture – fracture of lower end of radius (lower segment is displaced backward and laterally – dinner fork deformity), radial styloid process becomes proximal to ulnar styloid process.

Smith's Fracture or Barton's Fracture: fracture of lower end of radius with forward displacement.



Ulna	Medial bone of forearm Trochlear notch, olecranon process and coronoid process
Radial Notch	Articulate with head of radius. Fracture through the middle of the shaft of the ulna may occur alone or in combination with a similar fracture of the radius
Monteggia fracture dislocation	Fracture through the upper one-third of the shaft is often accompanied with forward dislocation of the head of the radius.

CARPAL BONES

The carpal bones are arranged in two rows, proximal and distal.

- The proximal row is made up (from lateral to medial side) from the scaphoid, lunate, triquetral and pisiform bones.
- The distal row is made up (from lateral to medial side) of the trapezium, trapezoid, capitate and hamate bones.

- ❖ The carpal bones of the proximal row (except the pisiform) take part in forming the wrist joint
- ❖ The distal row of carpal bones articulates with the metacarpal bones.

Scaphoid	Boat Like Shape		Pisiform	Pea Shape
Lunate	Lunar Crescent		Trapezoid	Shoe Shape
Triquetral	Cuboidal		Hammate	Hook Like Process
Capitate	Largest Carpal Bone			
(She Looks Too Pretty Try to Catch Her)				

Fracture of scaphoid bone is common while other is rare.

Carpal tunnel: Passage between the carpal bones and the flexor retinaculum. The compression of median nerve passing through it gives rise to burning pain in the lateral three and a half digits.

Brachial Plexus: The roots of the plexus are the ventral rami of spinal nerves C5, C6, C7, C8 and T1.

Trunks of Brachial Plexus

1.	The roots from C5 and C6 join to form the upper trunk of the plexus.
2.	The root from C7 continues as the middle trunk.
3.	The roots from C8 and T1 join to form the lower trunk.

Divisions and Cords of Brachial Plexus

1.	Each trunk divides into an anterior and a posterior division.
2.	The anterior divisions of the upper and middle trunks join to form the lateral cord.
3.	The anterior division of the lower trunk continues as the medial cord.
4.	The posterior divisions of all the three trunks join to form the posterior cord.

Branches of Brachial Plexus

The main branches of the brachial plexus are the median, the ulnar and the radial nerves.

1.	**The Median Nerve** is formed by union of lateral and medial roots arising from the lateral and medial cords, respectively.
2.	**The Ulnar Nerve** arises from the medial cord. **(MU)**
3.	**The Radial Nerve** **arises** from the posterior cord. **(PR)**

MODERN PHYSIOLOGY

Dr. Shakti Raj Rai

About 60% of adult human body is composed of fluid out of which 2/3 is intracellular and 1/3 is extracellular fluid.

Circulation:

Two Types- 1. Systemic circulation
2. Pulmonary circulation

Systemic Circulation/ Greater Circulation/ Peripheral Circulation: supplies blood to all tissue of the body except lungs.

General Feature:

Volume	4.5 to 5 litres
Ph	7.4 slight alkaline
Colour	Arterial blood – Scarlet red Venous blood – Purple red
Specific Gravity	1.052-1.060

Formation of Blood –Starts from 3rd week of intrauterine life.

Intravascular Erythropoesis (Mesoblastic Phase)	3rd week to 3rd month of intrauterine life→ RBCs are form in Mesoderm of Yolk sac
Hepatic Phase	3rd month to 5th month, →RBCs form in Liver and Spleen
Myeloid Phase	5th month to onwards→ RBCs form in Red Bone marrow

- Post Natal Erythropoesis occurs in Red Bone Marrow only.
- After the age of 20 yrs red bone marrow are confined to flat bones like Cranial Bones, Sternum, Ribs, Vertebrae, Scapula, pelvic bones and Upper ends of Long Bones (humerus and femur).

Regulation of RBCs Production:

- Tissue oxygenation is the most essential regulator of RBCs production.
- The principal stimulus for above is Erythropoietin (A glycoprotein hormone – 90% formed by Kidney, rest from Liver).

Erythropoietin: it is secreted by juxtaglomerular cells of juxtaglomerular apparatus of Kidney.

Its acts on Bone Marrow and stimulates RBCs production.

- ❖ Maturation of RBCs requires **Vitamin B_{12} and folic acid** which also are essential for DNA synthesis.
- ❖ Deficiency of both Vitamin and folic acid causes maturation failure (Cells are capable to carry O_2 but their fragility causes short life of RBCs).

Pernicious Anemia: The most common cause is B12 deficiency due to absence of intrinsic factor (IF).

Other causes → 1. Atrophy of gastric mucosa.
2. Autoimmune destruction of parietal cells which produce the IF.

- Absorption of Vitamin is caused by intrinsic factor, released by parietal cells of the gastric gland.
- Pernicious anemia is more common above 60 years of age and in children less than 10 years of age (**juvenile pernicious anemia**)
- In Sprue **(malabsorption syndrome)**, there is serious difficulty in absorption of both folic acid and VitaminB_{12}.

Megaloblastic Anemia: It is due to deficiency of vitamin B12 or folate.

Formation of Hemoglobin:

- ❖ 2 succinyl CoA+ 2 glycine→ pyrrole
- ❖ 4 pyrrole ring + Fe^{2+} centrally→ Heme
- ❖ Heme + polypeptide→ Hemoglobin chains

- Polypeptide Chains (Globin) are of 4 types - Alpha, Beta, Delta, Gamma.
- The most common form of Hb is adult human hemoglobin A (HbA), having 2α+ 2β chains (Molecular weight= 64,458).
- Types of Hb chains determine binding affinity of Hb molecule to O_2
- In **sickle cell anemia** glutamic acid is replaced by valine in β chains at the sixth position of peptide chain.
- When this type of hemoglobin is exposed to low oxygen tension, it forms elongated crystals inside RBC. This makes cells impossible to pass through

the small capillaries. And the spike ends of crystals ruptures the cell membrane of RBC.

Polycythemia:

Secondary-Polycythemia: Whenever the tissue become hypoxic because of too little O_2 as in high altitudes, or because of failure of O_2 delivery to tissue as in cardiac failure, leading to production of large number of extra RBCs.
The red cell count commonly rises to 6-7 million/mm^3, about 30% above normal.
Polycythemia Vera /Erythema: is a myeloproliferative disorder associated with janus kinase-2(JAK-2) mutation. There is increased production all the three blood cells (RBCs, WBCs and platelets).
Polycythemia Vera Results in –

- Increase RBCs count,
- Increase Haematocrit,
- Increase Viscosity,
- Increase Total Volume of Blood.

Normal Values

1.	RBC (Erythrocytes)	Male- 4.5-5.5 million / mm^3
		Female - 4-4.5 million / mm^3
2.	WBCs	(TLC)- 4000-11000 mm^3
		DLC- (GRANULOCYTES)- Neutrophils – 40-80 %
		Eosinophils – 1-6 %
		Basophils – 0-2 %
		(AGRANULOCYTES) Monocytes – 2-6 %
		Lymphocytes – 20-40 %
3	Hemoglobin	At Birth – 25 gm %
		Adult Male – 13 – 17.0 g/dl
		Adult Female – 11.5- 15.0 g/dl
4	Platelet (Thrombocytes)	1.5 -4.5 lacs/mm^3
5	PCV(PackedCell Volume) Hematocrit Value	Males – 40-52 %
		Female – 36-48 %
6.	MCV(Mean Corpuscular Vol)	78-95 femtoliters

7	MCH(Mean Corpuscular Hb)	27-32 picogram
8	MCHC(Mean corpuscular Hb conc)	30 -35g/dl (%)
9	Bleeding Time (BT)	3-6 min
10	Clothing Time (CT)	5-8 min
11	Prothrombin time(PT)	11.1-13.1 sec
12	ESR	By Westergren's Method- Males-- 0-10 mm in one hour Female-- 0-20 mm in one hour
		Wintrobe's Method- Males – 0-7 mm in one hour Female – 0-14 mm in one hour

- ❖ RBCs are destroyed in – Spleen
- ❖ Serum – Plasma-Fibrin
- ❖ Myeloid tissues are Red Bone Marrow
- ❖ Ratio both Myeloid: Erythroid tissue – 3:1
- ❖ Ratio between Fat cells: Blood cells – 1:1

Blood Group:

Prevalence:

- O – 47 % (commonest in world. B^{+ve} in India)
- A – 41 %
- B – 9 %
- AB – 3 %

- ➢ Blood group "O" is more prone to duodenal ulcer, and Hemolytic tendency.
- ➢ Blood group "A" is more prone to Carcinoma stomach, Carcinoma cervix and Thrombosis.
- ➢ Landsteiner's Law is regarding blood group.

Blood Group	Agglutinogen/ Antigen on surface of erythrocytes	Agglutinin/ Antibody in plasma
A	A	Anti B(β)
B	B	Anti A (α)
AB	A & B	NIL
O	NIL	Anti A & Anti B (α&β)

- Blood O^{-ve} - Universal donor.
- AB^{+ve}- Universal recipient.

- For an AB individual, if AB blood group is not available, A is better than B.
- In mismatched blood transfusion, only the donor's erythrocytes are destroyed but the recipient erythrocytes are not harmed.
- During blood transfusion, agglutinogen of the donor and agglutinin of the recipient are given importance.
- RBCs are suitable for transfusion for 3 weeks after collection.
- After transfusion of the body, RBCs become active after 3 days.
- In Rh^{+ve} individual, Rh-antigen is present on RBC membrane and there is no natural antibody for Rh-antigen in serum.
- 93% of Indians are Rh^{+ve}.
- Rh^{+ve} is dominant feature.
- If we give Rh^{+ve} blood to Rh^{-ve} individual then first time there will be no clumping of donors RBC because at that time acceptor does not have antibody to Rh antigen,
- But acceptor starts formation of antibody to Rh antigen in 3-4 weeks and B-lymphocyte gets modified into memory cell.
- If again we give Rh^{+ve} blood to same Rh^{-ve} individual next time, then memory cell rapidly form antibody to Rh antigen and clumping of RBC occur, and it will lead to hemolytic anemia.

Erythroblastosis Fetalis or Hydrops Fetalis:

- If an Rh^{-ve} female marry to a Rh^{+ve} male and if in 1^{st} pregnancy fetus is Rh^{+ve}, then this baby develops in uterus normally and at the time of delivery small amount of blood of fetus gets mixed with maternal blood.
- Mother starts formation of antibody to Rh-antigen within 3-4 weeks.
- If she becomes pregnant second time and baby is Rh^{+ve}then antibody to Rh-antigen crosses placenta and leads to clumping of blood cells of fetus.
- There will be haemolysis of RBC and this disease is known as Erythroblastosis fetalis or Hydrops fetalis.
- This disease is also known as icterus gravis neonatorum because bilirubin gets deposited at basal ganglia in brain.
- Haemolysis and anemia occur due to Rh incompatibility, thus also called as Hemolytic disease in new born (HDN).

PHARMACOLOGY

Dr. Shakti Raj Rai

Definitions

(1) **Pharmacology:** Science of drug which deals with interaction of exogenously administered chemical molecules with living system.
(2) **Drug:** (Drogue - Dry herb) A substance with can modify or explore the physiological system or pathological state for the benefits of the recipient.
(3) **Pharmacokinetics:** Movement of the drug and alteration of the drug by the body. It includes ADME (Absorption Distribution Metabolism Excretion) of drug.
(4) **Pharmacodynamics:** Physiological and Biological effect of the drug and their mechanism of action at macromolecular or sub cellular or organ system level.

(5) **Absorption:** Movement of the drug from its site of administration into the circulation.
(6) **Bio-availability:** It is the fraction of administered dose of a drug that reaches the systemic circulation in the unchanged form (In case of IV the bioavailability is 100 %).
(7) **Bio-transformation:** Chemical alteration of drug in the body.
(8) **First order kinetics:** A constant fraction of drug is metabolized / eliminated per unit time. Most of drugs follow first order kinetics.
(9) **Zero order:** A constant amount of the drug present in the body is metabolized/ eliminated per unit time. Examples – Alcohol, phenytoin, Aspirin, heparin, Phenylbutazone.

(10) **Affinity:** Ability of the drug to combine with the receptors.
(11) **Efficacy:** The maximum response that can be elicited by the drug.
(12) **Potency:** Amount of drug needed to produce a certain action.
(13) **Dose:** Amount of drug needed to produce a certain degree of response in a patient.
(14) **Plasma t½:** Time taken for drug's plasma concentration to be reduced to half of its original value.
(15) **Plateau principal:** When constant dose of a drug is repeated before the expiry of 4 t ½.

(16) **Agonist:** Have both affinity and maximum intrinsic activity (IA=1) e.g. Adrenaline, Histamine and Morphine.
(17) **Partial agonist:** Have affinity and sub maximal intrinsic activity (IA= b/w 0–1). E.g. Pentazocine.
(18) **Inverse agonist:** Have affinity but intrinsic activity with a minus sign (IA=between 0 to -1). E.g. β- carbolines on benzodiazepines receptors.
(19) **Antagonist:** Have affinity but no intrinsic activity (IA= 0) e.g. Propanolol, Atropine and Naloxone.
(20) **Synergism:** Both the drug can have action in the same direction or given alone one may be inactive but still enhance the action of other when given together.
It is of two types – (I) Additive (ii) Supra-additive

(21) **Adverse drug effect:** Any response to a drug that is noxious and unintended and that occurs at doses used in man for prophylaxis, diagnosis and therapy.
(24) **Cumulation:** If rate of elimination is less than rate of administration the drug will cumulate in body. E.g.- digoxin
(25) **Tolerance:** Requirement of higher dose of a drug to produce a given response.
(26) **Refractoriness:** Loss of therapeutic efficacy, which is a form of tolerance, is often called refractoriness.
(27) **Cross tolerance:** Development of tolerance to pharmacological related drug.eg chronic alcoholics show tolerance to barbiturates and general anaesthetics.

(28) **Tachyphylaxis:** Rapid development of tolerance when dose of a drug repeated in quick succession result in marked reduction in response.
(29) **Idiosyncrasy:** Genetically determined abnormal reaction to a drug.eg – primaquine and sulphonamides induce haemolysis in patients with G_6PD deficiency.
(30) **Drug resistance:** Tolerance of micro-organism to inhibitory action anti- microbial.
(31) **Secondary effect:** Indirect consequence of primary action of drug.
(32) **Therapeutic index:** LD_{50}/ ED_{50} = Median lethal dose / median effective dose. It's show safety of drugs.

For a drug to be considered safe – T.I must be > 1; higher the T.I safer will be the drug.

Classification Of Drugs

(1) Parasympathomimetic:

Directly acting –(i) Choline ester: Acetylcholine, Carbachol, Bethanechol.

(ii) Alkaloid (Natural): Muscarine, Nicotine, Pilocarpine

Indirect acting– (i)Carbamates: Physostigmine, Neostigmine, Edrophonium.

(ii) Organophosphate: OFP, Echothiophate, Parathion, Malathion.

(2) Parasympatholytic:

Natural alkaloids: Atropine and Hyoscine.

Semisynthetic and synthetic: Homatropine, Cyclopentolate, tropicamide, Dicyclomine, Propantheline, Mepenzolate, Isopropamide, Glycopyrrolate, Pirenzepine, Ipratropium, Tiotropium, Flavoxate, Oxybutynin, Benzhexol.

(3) Sympathomimetics:

Directly acting –

(i) Non selective: Adrenaline, Nor- adrenaline,Isoprenaline.

(ii)Selective: Phenylephrine, Tizanidine,Dobutamine, salbutamol, Terbutaline, Salmeterol,Formeterol.

Indirectly – Mixed acting: Ephedrine, Dopamine.

(4)Sympatholytic:

α-blocker – (i) Non selective: Phenoxybenzamine ,Dihydroergotoxine.

(ii) α- 1 blocker: Prazosin, Indoramin.

(iii) α- 2 blocker: Yohimbine.

ß-blocker – (i) Non selective: Propanolol, Pindolol, Nadolol.

(ii) ß -1 blocker: Atenolol, Metoprolol.

(iii) ß - 2 blocker: Butaxamine.

α - ß Blocker – Labetalol, Carvedilol.

(5) Sedative and Hypnotics:
Benzodiazepines –
(i) Hypnotics: Diazepam, Midazolam.
(ii) Anxiolytics: Diazepam, Lorazepam, Alprazolam, SSRI.
(iii) Anticonvulsant: Diazepam, Lorazepam, Clonazepam.
Non-Benzodiazepines – Zolpidem.
Barbiturates – **(i) Long acting:** Phenobarbitone, Mephobarbital.
(ii) Short acting: Pentobarbitone.
(iii) Ultra short acting: Thiopental.
Non- Barbiturates – Chloral hydrate.

(6) Antidepressant: (It's a type of anxiolytic inhibitors)
NSSRI – Imipramine.
SSRI – Fluoxetine, Sertraline.
MAO Inhibitors: Clorgiline.
(7) Antipsychotic drugs: (Also called as Neuroleptics)
Chlorpromazine, Fluphenazine, Haloperidol, Clozapine.

- Anxiolytics is called as minor tranquilizers.
- Neuroleptics is called as major tranquilizers.

(8) Mood stabilizers: Lithium carbonate, Sodium valproate, Carbamazepine, Lamotrigine
(9) Muscle relaxants:
Centrally acting – (i) Mephenoin: Mephensin, Chlorzoxazone.
(ii) Benzodiazepine: Diazepam.
(iii) Gaba group: Baclofen.
(iv) Central α- 2 agonist: Tizanidine
Peripherally acting –
(i) On neuromuscular junction: Curare derivatives,Succinylcholine.
(ii) On muscle directly: Dantrolene, Quinine.

MODERN PATHOLOGY

Dr. Shakti Raj Rai

Some Definition:

Hypertrophy	Increase size of cells
Hyperplasia	Increase number of cells. (Nerve cells and glomeruli muscle fibre can't under go hyperplasia).
Metaplasia	Change one type of tissue into another type.
Dysplasia	Reversible change in epithelium due to chronic inflammation or irritation.
Necrosis	Death of cell or group of cells surrounded by living tissue
Necrobiosis	Physiological death of cells due to changes with development
Dysgenesis	Defective embryonic development especially of gonads
Agenesis	Complete absence of an organ or specific cells within an organ.
Gangrene	Massive necrosis with superadded putrification

Important Pathological Features:

Nutmeg Liver	In Chronic Passive Congestion
Sago Spleen	In Focal Amyloidosis
Lardoceous Spleen	Diffuse Amyloidosis
Starry Sky Appearance	In Burkitt's Lymphoma.
Mallory's Hyaline	In Alchoholic Hepatitis
Grey and Red Hepatisation of Lung	In Pneumonia
Onion Skin Spleen	In S.L.E. (Systemic Lupus Erythematus).
Lumpy-Bumpy Basement Membrane	In S.L.E.
Piecemeal and Bridging Necrosis	In Chronic Active Hepatitis.
Sunburn Rash / Nacklace Rash	Pellagre
Flea Bitten Kidney	In Local Glomerulo Nephritis.
Swiss Cheese Endometrium	In Cystic Glandular Hyperplasia
Erythrophagocytosis	In Typhoid
Looser's Zones	In Osteomalasia.

Important Bodies Found in Disease:

Maccallum patches and Aschoff's bodies	Rheumatic fever.
Babes Ernest granule	Diphtheria
Counsilman bodies	Yellow fever and Acute Hepatitis
Donovan bodies	Granuloma inguinale.
Gamma-Gandi bodies gaint cells	Passive Congestion of Spleen
Lewy's bodies	Parkinsonism.
Negri bodies in neuron of brain stem	Rabies.
Gaurnier bodies	Small pox.
Russel's bodies	Multiple Myeloma and Radicular Cyst
L.D. bodies	Kala Azar
Howell Jolly bodies	Splenic atrophy and Megaloblastic anaemia
Warthin- finkeldy giant cells	Measles, S.L.E

Important Incubation Period:

DISEASE	INCUBATION-PERIOD	DISEASE	INCUBATION-PERIOD
Anthrax	1-3 days	Trachoma	5-12 days.
Influenza	1-3 days	Chicken pox and Mumps	2- 3 weeks
Cholera	1-5 days	Amoebiasis	2-4 weeks
Diphtheria	2-5 days	Filariasis	8- 16 days
Plague	2- 6 days	Leprosy	3- 5 years
Dengue	3-15 days	Tuberculosis	weeks to months
Tetanus	4- 21 days	Hepatitis A	15- 50 days.
Pertusis & Polio	7- 14 days	Hepatitis B	60-180 days
Typhoid	10 - 14 days	Hepatitis C	20- 90 days
Measles	10 days	Hepatitis D	30- 50 days
Malaria	14 days	Hepatitis E	15- 60 days

Important Feature Related with Disease:

Cement Kidney	Caseous T.B Kidney.
Frog Face	Nasopharyngeal Carcinoma.
Frog Hand	Deep Palmar Abscess.
Trench Foot	Frost bite.
Madure Foot	Mycotic Infection
Porter's Hand	Bursa between Clavicle and Skin.
Gardener's Hand	Callosity.
Student Elbow	Olecranon Bursitis.
Tennis Elbow	Tendinitis of Lateral epicondyle of Humerus
Golfer's Elbow	Tendinitis of Medial epicondyle of Humerus
Foot Baller's Ankle	Traumatic arthritis of Ankle
House Maid's Knee	Prepatteler Bursitis
Clergyman's Knee	Intra Patteler Bursitis
Signapore Ear or Telephonist's Ear	External Otitis.
Hand Boy Stomach	Scarring of Gastric Ulcer
Leather Bottle Stomach	LinitisPlastica
Weaver's Bottom	Ischial Bursitis
Winter Bed	Post Calcaneal Bursitis
Country Man's Lip	Carcinoma of lip
Policeman's Heel	Inflammation of Fibro fatty tissue of the heels
Dish Face	Congenital Syphilis.
Hippocratic Facies	Peritonitis.

Name of Some Diseases:

Corn	Grain
Boil	Furuncle
Stye	Hordeolum
Sebaceous cyst	Epidermoid cyst
Basal cell carcinoma	Rodent ulcer

SURGERY

Dr. Shakti Raj Rai

Wound

Types of Wounds – closed and open

Closed wounds	Open wounds
Contusion	Incised wound
Abrasion	Lacerated wound
Haematoma	Penetrating
	Crushed wound

Phases of Wound Healing

Inflammatory phase (lag phase) 1) In first 48 hours 2) Histamine is released	Proliferative phase (Collagen phase) 1) b/w 3- 5th day 2) monocytes increases
Remodelling phase (maturation phase) 1) starts from 4- 14 days	Scar formation l

PHASES OF WOUND HEALING

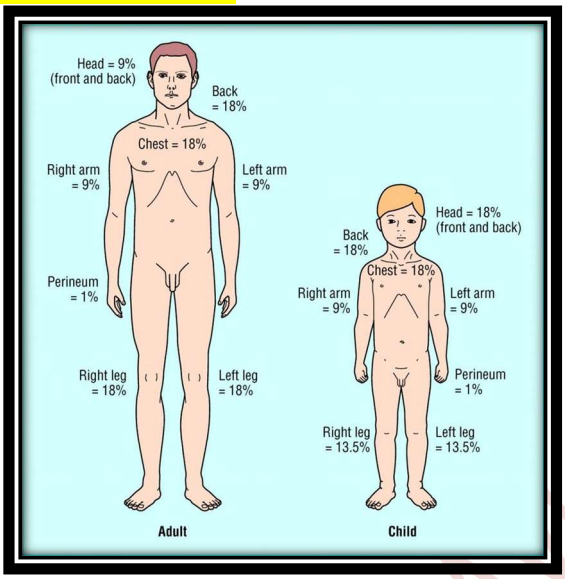
Keloid: Proliferation of immature fibroblast and immature blood vessels.

Burn

- Coagulative necrosis of tissues.
- **Cold burns -** frost bite, chill blains, trench foot, immersion foot.
- **Frost bite**: it can be 1st degree, 2nd degree, 3rd degree and 4th degree- bone gangrene.
- Severity of burn.

1st degree	Hyperemia, edema of epidermis
2nd degree	Epidermis destroyed + vesiculation
3rd degree	Sensory nerve destroyed

Wallace Rule Of Nine for Burn



Hemorrhage

Degree of Hemorrhage:

Factors	I	II	III	IV
Blood loss	<15% (<750ml)	15-30% (750-1500ml)	30-40% (1500-2000ml)	>40% (>2000ml)
Pulse	>100	>100	>120	>140
B.P.	Normal	Normal	↓	↓↓
Pulse pressure	N or ↓	↓	↓↓	↓↓
Capillary refill	<2s	2-3s	3-4s	>5s
Resp. rate	14-20	20-30	30-40	>40
Urine output ml/hr	30 or more	20-30	5-10	Negligible
Mental status	Slightly anxious	Mildly anxious	Anxious & confused	Confused Lethargic

ABCDE of Trauma Case:

Airway	Breathing	Circulation	Disability	Exposure

Varicose Vein

- Dilated, tortuous, elongated superficial veins of the limb.
- **Site:** legs, testicular veins, portal vein, Ano- rectal, esophagus, umbilicus.
- Common in great saphenous vein (50%), short saphenous vein (30%).
- **Etiology:** valve incompetency in limbs.

Deep Venous Thrombosis (DVT)

- **Common site:** veins in calf, i.e. soleus muscle venous sinus.
- **Homan's sign:** dorsiflexion of foot produces pain in calf region.
- **Venography –** is the gold standard method for confirming DVT.
- Doppler USG is also used for its investigation.
- **Other tests:** Morrissey's test, Trendelenburg test, multiple tourniquets, Schwartz' s test, Fegan's test.
- **Surgery:** Trendelenburg's Surgery.

Abscess

Collection of pus in a localized area.

Classification: Pyogenic, Pyemic, cold abscess.

Pyogenic	Pyemic	Cold
Staphylococcal infection t/t – I & D by Hilton's method	Due to pus producing organism	Tubercular abscess. No sign of inflammation

Boils

- Furuncle i.e. hair follicle infection caused by staphylococcal aureus.

Carbuncles

- Infective gangrene of subcutaneous tissue.
- Common in – diabetic patients.

Erysipelas

- It is a superficial bacterial infection, characteristically extends into cutaneous lymphatics.
- Rose pink rashes.
- Pinna can also be involved.

Esophagus

Achalasia cardia: severe spasm of circular fiber of lower end of esophagus.

Barret's Oesophagus: pre- malignant condition of CA oesophagus.

ENT & OPHTHALMOLOGY

Dr. Shakti Raj Rai

ENT

EAR:

External Auditory Canal / External Acoustic Meatus:(2.5cm long).
Outer 1/3rd: Cartilaginous and Contains hair follicles & secreting wax.
Inner 2/3rd: Bony and lacks sebaceous & Ceruminous glands.

Tympanic Membrane / Ear Drum / Drumhead:

- Layers – 3
- Parts – 2 i) Pars tensa
  ii) Pars flaccid (Attic, Shrapnel's membrane)
- Shape – Oval
- Surface – 2 i) Lateral surface – Concave
  ii) Medial surface – Convex
- Eardrum is placed obliquely at an angle of 55^0 with floor at the inner end of ext. auditory canal.
- Common site of perforation of tympanic membrane is Pars Tensa.
- Mobility of eardrum is tested by Siegle's pneumatic speculum.
- Eardrum increases the force of sound by 18 times.

Bones of the Ear: From outer to inner

1) Malleus (Hammer) is largest ossicle measuring 8 mm in length.
2) Incus is also called Anvil.
3) Stapes (Stirrup) is smallest ossicle measuring 3.5 mm in length. It consists of head, neck, foot plate and anterior & posterior crura.

- Main arteries of middle ear are anterior tympanic branch of the maxillary artery.
- Bony labyrinth contains Perilymph.
- Membranous labyrinth contains Endolymph.

It also has 3 parts:

1) Spiral duct of cochlea	Organ of hearing
2) Utricle and saccule	Organ of static balance
3) Semicircular ducts	Organ of kinetic balance

Eustachian Tube:

- 36 mm long in adult
- Outer 1/3rd is bony.
- Inner 2/3rd is cartilaginous.

Disease of Ear:

A.S.O.M.:

- ❖ Cartwheel appearance is seen in catarrhal stage of Acute Suppurative Otitis Media.
- ❖ Light house sign seen in stage of suppuration of A.S.O.M.
- ❖ The eardrum perforates at the stage of suppuration of A.S.O.M.
- ❖ Common complication of A.S.O.M is meningitis.
- ❖ Commonest cause of suppurative otitis media in children is Staphylococcus aureus.

C.S.O.M.:

- ❖ Common complication of Chronic Suppurative Otitis Media is conductive deafness.
- ❖ Commonest site of brain abscesses due to C.S.O.M. is temporal lobe.
- ❖ Multiple tympanic perforation, pale granulation are seen in Tuberculosis Otitis media.

NOSE:

Upper 1/3th of the external nose is bony while lower 2/3 is cartilaginous.

Furuncle or Boil- It is acute infection of hair follicle by staphylococcus aureus in nasal vestibule.

Little's Area or Kiesselbach's Plexus-This is the vascular area in the antero-inferior part of nasal septum just above the vestibule. Commonest site for epistaxis. It is also site for origin of bleeding polyps of nasal septum.

Fracture of Nasal Septum- Jarjavay fracture- horizontally
Chevallet fracture- vertically

- Common cold is also called coryza.
- Atrophic rhinitis is also called- ozaena.

Epistaxis-Bleeding from inside the nose.

1) Anterior epistaxis
2) Posterior epistaxis

Anterior epistaxis	Posterior epistaxis
Most common	Less common
Mostly from Little's area or anterior part of lateral wall	Mostly from posterior superior part of nasal cavity
Mostly occur in children or young adult	After 40 years of age
Mostly caused by trauma	Spontaneous; hypertension/ arteriosclerosis
Usually mild, easily controlled by local pressure or anterior pack	Bleeding is severe, require postnasal pack or hospitalization

Paranasal Sinuses:

- Largest paranasal sinus and commonest sinusitis is Maxillary.
- Rudimentary sinus at birth is Frontal sinus.

- Constant headache is in **anterior sinusitis**.
- Forenoon headache is in **Frontal sinusitis**.
- Afternoon headache is in **Maxillary sinusitis**.
- Retro ocular headache is in **Sphenoidal sinusitis**.

- Commonest malignant tumor is Squamous cell carcinoma.
- Commonest sinus for malignancy is Maxillary sinus.
- Commonest sinus for Polyp is Ethmoid sinus.
- Osteomyelitis in children is spread from Maxillary sinusitis, whenever in adult from Frontal sinusitis.
- Commonest complication in case of Sinusitis is Orbital lesion and in case of CSOM is Mastoiditis.
- Commonest intra cranial complication in case of Sinusitis is Meningitis and in case of CSOM is Brain Abscess.

- Water view is used for examining the **Maxillary sinus**.
- Caldwell's view demonstrates the frontal and **Ethmoidal sinuses**

Deviated Nasal Septum (DNS):

- Common cause of DNS is unilateral nasal obstruction.
- SMR (Sub mucous Resection) operation is done for DNS.
- Septal replacement is done with Asch forceps usually after age of 17 years.
- Nasal bone replacement is done with Walsham's forceps.
- **Cottle test**- It is used in nasal obstruction due to abnormality of nasal valve.

Important Points:

- External auditory canal, Malleus and Incus develops from the first brachial area.
- Canal of Huguier is for chorda tympani nerve.
- Membranous semicircular canals of ear are placed at an angle of 90^0 to each other.
- Semicircular canals respond to the angular acceleration and caloric stimulation.
- Utricle and Saccule lie in the vestibule of bony labyrinth.
- Cochlear duct lies in bony cochlea and is coiled for 2.5 turns around the central bony modiolus.
- The end organ in the cochlea is Organ of Corti and gets stimulated by sound.
- Auditory range of frequency is a 20 – 20,000 cycles/sec.
- Weber test compares Bony Conduction of the two ears useful.
- Schwabach test compares the ABC of patient with that of examiner.
- Furuncle in ear is staphylococcal infection.
- Otomycosis is caused by Aspergillus niger.
- Wax softening agents are Oil, Hydrogen peroxide, Sodium bicarbonate and Paradichlorobenzene.
- Meatal stenosis is narrowing of the external auditory canal.
- Complication of Mastoidectomy operation may be Facial nerve palsy.
- Meniere's disease is Deafness, Tinnitus and Vertigo. (DTV).

GYNAECOLOGY & OBSTETRICS

Dr. Shakti Raj Rai

Important Anatomical Points of Female Reproductive System

External Genitilia: (Vulva/ Pudendum)

1. Mons pubis
2. Labia majora : **(homologous to scrotum in males)**
3. Labia minora
4. Clitoris – 1.5- 2 cm **(homologous to penis in males)**
5. Vestibule : it has 4 openings . 1) urethral opening – 1
2) vaginal orifice - 1
3) Bartholin's duct
4) skene's duct
Hymen shape varies but is usually circular and crescentic in virgins.

Internal Genitilia

1. Vagina

❖ **Walls** = 4 --- anterior – 7cm, posterior – 9cm, lateral (2 in number)
❖ **Fornices** – 4 (posterior is deeper)
❖ **pH** – 4-5 (acidic) due to presence of doderlein bacilli, pH varies with estrogenic activity.
❖ Musculature is developed from the fusion of two mullerian ducts.
❖ Organ of copulation.

2. Uterus

❖ **Angle of anteflexion** - 115^0	❖ **Weight** – 50 – 80gms
❖ **Angle of anteversion** - 90^0	❖ **3 parts** : Body, Isthmus, cervix
❖ **Dimensions** – (8 x 5 x 1.25) cm	

3. Cervix :2.5 cm , Shape :Cylindrical or H shaped

4. **Fallopian Tubes:**(Uterine Duct / Oviduct)

• **Length** – 10cm	• **Each tube has 2 openings:** Uterine ; pelvic
• **Parts-** 4: Intramural – 1.25cm Isthmus- 2.5 cm Ampulla – 5-7cm Infundibulum–1.25cm	

5. **Ovaries**

Shape – oval and pinkish grey in color	**Dimension-** (3x2x1) cm

6. **Breast**
   a) Modified sebaceous glands.
   b) Position – 2nd – 6th rib
   c) Montogomery gland – present at periphery of areola of breast.
   d) Ectoderm – parenchyma
   e) Mesoderm – stroma.
7. **Umbilical Cord**
   a) Comprise of 2 umbilical arteries and 1 umbilical vein
   b) Length = 50cm, diameter – 1.5cm
   c) Constituents of fully formed umbilical cord- epithelium, Wharton's jelly.
   d) Length – 40cm, with usual variation of 30- 100cm
   e) Average diameter – 1.5cm

Changes Of Fetal Circulation at Birth:

S.No.	Structure	Functional Closure	Anatomical Changes
1.	Umbilical artery	At birth	Actual obliteration at 2-3 month
2.	Umbilical vein	Little later than umbilical artery.	Ligamentum teres
3.	Ductus Arteriosus	At birth after establishment of pulmonary circulation	Anatomically obliterated at 1- 3 month; becomes ligamentum arteriosus
4.	Foramen ovale	At birth	1 year
5.	Ductus venosus		Ligamentum venosum

Fertilization

- Site of fertilization- Ampullary part of fallopian tube.
- Fertilizable life span of oocyte- 12 to 24 hours.
- Fertilizable life span of sperm – 48 to 72 hours.
- Decidua- Endometrium of pregnant uterus.

Important Events following Fertilization:

'0' hour	Fertilization	10- 11th day	Interstitial implantation completed
30 hours	2 cell stage (Blastomeres)	6th – 12th week	Placenta formation period
96 hours	16 cell stage (MORULA)	21st – 22ndweek	Fetoplacental circulation
5th day	Implantation (Blastocyst)		

Objective Signs of Pregnancy: (Trimester Wise)

1st Trimester			
S.No	**Sign**	**Changes**	**Week**
1.	Goodell's sign	Cervix becomes soft and bluish discoloration on speculum examination (due to ↑ vascularity)	6th
2.	Jacquemier's sign/ Chadwick's sign	Dusky hue of ant. Vaginal wall (due to local vascular congestion)	8th
3.	Osiander's sign	Increased pulsation felt through lateral fornices	8th
4.	Palmer's sign	Regular rhythmic contractions can be felt during manual examination.	4- 8th
5.	Hegar's sign	An abdominal and vaginal finger seems to appose below the body of uterus.	6- 10th
6.	Piskacek's sign	Asymmetrical enlargement of uterus due to lateral implantation.	6- 8th

PEDIATRICS

Dr. Shakti Raj Rai

Vaccination Schedule

The **vaccination schedule** under the **UIP**–

1.	BCG (Bacillus, Calmette Guerin) 1 dose at the Birth (up to 1 year if not given earlier).
2.	DPT (Diphtheria, Pertussis, Tetanus Toxoid) 5 doses – Three primary doses at 6, 10 and 14 weeks and two booster doses at 16-24 months and 5 years of age.
3.	OPV (Oral Polio Vaccine) 5 doses – 0 dose at birth, three primary doses at 6, 10 and 14 weeks and two booster doses at 16-24 months and 5 years of age (The first dose is given birth – 15 days as zero dose OPV).
4.	Hepatitis B vaccine 4 dose – 0 dose at 24 hours of birth and three doses at 6, 10 and 14 weeks of age. (The first dose is given birth – 24 hours as zero dose OPV).
5.	Measles 2 dose – first dose at 9-12 months and second dose at 16-24 months of age. (Vit. A, 1st Dose at 9 months with measles 1 ml (1 lakh IU) orally and 2nd dose at 16 months with 2 ml (2 lakh IU) only.
6.	TT (Tetanus Toxoid) 2 doses at 10 years and 16 years of age.
7.	TT – for pregnant woman two doses or one dose if previously vaccinated within 3 years.

The Vaccination Schedule under the UIP

Age	Vaccine	Route of Administration	Dose	Disease Protected Against
Birth	BCG OPV (Dose at birth) Hepatitis-B	Intradermal Oral IM	0.1 ml 2 drops 0.5 ml	Tuberculosis Poliomyelitis Hepatitis-B (Jaundice)
6 weeks	DPT (1st Dose)	IM	0.5 ml	Diphtheria, Tetanus, Pertussis
10 weeks	OPV (1st dose)	Oral	2 drops	Poliomyelitis
14 weeks	Hepatitis-B	IM	0.5 ml	Hepatitis-B (Jaundice)

9 months	Measles	SC	0.5 ml	Measles
16-24 months	DPT OPV	IM Oral	0.5 ml 2 drops	Diphtheria, Pertussis, Tetanus, Poliomyelitis
5-6 years	DT*	IM	0.5 ml	Diphtheria, Tetanus
10 years	TT**	IM	0.5 ml	Tetanus
16 years	TT	IM	0.5 ml	Tetanus
Pregnancy	TT***	IM	0.5 ml	Tetanus

Types of vaccine

Live attenuated vaccines	B.C.G , OPV (Sabin) , measles , typhoid
Killed or inactivated vaccines	MMR, varicella, DPT , IPV (inactivated polio vaccine), Hep A, rabies . **SALK** – killed polio vaccine
Modified bacterial toxins or toxoids	Diphtheria toxoid (DT) and tetanus toxoids (TT)
Subunits	Meningococcal, pneumococcal, hepatitis - B

Schwartz vaccine – for measles

Storage of vaccines

Kept Frozen	BCG, Polio, Measles, yellow fever
Should not kept frozen	DPT, TT, Typhoid, Hepatitis B

Milestones

Age	Gross motor developmental Milestone	Fine motor developmental milestones	Social and adaptive milestones	Language milestones
1 month	-	-	-	Alerts to sound
2 months	-	-	Social smile	
3months	Neck holding	-	Recognizes mother	Coos

4month	-	Bidextrous reach	-	Laughs loud
5months	Rolls over	-	-	-
6months	Sitting with own support (in tripod fashion)	Reaching out objects with one hand, transfer objects	Recognizes strangers	Monosyllabic
8 months	Sitting without support	-	-	-
9 months	Stands with support	Immature pincer grasp, probes with forefinger	Wave bye bye	Bisyllabic
12 months	Creeps well, walk but falls , stands without support.	Pincer grasps mature	Comes when called	1-2 words with meaning
15 months	Walk alone, creeps upstairs	Imitates scribbling tower of 2 blocks	Jargon	
18 months	Runs	Scribbles tower of 3 blocks	Copies parents in task.	8- 10 words vocabulary
2 years	Walk up and downstairs	Tower of 6 blocks, vertical and circular stroke	Ask for food, drinks and toilet	2- 3 words sentence, uses pronouns, " I, Me, You".
3 years	Rids tricycle, alternate foot going upstairs	Tower of 9 blocks , copies circle	Shares toys, know gender.	Ask questions, know full name & gender
4years	Hops on one-foot, alternate feet going	Copies cross, bridge with blocks	Plays co-operatively in a group,	Say song or poem , tell stories