DERMATOLOGY LECTURES–Prof. Dr. Khudair Kh. Al-Kayalli – 2016-2017

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Dermatology:

Definition: It is the branch of medicine that concerned with the diagnosis and treatment of skin disorders .

Dermatologist : Is a physician that concerned with diagnosis and treatment of skin disorders , must have a good knowledge of internal medicine , external factors (chemicals , physicals , plants , animals , microorganisms , radiation ----- etc) and also pay attention to the psyche .

The dermatologists might face at least 2000 different conditions and they treated patients of different ages , from the neonate to the very old one , the conditions ranged from cosmetic problems (e.g. Dry skin) to a variety of acute and chronic diseases . In addition to the clinical work , all dermatologists are involved in teaching of nurses , undergraduate medical students , GPs and trainee dermatologists .

Anatomy : Skin is the largest organ in the body .

Normal human skin consists of three layers :

1. Epidermis (upper stratified squamous cellular layer) .
2. Dermis (middle connective tissue layer) .
3. Subcutaneous layer (panniculus adiposus , lower fatty layer) .

The epidermis joined to the underlying dermis by what is called derma epidermal junction , appears as undulating in section , i.e. the rete ridges of the epidermis project into the dermis , which provides mechanical support for the epidermis and acts as a partial barrier against exchange of cells and large molecules .

There are two main kinds of human skin :

a. Glabrous skin (non-hairy skin) is found on the palms and soles and is characterized by :

* It is grooved on its surface by continuously alternating ridges and sulci in individually unique configuration known as dermatoglyphics .
* It is characterized by a thick epidermis , divided in to several well-marked layers .
* The presence of encapsulated sense organs within the dermis .
* Lack of hair follicles , sebaceous glands and apocrine glands .

b. Hairy skin (hair bearing skin) is found on the other parts of skin , characterized by :

* Absence of dermatoglyphics .
* Thin epidermis with regional variation
* Lacks of encapsulated sense organs .
* The presence of hair follicles . sebaceous glands and in some areas apocrine glands e.g. axilla , groins .

Epidermis :- The normal epidermis is a terminally differentiated stratified squamous epithelium , its thickness is variable from 1.5mm (palm & sole) to 0.1mm (eye lid) . The major cell making up to 95% of the total number is keratinocyte , which move progressively from attachment to the epidermal basement membrane to word the skin surface , forming several well defined layers during its transit . These layers from done up ward are :-

1. **Stratum basale** (Stratum germinativum) :- It is a continuous layer of only one cell thick , but may be 2-3 cells thick in glabrous skin and hyperproliferative epidermis . The cell is small , cuboidal (10-14um) , have large , dark staining nuclei , dense cytoplasm containing ribosome and dense tonofilament bundles (the cell is keratinocyte) .
2. **Stratum spinosum** (Spinous or prickle cell layer) :- This layer is located immediately above the basal cell layer , about 5-10 cells thick , cuboidal in the lower layers and starting to flattened gradually as move up ward , it contains as well as to cytoplasmic structures , a keratohyalin granules (2nm size) , which is more prominent in the upper layers and also contain other lamellated granules (100-200nm in size) called lamellar or odland bodies . Both first and second layers called malpighian layer .
3. **Stratum granulosum** (granular cell layer) :- It is about 1-3 cells thick , small , slightly flattened , contains also keratohyalin granules and odland bodies as well as to the cytoplasmic structures .
4. **Stratum corneum** (Horny layer):- It is about 10-20 cells thick , the outermost layer of the epidermis (the cell called corneocyte) , have lost nuclei and cytoplasmic organelles , become severely flattened , compacted and containing keratin protein filaments , which represent the end result of keratohyalin granules .
5. **Stratum lucidum** ;- Only present in thick palmo-planter skin between the third and fourth layers , still nucleated and may be referred as transitional cells .

There are several types of cellular junctions that link the adjacent keratinocyte , which are responsible for mechanical , biochemical and signaling interactions between cells , these include desmosomes , adherent junctions , gap junctions and tight junctions .

Dermo-epidermal junction :- This is one of the largest epithelial junction in the body , it form an extensive interface between the dermis and epidermis and is continuous with the junction between the dermis and epidermal appendages , it is about 0.5-1um in thickness and acting as a barrier and adhere the dermis to the epidermis and consisting of :-

a. Plasma membrane of the basal keratinocytes , melanocytes , merkel cells and closely related structures including hemidesmosomes .
b. Basement membrane zone : which is immediately beneath the basal plasma membrane and consisting of three layers [lamina lucida , lamina densa and the lamina fibroreticularis (Anchoring fibrils)] .

Dermis:- It is the middle layer bounded externally by its junctions with the epidermis and internally by subcutaneous fat . Its thickness varies from about 5mm on the back and thighs to 1mm on the eye lids and contributes about 15-20% of the total body weight of the human . It provides nutriment to the epidermis and its appendages and cushioning the body against mechanical injuries .

The dermis consists of two layers :-

1. **Superficial papillary dermis** : is a thin layer separated from the epidermis by basement membrane .
2. **Lower reticular dermis :** it represented 9/10 of thickness of dermis , it blends with subcutaneous fat and in certain regions contain smooth muscles (e.g. nipple , penis , scrotum and perineum .

The dermis consists of two structures :-

a. **Ground substance** (matrix) : which consists of polysaccharides and proteins coexist and interact to produce hygroscopic proteoglycan macromolecules , which strongly attract and retain water .
b. **Protein fibers :** which run through and attached to the matrix , it includes the collagen and elastin . There are 17 type of collagen , represents 75% of the dry weight and 18-30% of the volume of dermis , more than 70% is type one collagen and 15% type three collagen . The elastic fibers form an extensive network which intermeshes with collagen fibers .

Subcutaneous layer (Panniculus adiposus) :- Is the fatty layer , located just below the dermis and separated from the rest of the body by vestigial layer of striated muscle called panniculus carnosus .

Blood supply of the skin:- The blood vessels of the skin consists of two plexus :

a. **Cutaneous network** (intermediate plexus): located on the border between the subcutaneous tissue and the dermis , which received arteries from the underlying deep plexus (fascial network , present in fascia lata) . The intermediate plexus gives branches to the various skin appendages and provides ascending arterioles to supply the subpapillary plexus .
b. Subpapillary plexus : located on the border between the papillary and reticular dermis , which it self forms capillary loops in the papillary layer between the ridges of the dermo-epidermal frontier , from these capillary the blood is drained by venules which descend to intermediate plexus .

Lymphatic system :- consists of interconnecting lymphatic spaces arise from terminal bulbs in the papillary dermis and ultimately form the system which drains into the regional lymph nodes , it serves to transport particulate and liquid materials , such as leaked protein from the extravascular compartment of the dermis .

Nerves and sense organs : Are divided into motor and sensory enervation.

A. **Motor enervation :** is autonomic and include both :

*** Cholinergic** (parasympathetic) to eccrine sweat glands .

*** Adrenergic** (sympathetic) to both eccrine and apocrine glands , smooth muscles , arterioles and to erector pili muscles .

B. **Sensory nerve endings :** are originated from posterior root ganglia and when the main nerve trunk entering the subdermal tissue each divided in to smaller bundles , which form groups of networks of myelinated fibers , from which ascending non-myelinated nerve fibers accompanying blood vessels ascend to the superficial dermis and it is of two main kinds :-

1.Corpuscular which embrace non-nervous elements and subdivided in to :-

a. Encapsulated receptors it occurs in the dermis and including :

- pacinian corpuscle – located at the border between dermis and subcutaneous layer .
- Golgi-Mazzoni corpuscle – located in the subcutaneous tissue of the human fingers .
- Krause end bulb – situated in the superficial layers of the dermis .
- Meissner corpuscles – situated in the papillary ridges of glabrous skin .
- Rufini corpuscle – related directly to collagen fibers in digits .

b. Non-encapsulated – is exemplified by Merkel's 'touch spot' which is epidermal in location .

1. **Free nerve ending**s : is derived from non-myelinated fibers , occur in the superficial dermis and overlying epidermis and also supplying the hair follicles .

Histology of the skin :-

1. **Epidermis** - the resident cells are :

- **Keratinocyte** – is the major cell of the epidermis , represented about 95% of the cellular mass and is stratified squamous epithelial cell .
- **Melanocyte** – is pigment producing cell ,dendritic , located in the basal cell layer of about 1/10 , having small dark-staining nucleus , with large clear cytoplasm , it form epidermal-melanin unite (1 melanocyte to 36 keratinocyte) , which synthesis melanin and transformed to the adjacent keratinocytes through dendritic processes .
- **Langerhan's cell** – also it is a dendrite cell similar to melanocyte , but free from pigment and dopa negative but ATP positive , found in the human epidermis , pilary canals and outer route sheath of the hair follicles . It has lobulated nucleus with clear cytoplasm and contain Birbeck granules , mesenchymal in origin from bone marrow , has an important role in cutaneous immune reactions as a specialized antigen –presenting cell .
- **Merkel cell** – it has a lobulated nucleus and characteristic granules in the cytoplasm and distally embedded in the basal layer , with nerve plate underlies it (touch spot) . There are two hypothesis about its origin , one postulates that they are derived from neural crest and the other assume that they arise in situ i.e. derived from epithelial cells , which is the mostly suggested and its function is a touch sensation .
- **Non specific cell** – (undeterminate cell) it is also dendritic cell of unknown origin and function .

The epidermis – may contain other transient cells i.e. not resident or permanent e.g. neutrophils , lymphocyte , monocyte , eosinophiles ----------etc .

2. **Dermis –** contains resident cells which include :-

- **Fibroblast –** is the basic cell of the dermis , mesenchymal in origin , it is active cells forming and secreting collagen and suspiciously elastic fibers , spindle in shape with abundant cytoplasm , also produce ground substance .
- **Mast cell –** is connective tissue cell , larger than eosinophile and basophile , occur in most of tissues , but numerous in skin , bronchus , nasal mucosa and the gut . It is of two types , mucosal and connective tissue and contains granules . Degranulation of the cell occurs as a result of IgE mediated reaction and results in release of histamine and other mediators , it is hematopoietic stem cell in origin . Mast cells are distributed close to blood vessels , nerves , skin appendages and are most numerous in the subpapillary dermis . Dermal mast cell is ovoid or spindle in shape , mononuclear or occasionally binuclear , rarely show signs of mitosis in normal skin .
- **Histiocyte , macrophage and lymphocyte .**
- **Basophile -** small , round multilobed nuclei , with cytoplasmic granules like mast cell .

Skin appendages are :-

1. Hair follicles .
2. Sebaceous glands .
3. Eccrine glands

4. apocrine glands .
5. Nails .

Functions of the skin :-

1. **Barrier functions –** the skin acts as two – way barrier , it is the function of the epidermis and performed by the stratum corneum and melanin pigment , to prevent the inward and outward passage of water , electrolyte and other physical and chemical substances and microorganisms . The epidermis is impermeable , which is due to the presence of intercellular cement , which is a cornified material produced by odland (lamellar) bodies , present in the keratinocytes from spinous layer up to horny layer . Cement consists of neutral sugars linked to lipids and proteins , free sterols , hydrolytic enzymes and ceramides . An example of disturbance of this function is atopic dermatitis and using of topical therapy .
2. **Temperature regulation –** the skin provides a sensory imputes to thermoregulation to allow heat loss or conservation . This function is performed throw warm and cold sensitive thermoreseptors , distributed over the skin cells , through which an impulse of temperature sense is sent to the hypothalamus , leading to either inhibition of sweating or stimulation of shivering . The rich blood supply of the dermis is the important factor in this mechanisms , the heat loss through the skin surface is by radiation , convection conduction and evaporation . The term **skin failure** is the loss of normal temperature control with inability to maintain the core temperature , failure to prevent percutaneous loss of fluid , electrolytes and protein , which result imbalance and failure of the mechanical barrier to prevent entry of foreign materials , the term was used to bring the attention of non-dermatologists to dermatological emergencies e.g. Steven-Johnson syndrome , TEN, burns , pustular psoriasis , erythroderma , PV, GVHD and EP. Bullosa .
3. **Mechanical functions –** the dermis and subcutaneous fat have a role in the protective functions of the skin against hard blows with blunt objects (due to the collagen and elastic fibers) , this function is lost in Ehlers-Danlos syndrome and striae distencea .
4. **Immunological functions –** it is performed by those cells residing in (keratinocytes and Langerhan's cells) or passing through (T-lymphocytes) the epidermis , as an antigen presenting cells and inducer cells respectively for e.g. ACD .
5. **Sensory and autonomic functions –** sensations of touch , vibration , pressure , change in temperature , pain and itching , both sympathetic and parasympathetic nerves are involved in maintaining of cutaneous homeostasis by regulating vasomotor functions , pilomotor activity and eccrine sweat gland secretion .
6. **Biosynthesis –** vitamin –D synthesis and its effects on calcium and bone metabolism .
7. **Nails and hair –** has cosmetic importance , hair has a role in heat regulation and nails has protective and aid in performing delicate tasks.

8. **Sociosexual communication –** the skin by virtue of its visual appear , smell and feel has an important role in social and sexual communication in humans , as dose in other animals .

Embryology (origin) of the skin :-

The skin arises by the Juxtaposition of two major embryological elements , the **prospective epidermis** , which originates from a surface area of the early gastrula and the **prospective mesoderm** , which is brought into contact inner surface of the epidermis during gastrulation , which give rise to the dermis . ***Neural crest*** give rise to the pigment cells . ***Epidermis*** is ectodermal in origin , in about third week of gestation the epidermis consists of no more a single layer of undifferentiated glycogen filled cells , in about 4-6 weeks of gestation two layers of cells formed , periderm (epitrichial layer) and stratum germinativum . The ***periderm*** is a purely embryonic structure and ultimately lost in utero as the true epidermis keratinized beneath it .

- Between 8-11weeks , a middle layer start to form , glycogen abundant in all layers and few microvillus projections occur at the surface of the periderm
- By 12-16 weeks , there are one or more intermediate layers , their cells contain mitochondria , Golgi complexes and few tonofilaments .
- Between 16-26 weeks the intermediate layers increased in number and by 21 weeks keratohylin granules appear in the upper most layer and by 24 weeks the periderm cells start to separate from the embryo , which with lanngo hair , sebum and other materials , they form the vernix caseosa .

Hair follicles and apocrine glands :-

By 9 weeks of gestation hair rudiments occurs in the regions of upper lip and chin of embryo . The first sign of hair follicle formation is a crowding of nuclei in the basal layer of the epidermis , the so called :

1. **Primitive hair germ** (pregerm stage) , which pass rapidly to :
2. **Hair germ stage** – in which the basal cells become high , elongated nuclei and start to grow down ward in to the dermis , at the same time mesenchymal cells and fibroblasts increase in number to form the rudiment of the hair papilla beneath the hair germ , these events forms :
3. **Hair pig stage** – it grows obliquely and the advancing extremity becomes bulbous and gradually enveloping the mesodermal papilla to form :
4. **Bulbous hair pig stage** – which enhanced proliferation and differentiation with down ward growth . The first cells of the inner root sheath began to form above the region of the matrix , the matrix continues to burrow deeper and above the root sheath the inner cells of the follicle grow upwards into the epidermis to form the hair canal . **No** hair follicle formed after birth .

At this bulbous hair pig stage , two epithelial swelling appears on the posterior wall of the hair follicle . The lower one is the bulge to which the erector Pilli muscle becomes attached and the upper is the rudiment of the sebaceous gland . In many follicles a third bud latter appears above the sebaceous gland , which is the rudiment of the apocrine gland , which developed on the scalp , face , chest , abdomen , back , legs , axilla , mons pubis , external auditory meatus , eyelids , circumanal area , areola , labia minora , prepuce and scrotum , where they survive in the adult life .

Sebaceous gland :- at first it arise as solid bud on the posterior surface of the hair pegs and bulbous hair pegs , it's cells contains moderate amount of glycogen , but

soon replaced by droplet of lipid , so the cell become larger and foamy . The differentiation of sebaceous gland started at 13-15 weeks of gestation .

Eccrine gland :- started to develop on the palms and soles at about 3months and on the other parts of the body at 5months . **At 12weeks** of gestation , the eccrine sweat gland rudiment first identifiable as regularly spaced undulations of the stratum germinativum , **by 14-15** weeks the tips of the eccrine gland rudiments have penetrated deeply into the dermis and begun to form the coils and in the overlying epidermis , columns of cells that are destined to form the intaepidermal sweat ducts .

Nail :- begin to develop in the 3rd month of gestation , by 16-18 weeks keratinizing cells form both dorsal and ventral matrices .

Melanocyte :- originate from the neural crest , although neural crest can be identified in the early human embryos , but pigmented melanocytes can not be identified before 4-6 months of gestation .

Langerhan's cell :- is derived from the monocyte – macrophage – histiocyte lineage and enter the epidermis at about 12 weeks .

Merkel cell :- appears at about 16 weeks on glabrous skin , finger tips , gingival , nail bed and other regions .

Dermis :- the dermis and its constituent as well as the subcutaneous fat are mesenchymal in origin . **At about 2months** of gestation both dermis and subcutis are not distinguishable from each other , collagen fibers are evident by the end of the 3rd month . **By 5th** month connective tissue sheath are formed around the hair follicles . **By 22** weeks elastic fibers are first detectable , **by 6-14** weeks 3types of cells have been described in the dermis , stellate cells , phagocytic macrophages and granulo-secretory cells (malanoblast or mast cells) . **By 14-21 weeks** fibroblast are numerous and active .

Dermal-epidermal junction :- by 2nd month the lamina densa of the basement membrane becomes evident and by the 3rd month the hemidesmosomes appears .

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Diagnosis of skin diseases

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As for any other organ system , diagnosis of skin disease involves :-

a. **History .**
b. **Examination .**
c. **Some times additional test .**

Disease definition :- Current definitions of most skin diseases therefore rely on the presence of constellation of clinical , histopathological and some times immunopathological or genetic features .

a. History – is very important for diagnosis of skin diseases , which involving the followings :-

1. **The presenting complain :-**

*** Symptoms are subjective ,** the most important are :-

** **Itching** is the prime dermatological symptom , but may be variously described by different patients , there are individual difference in threshold and perception , as well as type of skin disease and type of itch (weather it is paroxysmal , continuous , night or day itch and aggravating factors) for e.g. itching of scabies , atopic dermatitis .

** **Pain** – type of pain weather it is sharp , burning , stinging ,smarting and with tenderness .

* **Signs** are objective , also called rash or lesion , look for :-

** **Duration –** of the rash (who long the rash was present) .

** **Onset** of the rash weather it is sudden or gradual .

** **Evolution and periodicity** i.e. the progression of the rash for e.g. pityriasis rosea , start with herald patch than secondary lesions appear later on , pre-pemphigoid eczematous lesions and contact dermatitis .

** **Previous episodes –** of similar lesion or other skin lesion , e.g. allergic contact dermatitis .

** **previous therapy –** of any treatment used by the patient , e.g. topical steroid in tinea incognito .

2. General history – which include :-

* **Medical history –** involved present and previous general medical conditions (may have cutaneous features) for e.g. viral or bacterial infection may trigger urticaria , vasculitis , guttate psoriasis and erythema multiforme . Any resent or current systemic medication .

* **Dietary history** – may be important in some individuals for e.g. urticaria .

* **Family history –** may be important if a genodermatosis is suspected (e.g. atopic dermatitis , psoriasis) and in contagious and infectious diseases (e.g. scabies , chickenpox) .

* **Occupation and leisure activities :-** e.g. cement contact dermatitis , hobbies and outdoor work e.g. exposure to sun , cold or to plants allergens .

* **Ethnicity –** several disorders have a predilection to occur in specific racial groups e.g. sarcoidosis in black races , purpura pigmentosa in Japanese .

* **Cultural aspects –** e.g. use of hair pomades and skin depigmenting agents .

* **Geographical factors –**e.g. foreign travel especially if recent may cause skin diseases (due to exposure to environmental agents , dust –borne spores and insect vectors) .
* **Social and psychological factors –** the living conditions , economic status and standard of nutrition , may be relevant both as a guide to diagnosis and treatment advice (e.g. association between cigarette smoking and palmo-planter pustulosis , alcohol intake and psoriasis) , also sexual history is important in some instances and psychological factors may be aggravating or perpetuating the skin diseases or skin diseases may induce psychological troubles .

b. Examination of the skin :-

Most patients referred to the dermatologist have ***objective*** changes (signs or rash) in the appearance or consistency of the skin and less commonly subjective changes (symptoms) are the present complain and most of lesions or eruptions are diagnosed clinically .

The patient should always be examined in a good light , preferably day light and with magnification of lesion if necessary . Ideally the entire skin should be examined in every patient and particularly if the diagnosis is in doubt . Adolescents and elderly people will often deny the existence of lesions other than those presented for examination , either unwilling to undress in the former or have not seen them in the later .

In the examination the followings should be considered :

- **Morphology of individual lesions** (Type of skin lesion and special relationship to each other) .
- **Sit of the lesion –** with specific attention to hair , nails and mucous membrane.
- **Touching of the lesion is important –** to assess the size , consistency and surface of the lesion , wearing gloves for the examination of mouth , genital and perineal region , or in cases of infective or infected dermatosis .
- **Look for the colour of lesion .**

1. ***Morphology of individual skin lesion (nomenclature or glossary) :-*** There are two groups of skin lesions , the primary and secondary .

a. Primary lesions :-

**** Macule (spot or maculae)*** : is variously sized circumscribed changes in skin colour , non palpable less than 1cm in diameter e.g. tinea versicolor .

* ***Patch*** is macule 1cm or larger in diameter e.g. vitiligo .
* ***Papule*** is circumscribed solid elevation with no visible fluid , less than 1cm in diameter e.g. eczema , melanoma , nevus .
* ***Plaque*** is a broad papule of 1cm or more in diameter with flat or depressed surface e.g. psoriasis , eczematous lichenification .
* ***Nodule*** is morphologically similar to papule , but larger than 1cm in diameter , e.g. BCC , large mole .
* ***Tumor*** is soft or firm freely movable or fixed mass of various size and shape , but in general larger than 1cm in diameter , generally it means a neoplasm .
* ***Wheal (Hive)*** is evanescent edematous , plateau – like elevation of various size , shape and surrounded by a flare of macula erythema , it is the prototypic lesion of urticaria .
* ***Comedo (comedone)*** is a plug of keratin and sebum in a dilated pilosebaceous orifice e.g. acne , nevus comedonicus , senile comedone .
* ***Vesicles (Blister)*** is circumscribed , fluid containing epidermal elevation less than 1cm in diameter , pale or yellow in color from serous exudate or red from serum

mixed with blood of variable shape e.g. herpes simplex and zoster , it is either unilocular (single cavity) or multilocular .

* ***Bulla*** is vesicle larger than 1cm in diameter , either flaccid (epidermal) e.g. pemphigus vegetance or tense (dermal) e.g. bullous pemphigoid , cellular contents of bulla may be of diagnostic value . Two signs are related to bullous diseases :

** ***Nikolsky's sign –*** refers to the diagnostic maneuver of putting lateral pressure on unblistered skin in a bullous diseases , having the epithelium shear of (pinching of the skin result in shearing off the epithelium .

** ***Asboe-Hansen's sign –*** refers to the extension of a blister to adjacent unblistered skin when pressure is put on the top of the blister . Both signs are useful in evaluating the severity of blistering (bullous) diseases with a cantholytic features e.g. pemphigus valguris and bullous drug eruption .

* ***Pustule*** is small elevation of the skin containing purulent material (usually necrotic inflammatory cells) , similar to vesicle in shape , whit or yellow in color , or red when contain blood , may originate as pustule or may develop from papule or vesicle .

b. Secondary lesions :- Are lesions not present at the beginning of the disease but developed later on to the primary lesions , which include :-

* ***Scales (exfoliation)*** : are dry or greasy laminated masses of keratin , normally the body skin ordinarily is constantly shedding imperceptible tiny thin fragments of stratum corneum , when the formation of the epidermal cells is rapid or the process of normal keratinization is interfered with pathologic events , the exfoliation results producing scales , which of variable size .

* ***Crusts (scabs)*** – are dried serum , pus or blood , usually mixed with epithelial and some times bacterial debris , greatly variable in size thickness and volume , may be dry or soft friable golden yellow and superficial as in impetigo , yellowish as favus , thick , hard and tough as in 3rd degree burn .

* ***Excoriation and abrasion (scratch marks)*** : is a punctuate or a linear abrasion produced by mechanical means , usually involving only the epidermis but not uncommonly reaching the papillary dermis e.g. scratching of the skin by the finger nails in an effort to relive itching in a variety of diseases .

* ***Fissure (crack or cleft) :*** is a linear cleft through the epidermis or into the dermis may be single or multiple , vary from microscopical to several CM in length , with sharply defined margins .

* ***Erosion*** is loss of all or portion of the epidermis e.g. impetigo , herpes zoster , herpes simplex and after rupture of vesicles , it may or may not crusted , but heals without scaring .

* ***Ulcer –*** is rounded or irregularly shaped excavation that result from complete loss of the epidermis plus some portion of the dermis , and vary in diameter from a few millimeters to several CM , shallow or deep and heal with scaring .

* ***Scar*** – is composed of new connective tissue that replaced lost substance in the dermis or deeper parts as a result of d injury or disease , as a part of normal reparative process , some times the scar is thick hypertrophic or keloidal rather than normal thin and atrophic .

c. Special skin lesions :-

****cyst*** is a circumscribed lesion with a wall and lumen , may contain fluid or solid material **.**

**** Burrow*** is a narrow , elevated , tortuous , channel produced by the parasite of scabies .

* ***lichenification*** is an area of thickened epidermis induced by scratching , with accentuation of the skin lines , so the surface looks like washboard .

* ***Telangiectasia*** is a dilated superficial blood vessels .
* ***Petechiae*** is a circumscribed deposit of blood less than 0.5 cm in diameter .
* ***Purpura*** is petechiae larger than 0.5cm in diameter .
* ***Atrophy*** is loss of tissue from one or more of the epidermis , dermis or subcutaneous tissue .
***** ***Ecchymosis*** (bruise) is a macular area of haemorrhage more than 2cm in diameter .
* ***Erythema*** is redness of the skin produced by vascular congestion or increased perfusion .
* ***Fibrosis*** is the formation of excessive fibrous tissue .
* ***Guttate lesions*** are small rounded or oval lesions distributed as a shower of droplets
* ***Haematoma*** is a localized tumor – like collection of blood .
* ***Pyoderma*** is any perulant skin diseases .
* ***Sclerosis*** is a diffused or circumscribed induration of the subcutaneous tissue , it may also involve the dermis when the overlying epidermis may be atrophic , it is a characteristic feature of scleroderma .

2. **Shape (pattern) of lesion :-** The arrangement of the lesions in relation to each other form the shape or the pattern of the lesion (e.g. grouping of vesicles in herpes simplex a term called herpetiform) , which is often of great significance and may provide an easily recognizable clue to the rapid visual diagnosis . The anatomical factors and mechanism can some time interfered with the shape of the lesions .

Koebner (isomorphic) phenomenon – it is a term applied when localized non-specific trauma locally provokes lesions of a dermatosis which is usually spontaneously present else where and usually in a relatively active or eruptive phase seen in psoriasis , lichen planus , vitiligo , wart .

Reveres koebner phenomenon – is a disappearance of the lesion when exposed to non-specific trauma e.g. wart .

The following shapes may be seen in skin lesions :-

- **Discoid (nummular) –** a filled circle e.g. discoid eczema , psoriasis .
- **Petaloid –** discoid lesions which have merged together seborrheic dermatitis on the trunk .
- **Arcuate –** Incomplete circle – e.g. urticaria .
- **Annular –** open circles with different central skin compared with the rime e.g. tiea corporis , granuloma annular .
- **Polycyclic – circular** which have merged together e.g. psoriasis .
- **Reticulate** – fine lace like pattern e.g. oral lichen planus.
- **Target** – multiple concentric rings e.g. erythema multiform .
- **Stellate** – star shape e.g. lesions of meningococcal septicemia .
- **Digitate** – finger shape e.g. chronic superficial dermatosis .
- **Linear** – star line e.g. koebner reaction , scratch in lichen planus and psoriasis.
- **Serpiginous –** snake like e.g. cutaneous larva migrans
- **Whorled –** swirling pattern e.g. epidermal naevi .
- **Agminate –** clustered e.g. acne agminata (where granulomatous lesions clustered around the eye lids) , agminate naevi is an unusual clustering of melanocytic naevi .
- **Grouped –** is character of some infections e.g. herpes simplex vesicles , mulluscum contagiosum , plane wart , flea bites and lichen planus .
- **Satellite** – a cluster of lesions around a larger central lesion e.g. lymphatic spread of neoplasm such as melanoma , chronic bullous dermatosis of childhood .

- **Confluent** – lesions merging together , locally or widespread e.g. T.V. .
- **Scattered** – disseminated and exanthematous e.g. many drug eruptions , viral exanthemata .
- **Spared** – means area not involved by skin lesion e.g. confluent orange-red erythema of P.R.P. spared by normal skin .

3.**Distribution of lesions (site) :-** The overall distribution of lesions in many dermatoses may be so characteristic , that it is of great assistance in clinical diagnosis. The following factors are important in determining the distribution of dermatosis :-

a. **Anatomical factors :-**

* *Blood supply – e.g. venous eczema .*
* *Skin appendages – e.g. acne , hidradenitis sepurativa .*
* *Type of skin – e.g. palms and soles .*
* *Neural – e.g. herpes zoster .*
* *Regional variation – e.g. erythrasma is usually localized to flexures .*
* *Developmental - e.g. disorders which follows lines of Blaschko .*
* *Others – e.g. polychondritis is restricted to sites where there is cartilage .*

b. **External factors :-**

* *Solar exposure – e.g. photosensitivity .*
* *Chemical exposure – e.g. contact dermatitis .*
* *Infective – e.g. orf .*

4. Colour of skin lesions :- Normal skin colour is due to melanin , haemoglobin and carotenoids , this colour is greatly modified by the scatter of light , which is responsible for example , for the whiteness of the scale and blueness any melanin deep in the dermis . The rang of colours that may be seen in individual skin lesions is enormous (wide) include : black , blue-gray , dark-brown , pale-brown , muddy-brown , purple , dusky-orange , yellow-white yellow-pink , yellow-orange , yellow-green , green , white-ivory , white or pale-pink .

5. Palpation of skin :- Palpation of skin rash or lesions imparts additional information about texture , consistency , thickness tenderness and temperature of the lesions , it involve :

* **simple palpation** – to determine texture .
* **Blunt pressure –** to detect oedema , asses capillary refill .
* **Linear or shearing pressure –** to elicit dermographism or Nikolsky's sign in pemphigus .
* **Squeezing or pinching –** to determine localization , consistency and mobility of lesions (e.g. nodule) .
* **Stretching –** may produce blanching of vascular lesions .
* **Rubbing –** may cause release of chemicals , e.g. rubbing of mastocytoma cause urtication and flare due to release of histamine (Darier's sign) , rubbing of neuroblastoma causes surrounding pallor due to catecholamine release .
* **Scratching and picking –** e.g. scratching of scales in psoriasis makes the scales appear more silver in colour by introducing air-keratin interfaces , picking off or scratching the scales produces small bleeding points (**Auspitz's sign) .**

6. Additional simple clinical examination :-

* **Wetting the skin –** with water or mineral oil , fills air spaces in scale , allows underlying features to become more visible e.g. in psoriasis , pitted keratolysis , Wickham's striae of lichen planus .
* **Application of heat or cold –** may identify specific physical urticaria , cholinergic urticaria , dysarthria of Raynoud's phenomenon of the tongue .
* **Pinprick sensation –** may be lost in leprosy .

* **Paring the skin –** to distinguish between a wart and a corn .
* **Smell –** may be useful for e.g. anaerobic wound infection .
* **Simple microscopy –** may be diagnostic for hair shaft disorders , head lice (nits) and hair cast (dandruff) .

c. Additional clinical investigations (tests) :-

1. Diascopy –is pressing of the skin lesion by glass slid or (more safely) a stiff , clear, colourless piece of plastic to compress the blood out of small vessels to allow evaluation of the colours – e.g. in lupus valguris (T.B.) – a translucent brownish colour known as apple jelly nodules , veavus anemicus .

2. **Wood's light –**is a source of ultraviolet light from which virtually or visible rays have been excluded by a wood's (nickel oxide) filter , used in :-

* Diagnosis of fungal infection e.g. tinea capitis , acquired from cats and dogs (microsporm canis) give green florescence colour , T.V. – yellow colour .
* Diagnosis of bacterial infection e.g. erythrasma , acne ,give coral pink (porphyrens) , pseudomonas pyocyanea – yellow green .
* Diagnosis of infestation – scabies – florescene solution files burrow .
* diagnosis of porphyrias – urine , feces , occasionally blister fluid , fluoresce in porphyria cutanea tarda , teeth in erythropoietic porphyria , blood in protoporphyria .
* Pigmentary disorders - e.g. vitiligo is accentuated , dermal pigmentation less apparent , detection of ash leaf macule in tuberous sclerosis .
* Detection of drugs and chemicals – e.g. staining of teeth or sebum from tetracycline , nail from mepacrine , detection of photosensitizes on the skin or cosmetics and industrial agents .
* Tumors – red fluorescence can occur in some malignant tumors e.g. squamous cell carcinoma , by conversion of aminolaevulinic acid to protoporphyrin 9 occurs with in tumors .
* Miscellaneous , chromhidrosis –detect lipoucins in sweat by examination of stained clothes , detection of mineral oil on the skin , detection of epidermal turnover .

3.**Clinical microscopy and dermoscopy :-** in which illumination light are applied to the skin surface with a film of oil on the lesion to enhance visibility of subcorneal structures by extension of the use of simple magnification , used for diagnosis of BCC , malignant melanoma , burrows and mites -----etc .

4. **Identification of scabies mites :-** by using needle to extract the mite from the end of burrows and examined under light microscope .

5. **Fine needle aspiration of lymph nodes –**for cytological assessment of lymph nodes and staging of skin malignancy .

Commonly used laboratory tests :-

- Blood tests for haematology and biochemistry .
- Blood tests for immunological studies .
- Skin biopsy for histopathological studies – this may include special staining methods , immunofluorescence studies and immunocytochemistry .
- Other immunological and microscopical studies for bullous diseases e.g. immunoblotting and electron microscopy .
- Bacteriological and mycological studies – may include samples for microscopy and culture , serological tests , PCR (e.g. TB) .
- Cytological examination , usually fine needle aspiration .

* Other additional tests :-

* Ultrasound – US .

* MRI – magnetic resonance imaging .
* Skin testing – e.g. patch test , intadermal injection test , prick test , scratch test .
* Oral provocation tests – for drugs and foods e.g. in urticaria .