Dermatology

Marrow Edition 8

MARROW

Instructions

- Notes are to be used in conjunction with Marrow videos.

Please note:

- The information in this book has been printed based on the transcript of the Marrow videos. This book has to be used in conjunction with the Marrow videos and not as a standalone material.
- The information contained in this book is for educational purposes only. The content provided is not intended to substitute for professional medical advice, diagnosis or treatment.
- This book cannot be sold separately. It has been made available to only select eligible users who have an active subscription to Marrow videos.
- The text, images, slides, and other materials used in this book have been contributed by the faculty, who are subject matter experts. We have merely reproduced them as video transcripts in this book.
- The notes have been consciously designed in a way that is concise and revisable. To ensure this, we have intentionally added only the most relevant modules and images that are needed for you.
- Reasonable care has been taken to ensure the accuracy of the information provided in this book. Neither the faculty nor Marrow takes any responsibility for any liability or damages resulting from applying the information provided in this book.

// ME821-PPL

Contents

BASICS OF DERMATOLOGY : PART 1

----- Active space -----

Skin

00:00:34

Weight : 4–5 Kg.

Area : 1.7 m^2.

Layers of skin :

Outermost to innermost

a. Epidermis : Above dermis.

b. Dermis.

c. Hypodermic : Below dermis.

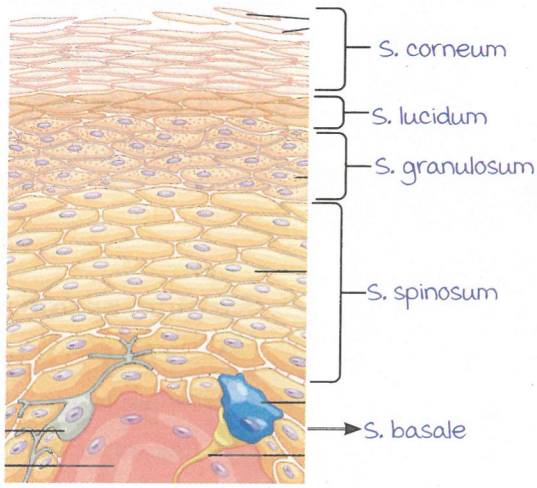
Epidermis

00:01:27

Layers :

From outer to inner.

Histology : Stratified squamous epithelium.



Stratum corneum

- " Stratum " : Layer; " Corneum " : Keratin.
- Shape : Flat.
- Composition : Fully keratinised.
- Nucleus : Absent (Dead protein).
- Function : Barrier function
  - Prevents entry of microbes, allergens, irritants.
  - Prevents exit of dermal fluid (Trans epidermal water loss).

Stratum Lucidum :

- " Lucidum " : Clear.
- Location : Palms & soles.

Stratum Granulosum :

- " Granulosum " : Granule (Prominent).

Types of granules

- Keratohyaline
- Lamellar granules (Odland bodies, cementosomes)

----- Active space -----

Components : Profilaggrin (Inactive) — Lipid

↓

Filaggrin (Active)

(Filament aggregating protein)

Function : Aggregation of keratin intermediate filaments — Barrier function of skin

Disease : D/t mutation of filaggrin — -

- Ichthyosis vulgaris (Vulgaris is m/c).
  (Fish like scales)
- Atopic dermatitis.

Note : " Vulgaris " indicates most common.

Stratum spinosum

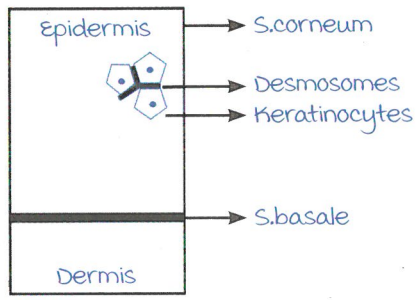
- Spines are most prominent in s.spinosum.
- Spines correspond to protein : Desmosomes.

Desmosomes :

- Intra epidermal intercellular connections.
- Lies between keratinocytes (Cells of epidermis).
- Importance : Autoantibodies to desmosomes

↓

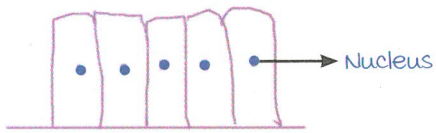
Pemphigus group of disorders



Desmosomes

Stratum basale :

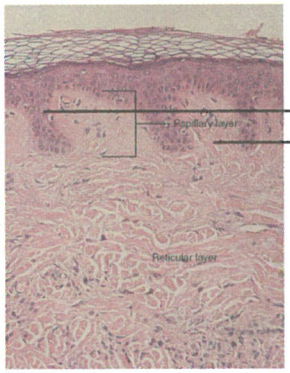
- synonym : S. germinativum.
- Single layer.
- Columnar cells.
- Central nucleus.



S.basale

Note : Malphighian layer : S. spinosum + S. basale.

Rete ridges vs dermal papilla



Rete ridges : Projection of epidermis into dermis

Dermal papilla : Extension of dermis into epidermis

----- Active space -----

Epidermal transit time :

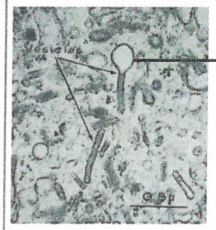
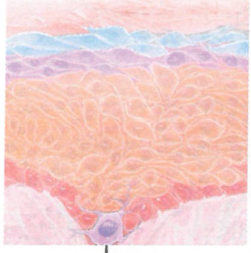
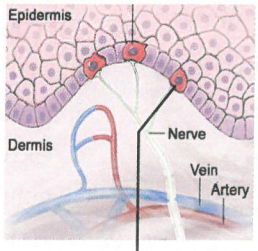
- Cells move from S. basale —(Time taken: 4 weeks)→ S.corneum.
- Psoriasis : ↓ epidermal transit time.

Cells :

Cells

- Keratinocytes (90%)
  - Derived from ectoderm
  - Keratin intermediate filament (KIF) :
    - Hallmark of Keratinocyte.
    - Function : Provide structural integrity.
- Non- Keratinocytes
  - Langerhans cell
  - Melanocyte
  - Merkel cell

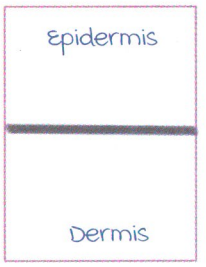
Non Keratinocytes :

	Langerhans cell	Melanocyte	Merkel cell
Location	S. spinosum	s. basale	s. basale
Embryology	Mesoderm (Bone marrow)	Neural crest	Ectoderm
Content	Birbeck granules	Melanosomes	Neuro secretory granules
Function	Antigen presenting cells (APC) : Dendritic langerhan cells present antigens to T cells in lymph node.	Tyrosine (Aminoacid) → Melanin (Protection from UV light)	Fine touch Mechano receptors (Slow adapting, low threshold)
markers for diagnosis	• S100, CD1a, CD 207 (Langerin) : Most specific. • Dx of LCH.	• S100, HMB 45, Melan A. • Dx of melanoma.	• Cytokeratin 20. • Dx of merkel cell carcinoma.
Additional points	Dendritic cell	Dendritic cell	
Image	 Tennis racket apperance Birbeck granules (Electron microscope)	 Melanocyte	 Merkel cell

----- Active space -----

Dermo epidermal junction (DEJ) :

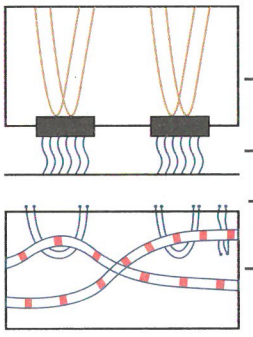
- Synonym : basement membrane zone (BMZ).



BMZ/DEJ : Connects epidermis to dermis.

Layers :

1. Hemidesmosome – KIF complex.
2. Lamina lucida.
3. Lamina densa.
4. Sublamina densa.



Basement membrane zone

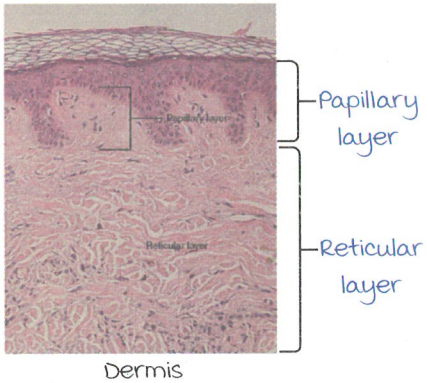
Dermis

00:19:01

Types :

Dermis

Features	Papillary dermis (10%)	Reticular dermis (90%)
Histology	Contains dermal papilla	Mesh-like network
of collagen	Loosely arranged	Dense, irregular
	Thin fibres	Thick fibres



Dermis

Content :

Contents

- Connective tissue
  - A. Collagen fibres : 70% in dermis For tensile strength.
  - B. Elastic fibres : For elasticity & recoil.
- Cells
  - A. Fibroblasts : Principal cells production of extracellular matrix, collagen fibres.
  - B. Mast cells : Perivascular location (Around dermal capillaries).
  - C. Macrophages.
  - D. Dermal dendrocytes.
- Ground substance
  - Glycosaminoglycans
- Vasculature & Nerve (mechanoreceptors)
- Appendages
  - Hair.
  - Nail.
  - Sweat gland.
  - Sebaceous gland.

Collagen :

----- Active space -----

- m/c tupe of collagen : Type I > Type 3.
- Type of collagen in cartilage : Type 2.

Hypodermis

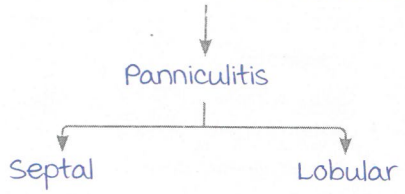
00:23:12

Overview :

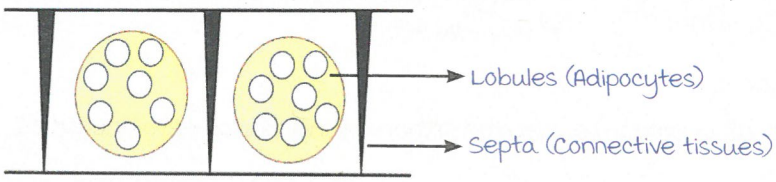
- AKA subcutaneons tissue.
- Function : Insulation, Thermal regulation (D/t presence of subcutaneous fat).

Panniculus :

- " Panniculus " : Fat.
- Inflammation of subcutaneous fat.



Structure :



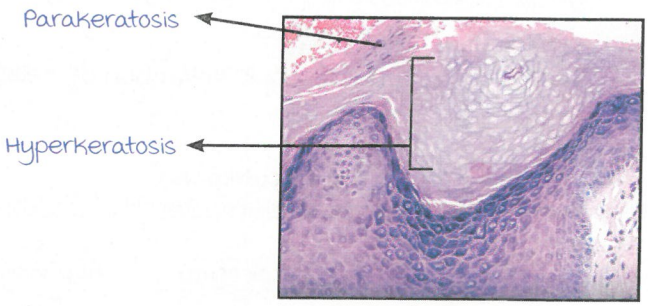
Structure of hypodermis

Dermopathology

00:24:16

S.corneum :

- Thickening : Hyperkeratosis.
- Presence/retention of nucleus : Parakeratosis.



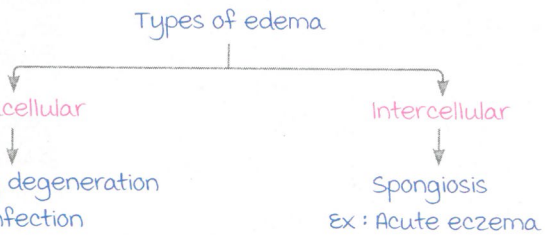
S.corneum

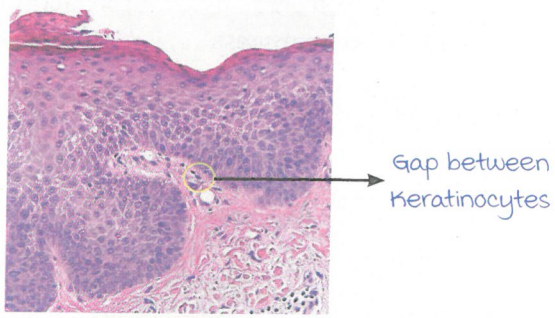
S. granulosum :

- Wedge shaped hypergranulosis : Lichen planus.
- Absent /decreased granular layer :
  a. Psoriasis.
  b. Ichthyosis vulgaris.

S. spinosum :

Edema :

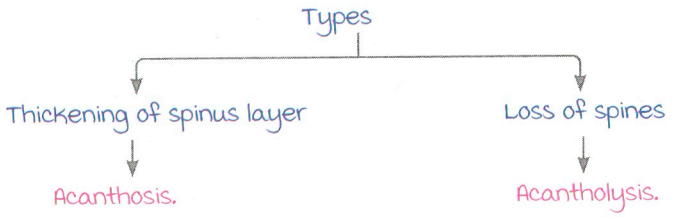




Spongiosis

----- Active space -----

Layers :

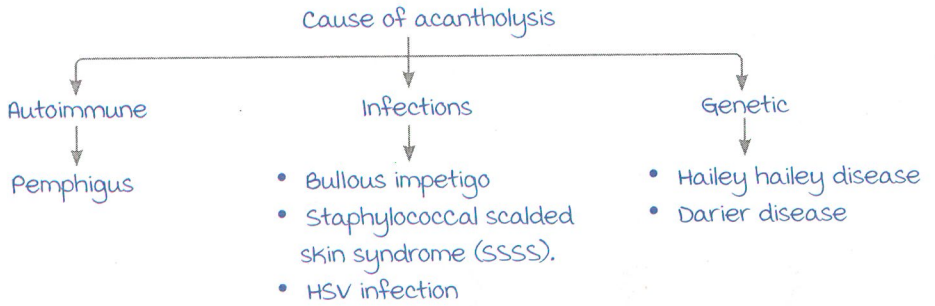


Acantholysis :

- Pathology : Loss of attachment b/w Keratinocytes.

Polyhedral Keratinocytes $\xrightarrow{\text{Loss of desmosomes}}$ Circular Keratinocytes.

- Circular Keratinocytes have prominent nucleus.
- Called as tzanck cells /acantholytic cells.

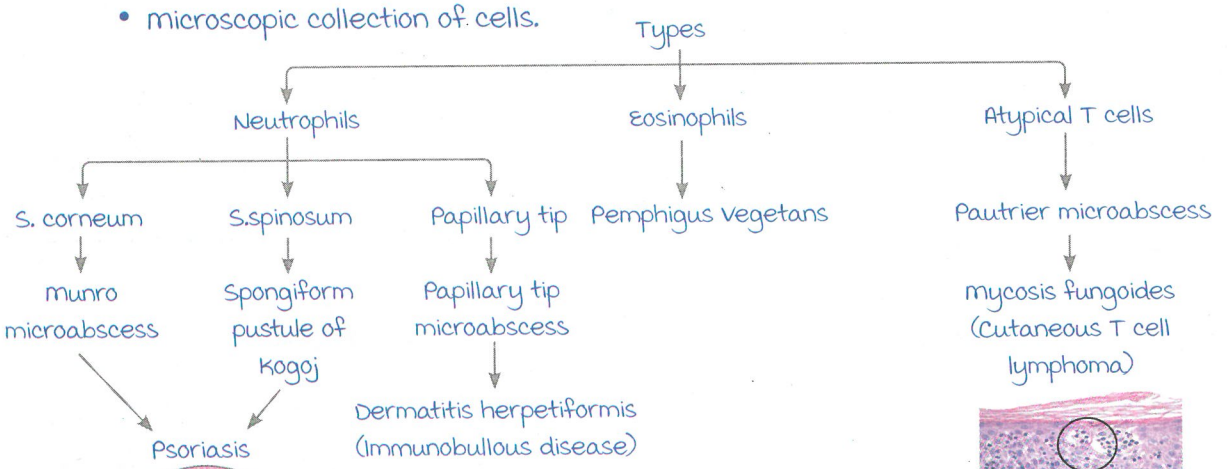


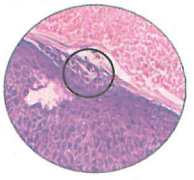
Dyskeratosis :

- Abnormal, premature, keratinisation of individual keratinocytes.
- Ex :
  - Bowens disease (Carcinoma in situ).
  - Darier disease.
  - Squamous cell carcinoma.

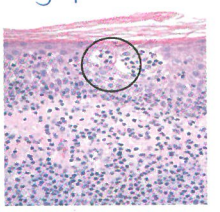
Microabscess :

- Microscopic collection of cells.





Munro microabscess



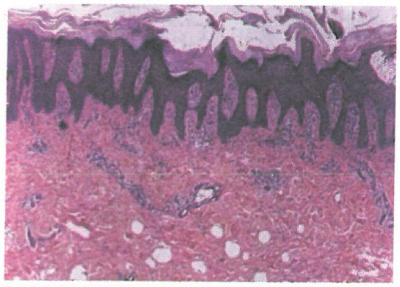
Pautrier microabscess

Rete ridges

----- Active space -----

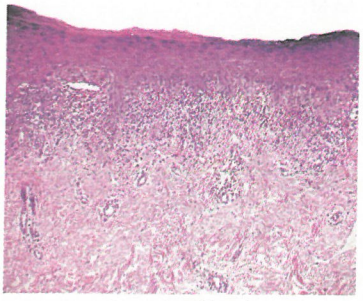
2 appearances

- Regular elongation : Psoriasis



Regular elongation

- Saw toothed appearance : Lichen planus



Saw toothed

----- Active space -----

BASICS IN DERMATOLOGY : PART 2

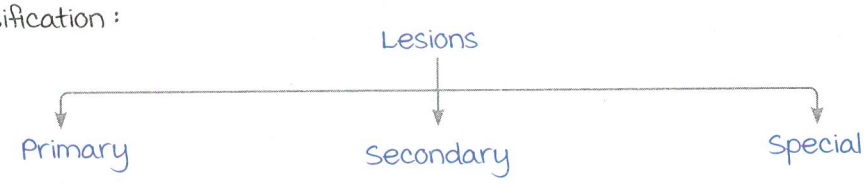
Principles of clinical diagnosis :

- Morphology.
- Configuration.
- Distribution.

Morphology

00:00:38

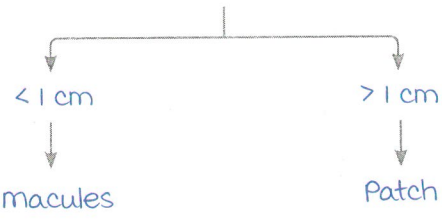
Classification :

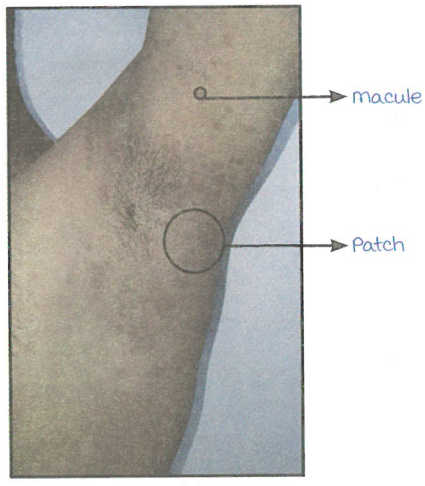


Primary skin lesions :

- Initial skin lesions.
- Non-modified lesions.

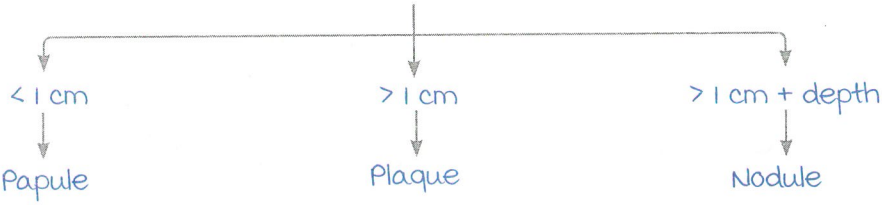
A. Flat non-palpable

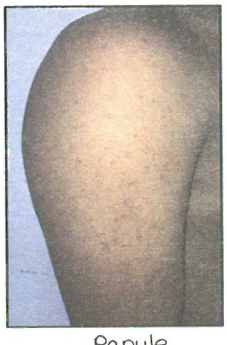




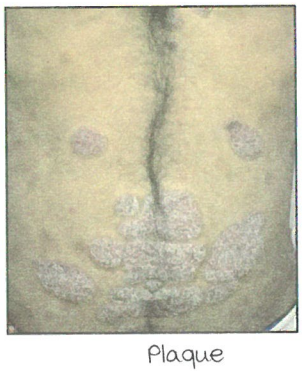
Flat non-palpable lesions

B. Circumscribed, solid, raised lesions

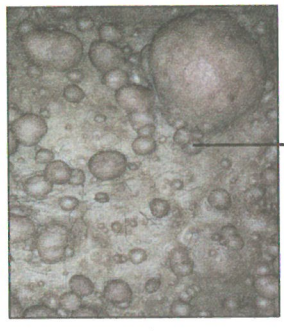




Papule



Plaque

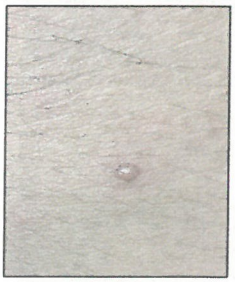


Nodule

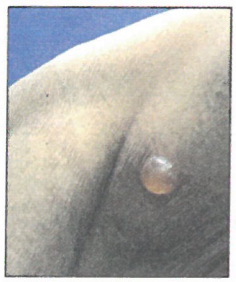
Seen in neurofibromatosis

C. Clear fluid filled lesions

- < 1 cm → Vesicle
- > 1 cm → Bulla



Vesicle



Bulla

Vesicular rash :

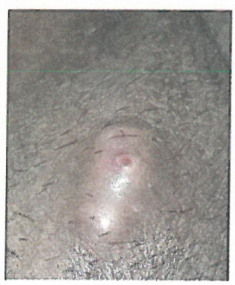
1. Herpes labialis/zoster.
2. Varicella.
3. Hand foot mouth disease.

----- Active space -----

D. Pus filled lesions

- Pin point → Pustule
- Large → Abscess

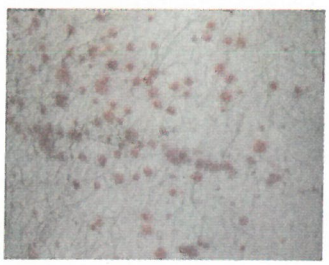
Pustule



Abscess

E. RBC extravasation into skin/mucous membrane

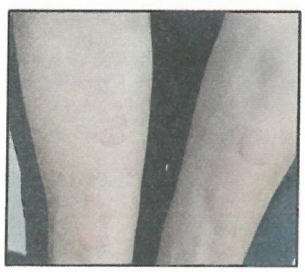
- 1–2 mm → Petechiae
- ≥ 3 mm → Purpura
- > 1 cm → Ecchymoses



Purpura

F. Wheals :

- Plaques which are :
  - a. Pruritic.
  - b. Erythematous.
  - c. Edematous.
  - d. Transient.
- Seen in urticaria

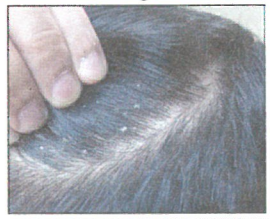
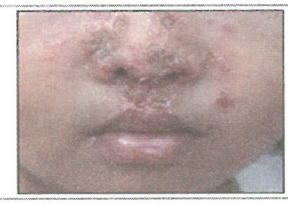
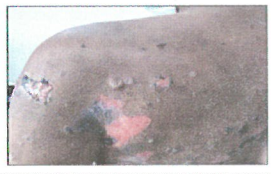
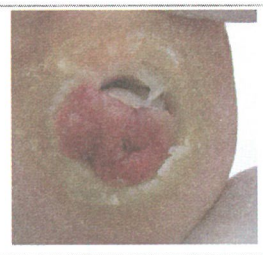
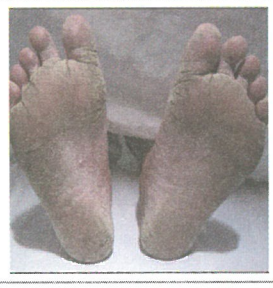
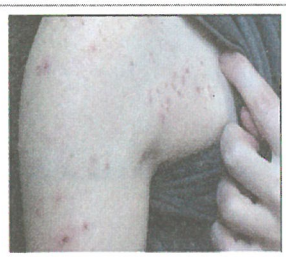
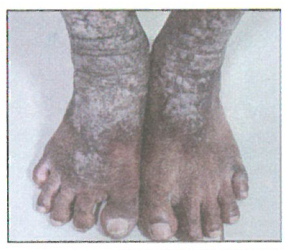


Wheals

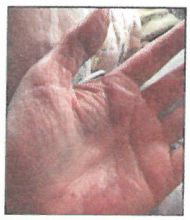
----- Active space -----

Secondary skin lesions :

- Skin lesions modified —D/t→ Itching/treatment.

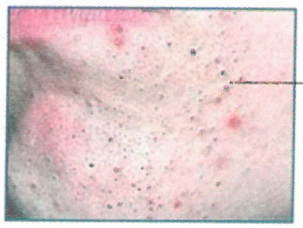
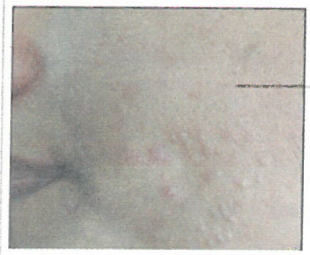
Lesion	Features	Images
A. Scale	• Visible exfoliation of stratum corneum. • Scalp scaling : Seborrhoeic dermatitis, psoriasis.	
B. Crust	• Hard exudate. • D/t drying of serum, pus, blood. • Golden brown (honey color crust) : Non-bullous impetigo.	
C. Erosion	• Focal/total loss of epidermis. • Eg : pemphigus vulgaris.	
D. Ulcer	Loss of epidermis leads to Partial/total of dermis which in turn leads to molecular death	
E. Fissure	• Linear deep cleft in skin. • Eczema.	
F. Excoriation	• Punctate/linear abrasions resulting due to Scratching • Scratch marks	
G. Lichenification	• Thickening of skin. • Hyperpigmentation. • Exagerrated skin markings. • D/t chronic scratching.	

----- Active space -----

Lesion	Features	Images
H. Atrophy	• Decreased/absent structural component of skin. • Clinically : Wrinkling + • Eg : in topical steroid abuse.	

Special lesions :

Specific to a particular disease.

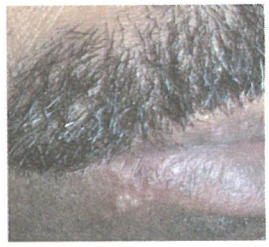
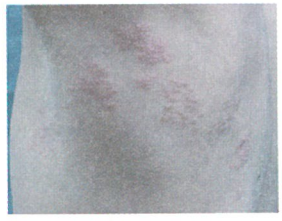
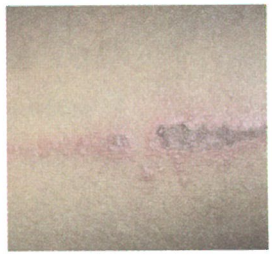
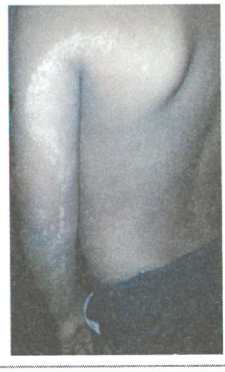
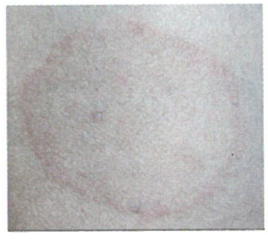
Lesion	Features	Images
A. Burrow	• Wavy, grayish white tunnel. • Level : S. corneum. • Seen in scabies.	
B. Comedones	• Folliculo-centric lesion plugged by sebum + Keratin. • Seen in acne vulgaris. • Types : a. Open comedones : Black in color due to oxidation of sebum b. Closed comedones : White color	 Open comedone  Closed comedone
C. Target lesion	3 zones : • Centre : Dusky red hue. • Intermediate : Pale edema. • Periphery : Erythema. – Seen in Erythema multiforme.	

----- Active space -----

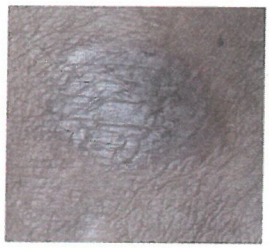
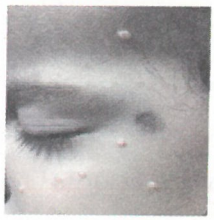
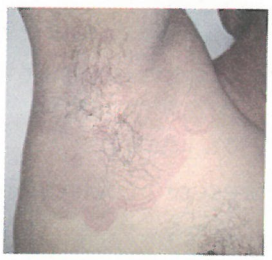
Configuration/pattern

00:13:05

- Refers to arrangement of skin lesion.

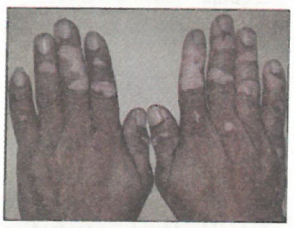
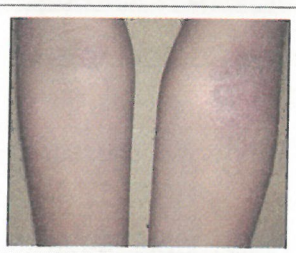
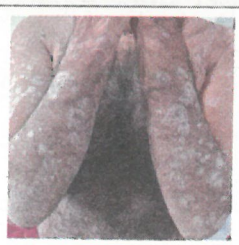
Pattern	Features	Images
A. Grouped	• Clustered. • Seen in herpes labialis.	
B. Dermatomal	• Along area supplied by single nerve. • Seen in herpes zoster, shingles.	
C. Linear	• Line like pattern.	
D. Blaschkoid	• Wavy/whorled.	
E. Annular	• Shape : Ringlike • Centre : Clear. • Periphery : Active. • Seen in : – Pityriasis rosea, – mid borderline leprosy (BB), – Tinea corporis.	

----- Active space -----

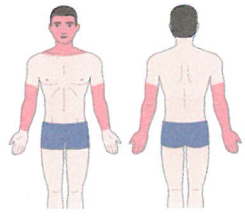
Pattern	Features	Images
F. Discoid/ Nummular	• Shape : Coin. • Centre : Active. • Periphery : Active. • Seen in : – Discoid lupus erythematosus – Discoid eczema.	
G. Discrete	• Individual/separately present	
H. Confluent	• multiple lesions merge together.	

Distribution

00:16:48

Pattern	Distribution	Images
A. Acral	• Extremities	
B. Flexor	• Flexor aspect.	
C. Extensor	• Extensor aspect (Elbows, Knees).	

----- Active space -----

Pattern	Distribution	Images
D. Photodistributed	• Sun exposed areas.	

Lines In Dermatology

00:17:35

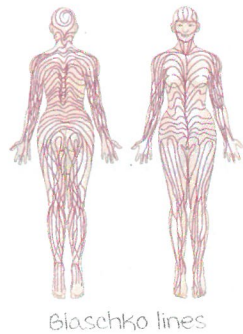
Langer's lines :

- Represent : Skin tension lines.
- Along the orientation of collagen fibres in dermis.
- Importance :
  - a. Surgical incisions are made along these lines.
  - b. Incisions across these lines → Hypertrophic scars.

Langers lines

Blaschko's lines :

- Represent : Epidermal cell migration during embryologic development.
- Patterns :
  - Upper spine : V shaped.
  - Abdomen : S shaped.
  - Lower extremities : Perpendicular down.
  - Scalp : Spiralled.
- Importance : Incontinentia pigmenti (X-linked dominant disease) → Follows these lines.



Blaschko lines

Dermatological Diagnosis and Investigations

00:20:38

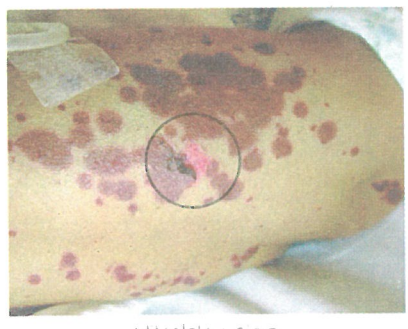
DERMATOLOGICAL SIGNS

Nikolsky sign :

Tangential pressure applied over skin

↓

Upper layer separates from lower layer.



Nikolsky sign

----- Active space -----

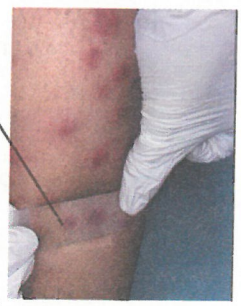
Types of Nikolshy sign

	Nikolsky sign : True	Pseudo
Mechanism :	Acantholysis	Necrosis of keratinocytes
Ex :	1. Pemphigus foliaceus 2. Pemphigus vulgaris 3. Staphylococcal scalded skin syndrome (SSSS)	1. Toxic epidermal necrolysis (TEN)

Diascopy/Vitropression test :

Glass slide pressed over an erythematous lesion

- Blanching response (Vasodilation) → Ex : Erythema
- Non-blanching response (Extravasation of RBC → results in degeneration → Staining of vessel wall) → Purpura

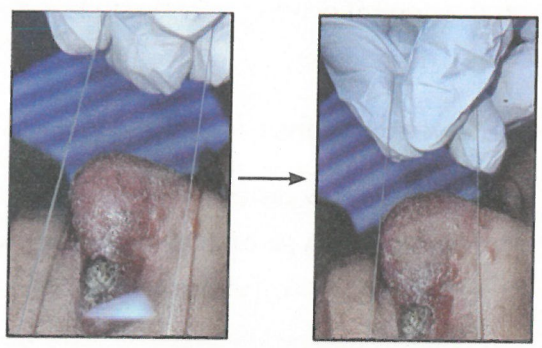


Diascopy test

Apple jelly nodules :

- Yellowish-brown color on diascopy.
- Suggests granulomatous diseases.

Ex : Lupus vulgaris, Sarcoidosis, Cutaneous leishmaniasis.


Apple jelly nodules

DERMATOLOGICAL INVESTIGATIONS

Wood's lamp :

- Outpatient/office procedure.
- Wavelength : 364 nm.
- Filter : 9% Nickel oxide, Barium silicate.


Woods lamp

----- Active space -----

Users of woods camp

a. Infections :

Disease	Organism	Wood Lamp color	Image
Tinea Capitis	Microsporum species → Trichophyton schoenleinii → (causes favus)	Blue/green → Dull blue	
Pityriasis versicolor	Malassezia globosa/ furfur	Yellow color	
Erythrasma	Corynebacterium minutissimum	Coral red (d/t coproporphyrin III)	

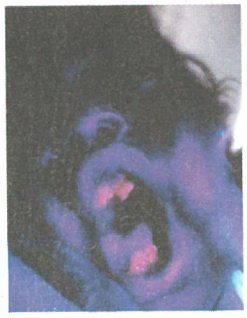
b. Pigmentary diseases :

- Ash leaf macule : Tuberous sclerosis.
- Vitiligo : Milky white fluorescence.
- Melasma.

c. Metabolic diseases :

- Porphyria cutanea tarda : Pink urine.
- Congenital erythropoietic porphyria : Red teeth (Erythrodontia).

Pink urine



Erythrodontia

Lab investigations :

Potassium hydroxide (KOH) mount :

- Sample : Skin scrapings, nail, hair clippings.
- Procedure : Scrape the active border → slide → microscope

Findings :

	Dermatophytosis (Tinea Infections)	Pityriasis versicolor	Chromoblastomycosis (Subcutaneous mycosis)
Findings	Refractile branching hyphae	Short hyphae + round spores Spaghetti & meatballs	Round, brown, thick-walled bodies : medlar/ sclerotic/ copper penny bodies
Images