Assessment of the Integumentary System (Skin, Hair, Nails)

Outlines

- Anatomy and physiology of the skin.
- History
- Physical examination
- Conclusion
- References

Introduction

- The skin is the largest organ in the body.
- Functions of the skin:

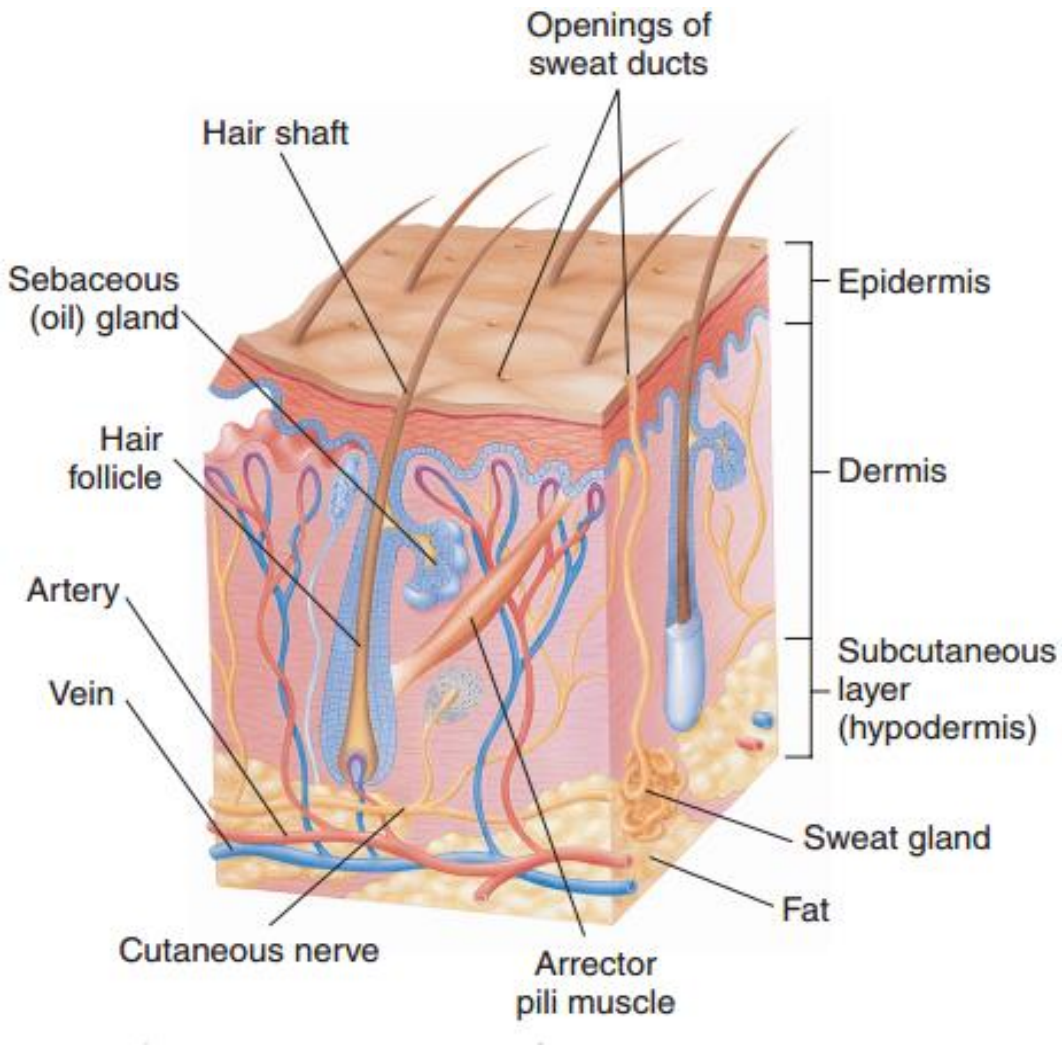
- Provide a protective barrier against irritants, toxins, microorganisms, trauma, ultraviolet (UV) rays, and loss of body fluids.
- Assists in body temperature regulation.
- Helps excrete toxins through sweat glands.
- Vitamin D synthesis occurs in the skin when exposed to sunlight.
- functions as a sensory organ.

- Unique skin properties of each age group.
- The condition of the skin, hair, and nails provides important information about the child’s physical and emotional health.
- Examination of the skin, hair, and nails provides clues to oxygenation, tissue perfusion, nutritional and hydration status of the child.
- Many communicable infectious diseases or infestations have characteristic skin rashes as a manifestation of the illness.
- Child abuse or neglect may also have clinical manifestations of the skin, hair, or nails. Poor
- personal hygiene (e.g., dirty hair or nails) may be an indication of depression or other mental health disorders.

Anatomy and physiology

The skin consists of three layers:

1. Epidermis
2. Dermis
3. Subcutaneous layer



Anatomy of the Epidermis

Dead cells flaking off at the skin surface

Stratum corneum

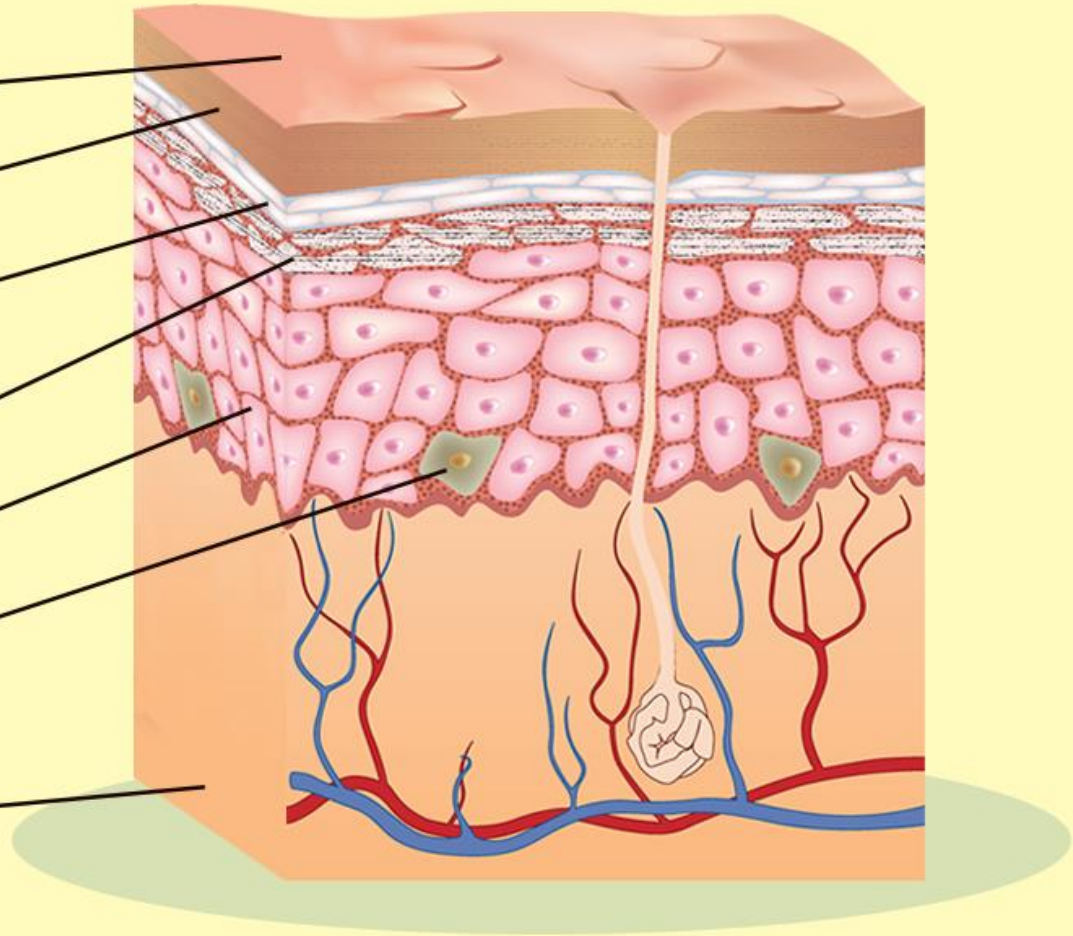
Stratum lucidum

Stratum granulosum

Stratum spinosum

Stratum basale

Dermis



• Epidermis

- The epidermis is the outermost, avascular layer of the skin and is further divided into four or five cell layers.

1. The stratum corneum, the top layer, functions as a barrier, it is continually shed and replaced, every 4 weeks.
2. The stratum lucidum , mostly found in the thick skin of the hands and feet.
3. The stratum granulosum , contains a layer of cells that contain dark-staining granules that are involved in keratin formation.
4. The stratum spinosum assists in the continual production of a new epidermis.
5. The stratum basal (basal layer) , where the new cells are germinated, because it houses keratinocytes ,also contains melanocytes.

Dermis

- The dermis underlies the epidermis
- richly vascular
- supplying the epidermis with nutrition.
- consists mostly of connective tissue, or collagen, which provides elasticity to the skin.
- The dermis also contains blood vessels, lymphatic vessels, autonomic nerve fibers, muscles.
- It includes nails, hair follicles, sweat glands, and sebaceous glands.

Subcutaneous Tissue

- It is composed of adipose and connective tissues and contains blood vessels, nerves, sebaceous glands, sweat glands, and deep hair follicles.
- The subcutaneous layer cushions the body against trauma and maintain body temperature.
- Subcutaneous tissue is a source of energy for the body.

Physiological Variations

- The stratum corneum does not develop until between 23 and 25 weeks of gestation.
- Extremely premature infants are born without this critical top layer of skin. which greatly increases the infant's risk for infection, temperature instability, and fluid loss.
- When an infant is born is covered with a thick, white, cheesy substance called vernix caseosa

Neonates' epidermis is very thin, with little underlying subcutaneous tissue, that’s result in several consequences:

- They lack the ability to shiver to increase body temperature.
- They lose heat rapidly and have difficulty conserving body heat.
- They lose fluid readily, making them susceptible to dehydration.
- Their skin has greater permeability, that’s increased absorption of potentially harmful chemicals .
- The pH of the skin in neonates is basic which makes infants prone to skin infections.
- There is less melanin in the skin at birth, so the skin is lightly pigmented.

- Vascularization of the dermis is well developed by the second year of life.
- Throughout childhood, the hair and skin color changes as the child matures.
- At the onset of puberty, secondary sex characteristics appear in the skin.

SKIN APPENDAGES

- Hair
- Nails
- Sweat Glands
- Sebaceous Glands

Hair

- Hair consists of a thread of keratinized cells.
- Hair consists of a shaft and root.
- Two types of hair can be found on the body.
- Vellus hair is fine, short, pale, and covers much of the body.
- Terminal hair is coarser, longer, and darker than vellus hair and is found on the scalp, eyebrows, pubis, and axillae.
- Hair color and texture vary and are determined by genetics and the type and amount of pigment produced.
- Hair follicles are found over most of the body except for the lips, palms, knuckles, soles, nipples, labia minora, and penis.

- At approximately 36 weeks' gestation, lanugo begins to disappear and is completely gone by 37 to 40 weeks' gestation, except for the upper arms and shoulders.
- In a full-term infant, scalp hair is soft in texture, and often patchy.
- In children, hair grows approximately 1 cm a month.
- At the onset of puberty, coarse hair appears in the pubic area and axilla and, in males, on the face.

Nails

- The purpose of nails is to protect the distal ends of the fingers and toes against trauma.
- The fetus's fingernails should reach the end of the fingertips by 36 weeks' gestation and extend beyond the fingertips by 37 to 40 weeks' gestation.
- Nail plate, appear pink .
- Lunula, base of the nail is a crescent shaped, whitish area.
- Nails are spoon-shaped and thin from birth until approximately 2 to 3 years of age.

Sweat Glands

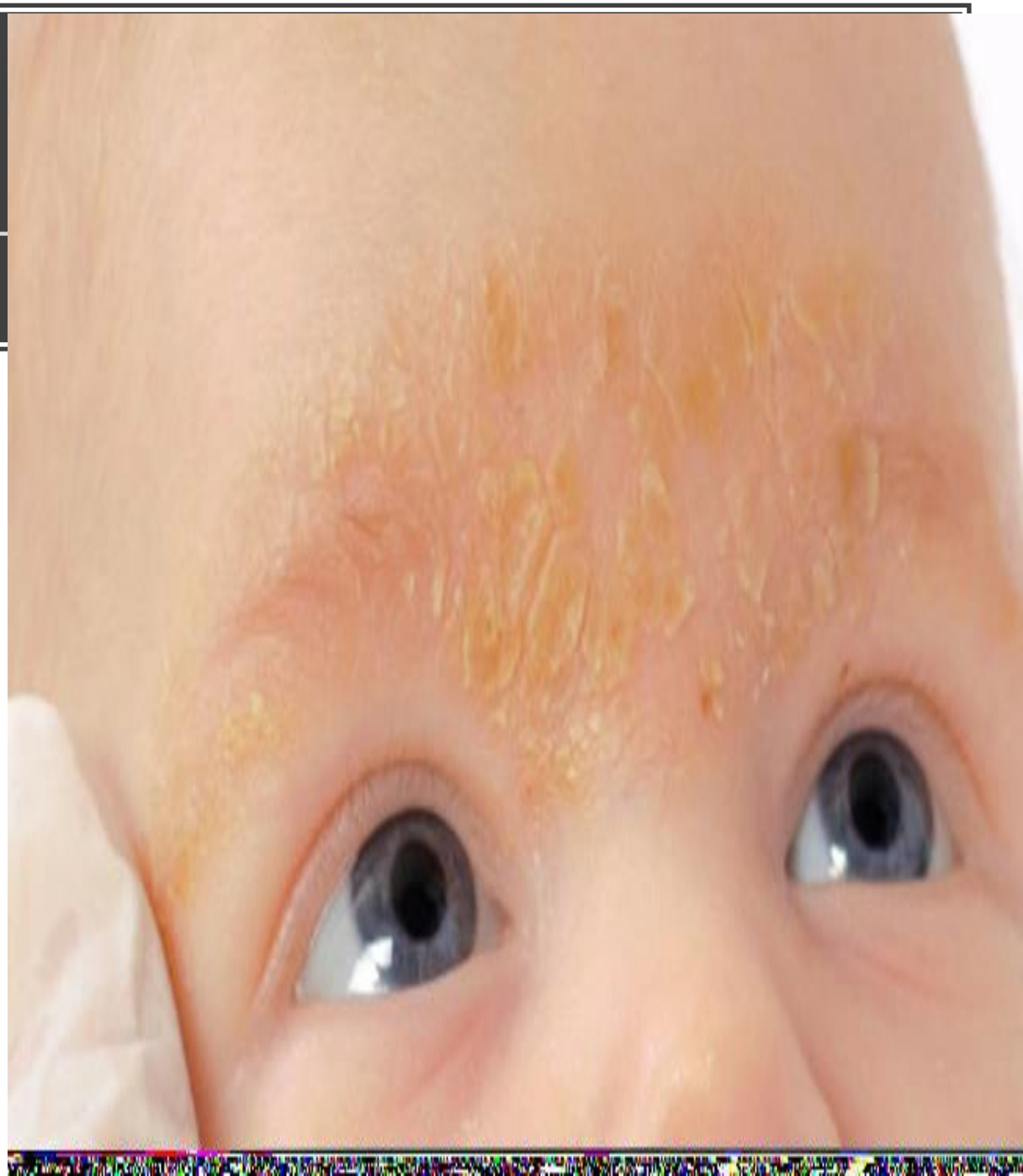
- There are three types of sweat glands: eccrine, ceruminous, and apocrine.
- The eccrine glands are widely distributed throughout the body and open directly onto the skin's surface.
- Ceruminous glands are located in the external auditory canal and produce cerumen.
- Apocrine glands are located primarily in the axillary, genital, and periumbilical regions.

- Eccrine glands begin to function by 2 to 18 days of age but do not fully function until middle childhood.
- Therefore, infants and very young children sweat minimally and are unable to regulate body temperature as efficiently as older children and adults.
- Infants experience palmar sweating in response to heat and emotional stimuli.
- Eccrine glands achieve full function at puberty; boys sweat more than girls.
- Apocrine glands do not become active until puberty.
- These glands secrete a fluid in response to heat or emotional stress.

Sebaceous Glands

- Sebaceous glands are everywhere on the body except the palms and soles.
- The sebaceous glands produce sebum, a lipid substance that is secreted through the hair follicles.
- Sebum keeps the hair from drying, prevents water evaporation from the skin, moisturizes the skin, and is thought to have some fungicidal and bactericidal effects.

- Sebum is present for the first few weeks of life, and its presence produces milia and seborrhea.
- It provides protection against evaporation and drying, interfering with body temperature regulation and skin integrity.
- Sebaceous glands decrease in size and stop producing sebum between 6 and 12 months of age but become active again at puberty when stimulated by testosterone.
- Increased sebum production during puberty makes hair and skin oilier, often causing acne.



HISTORY

Ask about:

1- Nevi (birthmarks), Congenital Skin Lesions

The most common types are:

- pigmented (e.g., café au lait spots, Mongolian spots)
- vascular (e.g., salmon patches, port-wine stains)

caused by a structural abnormality (vascular malformations) or an overgrowth of blood vessels.

- Hemangiomas (Capillary hemangioma, Cavernous hemangioma)

café au lait spots if there are six or more and over 5 mm in diameter, neurofibromatosis may be present.

Mongolian spots

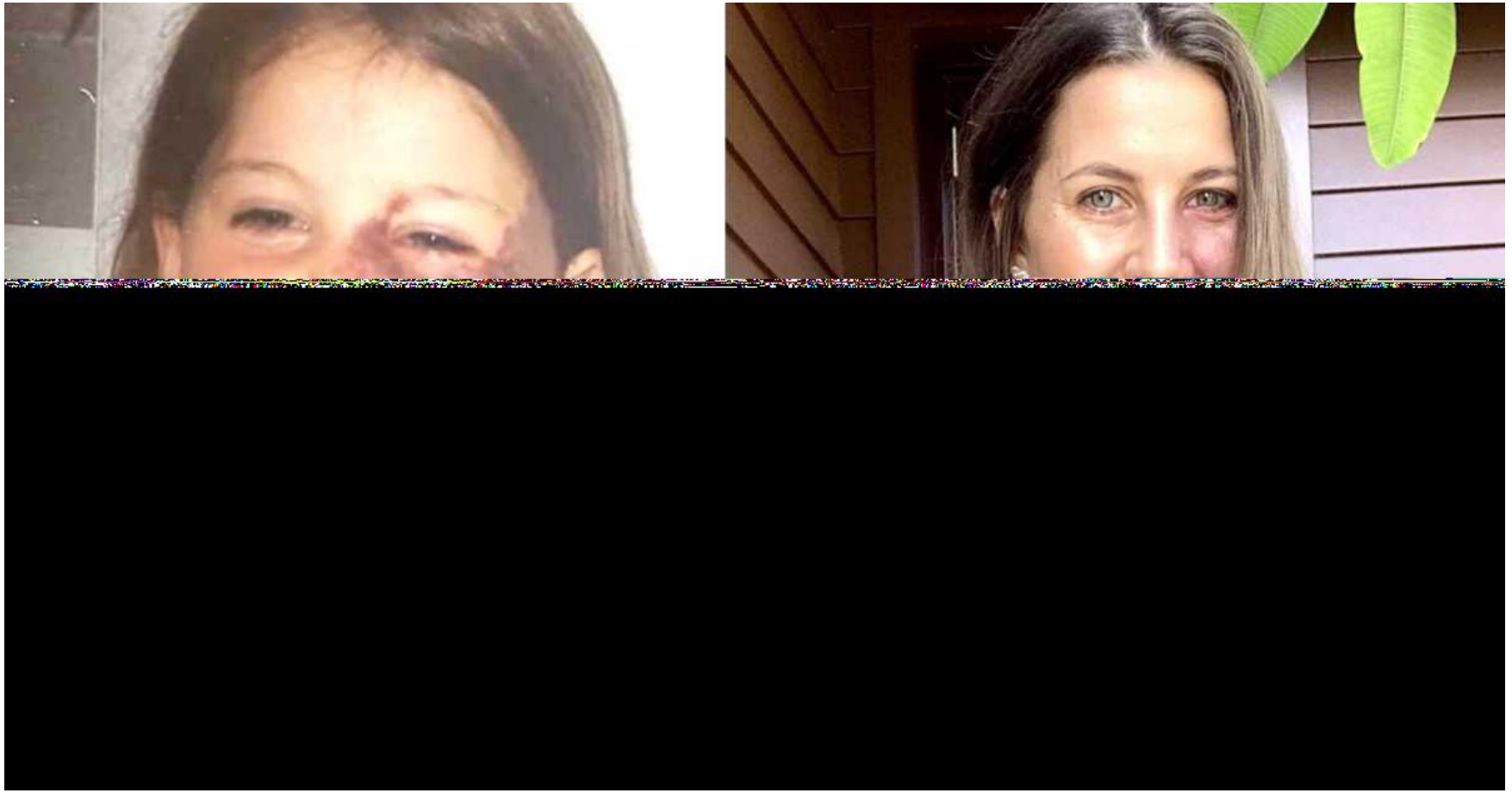
They are noteworthy because they must be distinguished from bruises to rule out child abuse.

salmon patches

are flat, light pink macules that blanch with pressure and fade with time.

Port-wine stains

are permanent dark red to purple macules; they do not blanch with pressure or fade with time. They can be associated with congenital syndromes.



Hemangiomas

is a raised, soft, compressible lesion

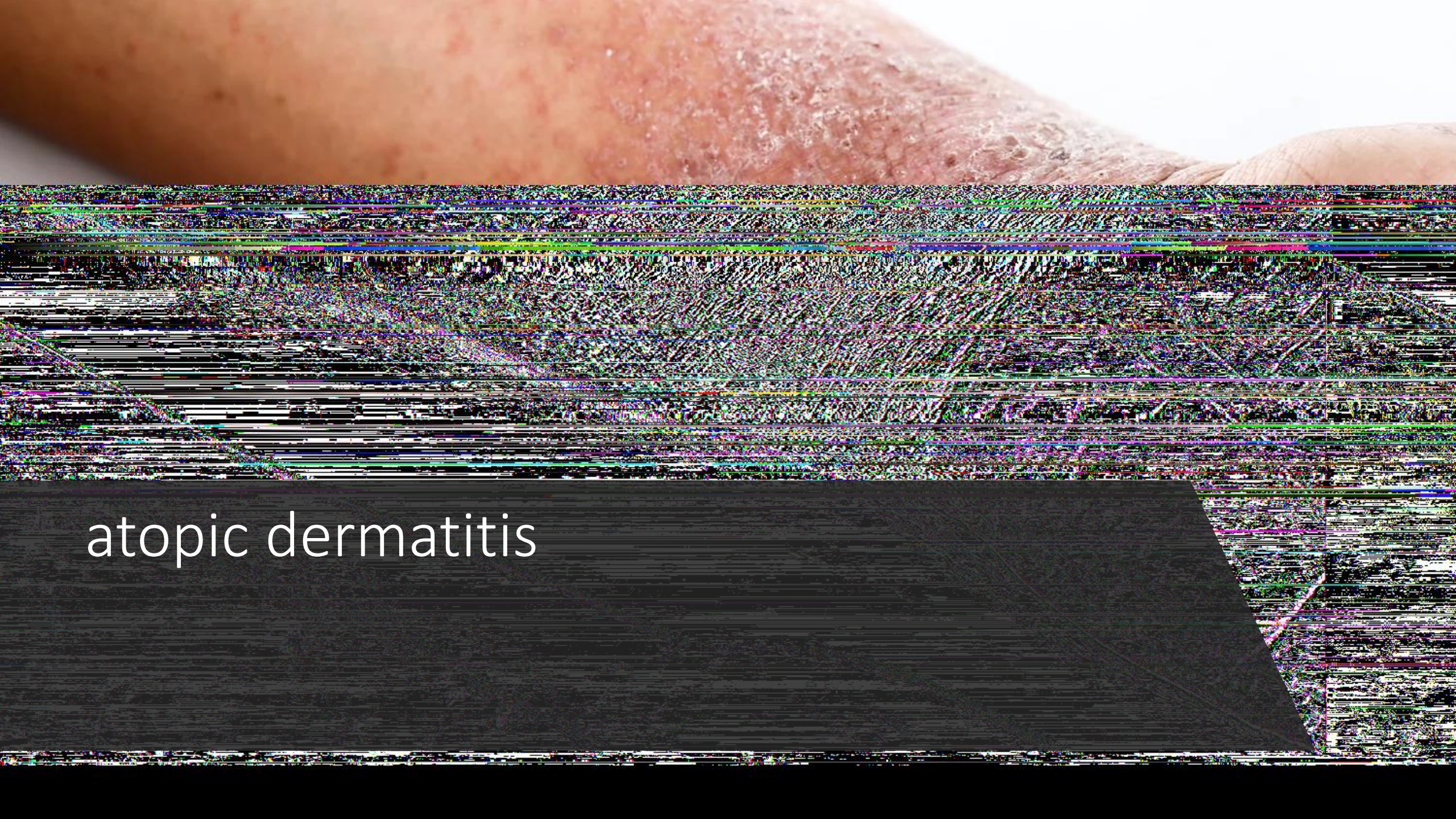
2- Allergies

- Ask about allergies related to the following:

Medications, foods, chemicals, insect bites, animals, plants, and environmental allergens.

3- Family History

- It is focusing on hereditary skin disorders, such as atopic dermatitis (eczema), seborrheic dermatitis, psoriasis.
- Ask about any family history of asthma, allergic rhinitis, environmental or food allergies, persistent rashes, and diabetes.
- A family history of skin cancer should be noted.



atopic dermatitis

4- A history of illnesses, infections, injuries involving the skin, or sensitivity to UV light .

5- skin changes in the neonatal period

6- Habits such as nail-biting.

7- measures used to protect the child’s skin from the sun.

8- current medication.

The provider should also ask about a history of nutritional deficiencies, many of which alter the condition of the hair, skin, and nails. For example, a lack of vitamins C and K may cause bruising, while a deficit of vitamin A may cause dry hair.

Food allergies may also have integumentary manifestations (e.g., rashes, atopic dermatitis, pruritus, urticaria)

key questions are important When a child presents with an integumentary complaint

- Date of onset of rash or lesions, Sudden or gradual?
- Evolution of rash or lesions, Has the rash or lesion changed since its onset ?
- Location of rash or lesions, Is the rash or lesion localized or has it spread? Where is the rash located?
- Quality of rash or lesions, Are there single or multiple lesions? Is it a primary or secondary lesion?
- Associated symptoms, Is there a history of a recent fever, malaise, systemic illness, or weight loss or gain?

- Aggravating factors, What makes the rash worse?
- Alleviating factors, Are any treatments (e.g., prescription or over-the-counter medications, heat, cold, creams, lotions, home remedies) currently being used? If so, what are their effects?
- Presence or absence of itching, Is the itching because of dry skin, atopic or contact dermatitis, insect bites, allergies, infection, infestations (e.g., scabies, lice), or systemic illness such as varicella, or is it a prodrome to an asthma attack? Does it awaken child from sleep? Where does it itch?
- Prior history of similar rash, Could this be a chronic condition such as atopic dermatitis?

- Change in skin or mucous membrane pigmentation, Has the child had extensive sun exposure, which can cause skin color changes?
- Does the child have atopic dermatitis, which can cause excessive itching and lead to skin lichenification?
- Does the child have a cardiac condition, which can cause changes in the color of the skin or mucous membranes?
- Is the child obese (increased brown pigmentation, especially in the folds of the neck and axillae, can indicate insulin resistance.
- History of eating large amounts of yellow fruits or vegetables, Is it possible that diet caused yellow skin pigment change (carotenemia)?
- Hair loss, Does the child have any known nutritional deficiencies? Is there a history of recent weight loss? Does the child pull out his or her own hair, Is the child on chemotherapy?

PHYSICAL EXAMINATION

- The skin is the most easily examined organ because of its size and accessibility.
- Assessment of the integumentary system involves inspection and palpation of the skin, hair, scalp, and nails.
- Palpation is also useful as it enables the examiner to assess the temperature, texture, and turgor of the skin.
- Palpation also aids in assessing elevated skin lesions.
- For example, when examining dark-skinned children and adolescents, inspection alone is often inadequate and palpation is an important part of assessment, especially when keloids form or lichenification occurs.

Skin Inspection

- The provider should evaluate the skin’s color, texture, turgor, and look for edema, rashes, and lesions.
- skin odors may indicate infection, poor hygiene, or neglect.

color

- Assessment of the skin should begin by inspecting the child's skin color.
- Normal skin color varies from pink, yellow, olive green, brown to dark brown or black, depending on the child's race. So, It is essential to know the child's normal skin color to assess for color or pigment changes accurately.
- should be correlated with inspection of the color of the nailbeds, earlobes, sclerae, conjunctivae, lips, and mucous membranes.

Abnormal Skin Color Findings in Children

COLOR	POSSIBLE CAUSES	BEST PLACE TO OBSERVE
Yellow-orange (jaundice)	Hepatitis, hemolytic disease, biliary obstruction, infectious mononucleosis, carotenemia, neonatal sepsis, and chronic renal disease	Sclerae, skin, mucous membranes, fingernails, soles, palms, abdomen; in dark skinned children, inspect palate, palmar surfaces, sclerae; if renal cause, assess exposed skin only(not sclera) .
Blue (cyanosis)	Anxiety, cold temperatures (peripheral cyanosis), and cardiac and respiratory (central cyanosis) problems	Peripheral cyanosis can be observed in the nails, soles, and palms. Central cyanosis is observed in the lips, tongue, and oral mucosa Dark-skinned children may not appear blue when cyanotic but gray or pale.

White (pallor) (Dark-skinned children appear yellow-brown to gray.)	Anemia, shock, syncope, and edema	Face, mouth, conjunctivae, and nail beds
Red (erythema, flushing) (Dark-skinned children may appear purplish.)	Fever, polycythemia, burns, inflammation, infection, allergies, and alcohol consumption.	Face, localized affected area
Absence of color	Vitiligo and albinism	Symmetric white patches (vitiligo); a generalized absence of pigment involving skin, hair, and eyes (albinism)

lesions or rashes.

- Identify the **morphology** of the lesions.
- Primary lesions, develop from previously normal skin.
- Secondary lesions, evolve from primary lesions and are usually because of the child scratching or picking the primary lesions.
- Asses the **color** and **elevation** of the lesion .
- The provider should **measure** the lesion with a centimeter ruler.

Vascular Skin Lesions

TYPE	DESCRIPTION	CAUSES
Ecchymosis (bruise, contusion)	Purple to yellow to green to brown in color, depending on age of injury; irregularly shaped .	Injury or trauma
Hematoma	Accumulation of blood from ruptured blood vessel; >1 cm; bluish-red.	Subdural or epidural hematoma from traumatic injury
Petechiae	Pinpoint hemorrhages, <2 mm in diameter, round and discrete, dark red to purple	Injury, thrombocytopenia, infection, hemophilia, nutritional deficiency, anticoagulants, aspirin, and steroids

Purpura	**Purple flat, macular lesions 2–10 mm in diameter; dark red to purple**	**Vitamin C deficiency, infection, sepsis, meningococcemia, thrombocytopenia, hemophilia; anticoagulants, aspirin, and steroids**
Telangiectasia	Dilated terminal vessels under the skin	Chronic topical steroid use, liver disease
Vascular malformations	Abnormal clusters of blood vessels that occur during fetal development	Examples: Port-wine stain, salmon patch

PRIMARY LESIONS

SECONDARY LESIONS

Primary Skin Lesions

Macule	< 1 cm in diameter, flat, nonpalpable, circumscribed, discolored	Mongolian spot, vitiligo	
Patch	>1 cm in diameter, flat, nonpalpable, irregular shape, discolored	Hypopigmented: vitiligo Brown: junctional nevus	
Papule	< 1 cm in diameter, raised, palpable, firm	Flesh, white, or yellow: flat wart, milium, sebaceous hyperplasia, skin tag Blue or violaceous: venous lake, lichen planus, melanoma Brown: melanoma, nevi Red: acne, cherry angioma, urticaria, eczema	

Nodule	>1 cm, raised, solid	Wart, xanthoma, prurigo nodularis, neurofibromatosis	
Plaque	>1 cm, raised, superficial, flat-topped, rough	Psoriasis, discoid lupus, tinea corporis, eczema, seborrheic dermatitis	

Secondary Skin Lesions

TYPE	DESCRIPTION	EXAMPLES/CAUSES
Atrophy	Loss of epidermis/dermis; may	Striae; consequence of atopic dermatitis or chronic topical steroid use
Crusts	Dried serum, blood, or exudates; slightly elevated; varied color	Impetigo, tinea capitis, atopic dermatitis, varicella, or herpes
Desquamation	Skin peeling in sheets of scales	Poststreptococcal scarlet fever or seborrheic dermatitis
Erosion	Localized loss of epidermis; area often depressed, oozing, and moist; heals without scarring; does not extend into dermis	Herpes simplex, eczema herpeticum, epidermolysis bullosa or aphthous ulcers
Fissure	Linear break in the skin extending into the epidermis and dermis	Dry skin, intertrigo, or contact dermatitis

Lichenification	Thickened epidermis with visible furrows caused by chronic rubbing	Chronic itching or irritation; dry skin, atopic dermatis, or psoriasis
Scales	Thin, exfoliated layers of epidermis	Psoriasis, poststreptococcal scarlet fever, tinea versicolor, pityriasis rosea, or seborrheic dermatitis
Scar	Healed fibrous tissue after a dermal injury; some areas may behypertrophied	Keloid, burns, or acne
Striae	Pink or silver bands, stripes, or lines on skin where skin has been stretched	Obesity, pregnancy, or chronic topical steroid use
Ulcer	Deeper than erosion; loss of epidermis and dermis; varies in size	Decubitus or stasis ulcer

Things that you should consider

- The provider should also inspect the skin for piercings and tattoos.
- Inspection of the skin in adolescents should also include looking for unexplained cuts, burns, bruises, and pinch marks on the body.
- The provider should inspect the skin for needle or “track” marks, which may indicate use of street drugs.

Skin Palpation

- Skin should be palpated to assess temperature, texture, turgor, moisture, perfusion, and edema.
- The skin temperature, should feel warm when palpated.

- cool skin indicate hypothermia, poor localized circulation or Hypothyroidism.
- Hot skin may be result of fever, hyperthermia, hyperthyroidism, infection, or recent sunburn.

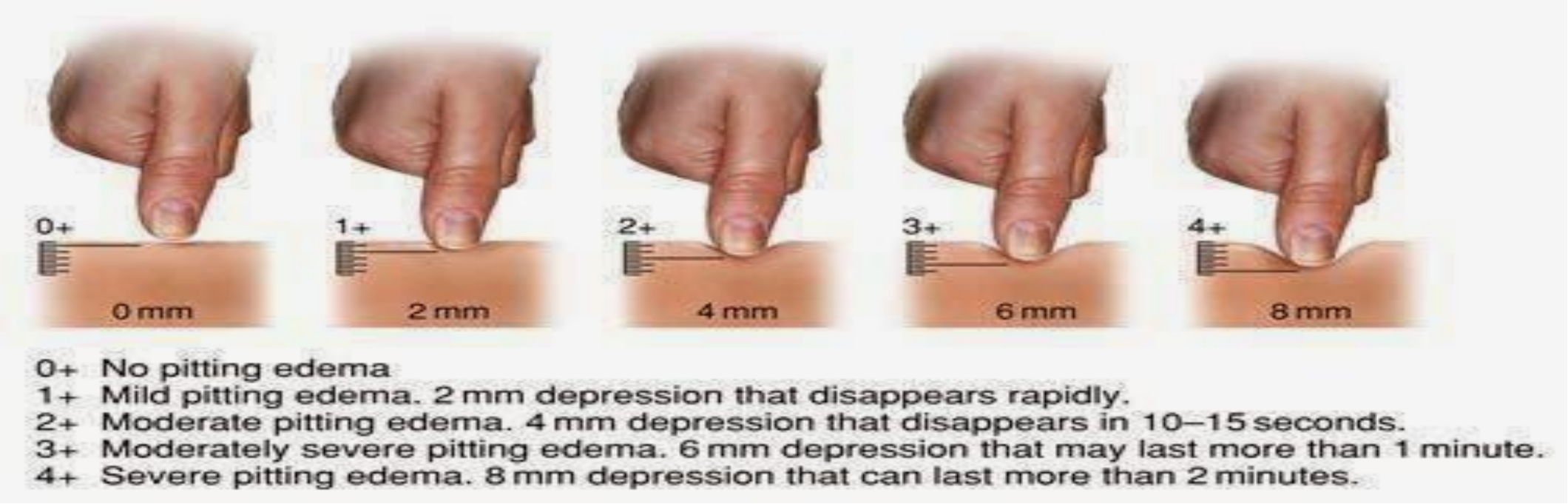
- Normal skin texture in a child is smooth, firm, and even.
- Skin that feels rough may be because of overbathing, poor nutrition, or chronic exposure to cold weather or chemicals or prolonged scratching of a specific area.


lichenification

- skin moisture is normally slightly dry.
- The skin is normally slightly dry.
- Mucous membranes should be moist; dry mucous membranes indicate dehydration.
- Excessive skin dryness may be because of overbathing, poor nutrition, sunburn, chronic exposure to cold temperatures, or hypothyroidism.
- Excessively oily skin is associated with acne in adolescents.

- When evaluating **perfusion**
- the provider should palpate the skin for blanching and capillary refill.
- Assessment of skin turgor
- evaluates the elasticity of the skin.
- Skin that remains folded (i.e., “tenting”) indicates dehydration.
- Skin that has decreased mobility indicates edema.

- Edema is a sign of fluid retention.
- Generalized edema is most serious, likely reflecting a cardiac, hepatic, or renal disorder.
- Periorbital edema in children could be the result of recent sleep, crying, allergies, alteration in renal function, or hypothyroidism.
- Grading of Pitting Edema.



0+ No pitting edema
1+ Mild pitting edema. 2 mm depression that disappears rapidly.
2+ Moderate pitting edema. 4 mm depression that disappears in 10–15 seconds.
3+ Moderately severe pitting edema. 6 mm depression that may last more than 1 minute.
4+ Severe pitting edema. 8 mm depression that can last more than 2 minutes.

Hair: Inspection

- inspecting the hair color, quality, cleanliness, and amount.
- Scalp hair should be shiny, strong.
- lusterless, matted, or has an odor may indicate neglect or depression.
- Hair that is dry and dull can be the result of poor nutrition, hypothyroidism, frequent swimming or shampooing, application of chemicals (hair dyes, bleaches), sun damage, heat from curling irons.
- Hair that is oily or dirty may be a sign of poor hygiene or neglect.
- Any presence of nits (eggs of head lice) on the hair shaft should be noted

Thin hair indicate:

- Poor nutrition
- Abuse or neglect
- Infection of the scalp (e.g., tinea capitis [ringworm], impetigo)
- Hypothyroidism
- Liver disease
- Drug toxicity
- Autoimmune disorders (e.g., alopecia areata)
- Chemotherapy or radiation
- Trictillomania, (chronic hair pulling in a child or adolescent may be a clue to anxiety or compulsive disorders)

- Hair distribution is also important to note when estimating sexual maturity in a child.

-Delayed appearance of body hair may be indicative of hormonal disturbances.

- Increased body hair (hirsutism) could be the result of polycystic ovary syndrome (PCOS), Cushing’s syndrome, testicular or ovarian tumors, and anabolic steroid use.
- Hair tufts over the spine, especially in the sacral area, can indicate spina bifida occulta.

Tinea capitis

- Gray, scaly, well-defined areas with broken hairs.
- It is an intense inflammatory response that, when palpated, is a tender, raised, boggy mass

Hair palpation

- Hair should feel soft or silky.
- Hair that is very fi ne can indicate hyperthyroidism.

Nails Inspection

- inspect the child’s nails for color, contour, thickness, texture, cleanliness.
- Nail beds should be pink, smooth, flat, or slightly convex in shape with uniform thickness.
- Nails that appear white or yellow and thickened can indicate a fungal infection of the nail plate (onychomycosis).
- Cyanotic nail beds can indicate hypoxia.

- concave nail beds may be hereditary or related to trauma, iron deficiency, or infection.
- Clubbing nails, because of Hypoxia.
- transverse nail furrow may indicate acute infection, anemia, or malnutrition.

- Skin that is macerated at the thumb tip signifies chronic thumb-sucking.
- Paronychia, an acute or chronic infection of the epithelium lateral to the nail plate.

Nails Palpation

- Assess time of capillary refill
- Dry, brittle nails can be the result of hypothyroidism or poor nutrition (e.g., calcium, vitamin A, protein deficiency).
- Tenderness of the nail beds indicates inflammation or infection.

Summery

- **Skin,** Color pink without evidence of cyanosis, jaundice, or pallor. Pigmentation even. No nevi. Skin warm, smooth, and dry with elastic turgor. No evidence of edema; no bruising, rashes, or lesions noted.
- Hair, well distributed; black, fi ne, silky, straight.

- clean and shiny; no nits or scalp lesions seen.

- Nails , present on all 10 digits, nail beds pink, not brittle; no evidence of clubbing or other deformities. Capillary refill <3 seconds.

The stigma of skin disease (2019)

Wu, Julie H.a; Cohen, Bernard A.b,c

- stigmatization is a common problem that requires significant attention in pediatric patients with skin diseases.
  Findings:
- The impact of skin disease on psychosocial well being and quality of life.
- some skin diseases are often overlooked medically and considered to be primarily cosmetic issues, the long-term consequences of skin diseases on psychosocial health, especially in pediatric patients, can be profound.
- The precipitating factors for stigma vary widely depending on age, sex, and culture.

- In order to effectively reduce the impact of pediatric skin diseases on psychosocial health, physicians should be able to identify specific characteristics that may increase risks for stigmatization in children.
- Carefully monitoring psychosocial development in pediatric patients with dermatological conditions in addition to proactively guiding patients and families to appropriate resources can benefit the child's development and overall long-term well being (Wu & Cohen, 2019).

Indian Academy of Pediatrics Guidelines for Pediatric Skin Care(2021)

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- **Objective**: To develop standard recommendations for skin care in neonates, infants and children to aid the pediatrician to provide quality skin care to infants and children.
- (Madhu et al., 2021)

Recommendations:

- Vernix caseosa should not be removed.
- First bath should be delayed until 24 hours after birth, but not before 6 hours, if it is not practically possible to delay owing to cultural reasons. Duration of bath should not exceed 5-10 minutes.
- Liquid cleanser with acidic or neutral pH is preferred, as it will not affect the skin barrier function or the acid mantle.
- Cord stump must be kept clean without any application.
- Diaper area should be kept clean and dry with frequent change of diapers.
- Application of emollient in newborns born in families with high risk of atopy tends to reduce the risk of developing atopic dermatitis.
- Oil massage has multiple benefits and is recommended. Massage with sunflower oil, coconut oil or mineral oil are preferred over vegetable oils such as olive oil which have been found to be detrimental to barrier function(Alhumaid et al., 2021).

Newborn Physical Examination

General Appearance

- Posture—Flexion of head and extremities, which rest on chest and abdomen.

COMMON VARIATIONS OR MINOR ABNORMALITIES:

- Frank breech—Extended legs, abducted and fully rotated thighs, flattened occiput, extended neck.

POTENTIAL SIGNS OF DISTRESS OR MAJOR ABNORMALITIES

- Limp posture, extension of extremities

Skin

At birth

- bright red, puffy, smooth

- Vernix caseosa
- Lanugo
- Edema around eyes, face, legs, dorsa of hands, feet, and scrotum or labia
- Acrocyanosis—Cyanosis of hands and feet
- Cutis marmorata—Transient mottling when infant is exposed to decreased temperature.

Common Variations or Minor Abnormalities

- Neonatal jaundice after frst 24 hours
- **Ecchymoses** or **petechiae** caused by birth trauma
- **Milia**—Distended sebaceous glands that appear as tiny white papules on cheeks, chin, and nose
- **Miliaria** or sudamina—Distended sweat (eccrine)

glands that appear as minute vesicles, especially on face

- **Erythema toxicum**—Pink papular rash with vesicles superimposed on thorax, back, buttocks, and abdomen; may appear in 24–48 hours and resolve after several days

- **Mongolian spots**—Irregular areas of deep blue pigmentation, usually in sacral and gluteal regions
- **Telangiectatic nevi** (“stork bites”)—Flat, deep pink localized areas usually seen on back of neck

Potential signs of distress or major abnormalities

- Jaundice appearing in first 24 hr
- Generalized cyanosis
- Pallor
- Mottling
- Grayness
- Plethora
- **Sclerema**—Hard and stiff skin Poor skin turgor
- Rashes, pustules, or blisters
- Café-au-lait spots—Light brown spots
- Nevus flammeus—Port-wine stain

Head

- Fontanels flat, soft, and firm
- Widest part of fontanel measured from bone to bone, not suture to suture.

Common Variations or Minor Abnormalities:

Molding after vaginal delivery

Bulging fontanel because of crying or coughing

Caput succedaneum—Edema of soft scalp tissue

Cephalhematoma (uncomplicated)—Hematoma between periosteum and skull bone

Potential signs of distress or major abnormalities

- Fused sutures
- Bulging or depressed fontanels when quiet
- Widened sutures and fontanels
- **Craniotabes**—Snapping sensation along lambdoid suture that resembles indentation of ping-pong ball

Eyes

- Eyelids usually edematous
- Absence of tears
- Presence of red retinal reflex
- Corneal reflex in response to touch
- Pupillary reflex in response to light
- Blink reflex in response to light or touch
- Rudimentary fixation on objects and ability to follow to midline.

Common Variations or Minor Abnormalities

- Searching nystagmus or strabismus
- Subconjunctival (scleral) hemorrhages— Ruptured capillaries.

Potential signs of distress or major abnormalities

- Pink color of iris
- Purulent discharge
- Upward slant in non-Asians
- Hypertelorism (3 cm)
- Hypotelorism
- Congenital cataract(s)
- Constricted or dilated fixed pupil
- Absence of red retinal reflex
- White reflex (leukocoria)
- Absence of pupillary or corneal reflex
- Inability to follow object or bright light to midline
- Yellow sclera

Ears

- **Position**—Top of pinna on horizontal line with outer canthus of eye
- Startle reflex elicited by a loud, sudden noise
- Pinna flexible, cartilage present.

Common Variations or Minor Abnormalities

- Inability to visualize tympanic membrane because of filled aural canals
- Pinna flat against head
- Irregular shape or size
- Pits or skin tags
- Preauricular sinus

Potential signs of distress or major abnormalities

- Low placement of ears
- Absence of startle reflex in response to loud noise should be evaluated
- Minor abnormalities may be signs of various syndromes, especially renal.

Nose

- Nasal patency
- Nasal discharge—Thin white mucus (transient)
- Sneezing

Common Variations or Minor Abnormalities

- Flattened and bruised

Potential signs of distress or major abnormalities

- Nonpatent canals
- Thick, bloody nasal discharge
- Flaring of nares
- Copious nasal secretions or stuffiness (may be minor)

Mouth and Throat

- Intact, high-arched palate
- Uvula in midline
- Frenulum of tongue
- Frenulum of upper lip
- **Sucking reflex**—Strong and coordinated
- Rooting reflex
- Gag reflex
- Extrusion reflex
- Absent or minimal salivation
- Vigorous cry

Common Variations or Minor Abnormalities

- **Natal teeth**—Teeth present at birth; benign but may be associated with congenital defects
- **Epstein pearls**—Small, white epithelial cysts along midline of hard palate
- Potential signs of distress or major abnormalities
- Cleft lip, Cleft palate
- Large, protruding tongue
- Receding chin (lower jaw): micrognathia
- Profuse salivation or drooling
- Candidiasis (thrush)—White, adherent patches on tongue, palate, and buccal surfaces
- Inability to pass nasogastric tube
- Hoarse, high-pitched, weak, absent, or other abnormal cry

Neck

- Short, thick, usually surrounded by skinfolds
- Tonic neck reflex
- Potential signs of distress or major abnormalities
- Excessive skinfolds
- Resistance to flexion
- Absence of tonic neck reflex
- Fractured clavicle; crepitus

Chest

- Anteroposterior and lateral diameters equal
- Slight sternal retractions evident during inspiration
- Xiphoid process evident
- Breast enlargement

Common Variations or Minor Abnormalities

Funnel chest (pectus excavatum)

- Pigeon chest (pectus carinatum)
- Supernumerary nipples
- Secretion of milky substance from breasts

Potential signs of distress or major abnormalities

- Depressed sternum
- Marked retractions of chest and intercostal spaces during respiration
- Asymmetric chest expansion
- Redness and firmness around nipples
- Wide-spaced nipples

Lungs

- Respirations chiefly abdominal
- Cough reflex absent at birth; may be present by 1–2 wk
- Bilateral equal bronchial breath sounds.
- Common Variations or Minor Abnormalities
- Irregular rate and depth of respirations, periodic
- breathing
- Crackles shortly after birth

Potential signs of distress or major abnormalities

- Inspiratory stridor
- Expiratory grunt
- Intercostal, substernal, or suprasternal retractions
- Persistent irregular breathing
- Periodic breathing with repeated apneic spells lasting >20 sec
- Seesaw respirations (paradoxic)
- Unequal breath sounds
- Persistent fine, medium, or coarse crackles
- Wheezing
- Cough
- Diminished breath sounds
- Peristaltic bowel sounds on one side with diminished
- breath sounds on same side

Heart

- Apex—Fourth to fifth intercostal space, lateral to left sternal border
- S2 slightly sharper and higher in pitch than S1

Common Variations or Minor Abnormalities

- Sinus arrhythmia—Heart rate increasing with inspiration and decreasing with expiration
- Transient cyanosis on crying

Potential signs of distress or major abnormalities

- Dextrocardia—Heart on right side
- Displacement of apex, muffled or distant
- Cardiomegaly
- Abdominal bruit
- Murmur
- Thrill
- Persistent central cyanosis
- Hyperactive precordium

Abdomen

- Cylindric
- Liver—Palpable 2–3 cm below right costal margin
- Spleen—Tip palpable at end of first week of age
- Kidneys—Palpable 1–2 cm above umbilicus
- Umbilical cord—Bluish white at birth with two arteries and one vein
- Femoral pulses—Equal bilaterally

Common Variations or Minor Abnormalities

- Umbilical hernia
- Diastasis recti—Midline gap between recti muscles
- Wharton jelly—unusually thick umbilical cord

Potential signs of distress or major abnormalities

- Abdominal distention
- Localized bulging
- Distended veins
- Absent bowel sounds
- Enlarged liver and spleen
- Ascites
- Visible peristaltic waves
- Moist umbilical cord

- Presence of only one artery in umbilical cord
- Urine, stool, or pus leaking from umbilical cord or cord insertion site
- Periumbilical erythema
- Palpable bladder distention after scanty voiding
- Absent femoral pulses
- Cord bleeding or hematoma
- Omphalocele or gastroschisis—Protrusion of abdominal contents through abdominal wall or cord

Female Genitalia

- Labia and clitoris usually edematous
- Urethral meatus behind clitoris
- Vernix caseosa between labia
- Urination within 24 hours

Common Variations or Minor Abnormalities

- Pseudomenstruation—Blood-tinged or mucoid discharge

Potential signs of distress or major abnormalities

- Enlarged clitoris with urethral meatus at tip
- Fused labia
- Absence of vaginal opening
- Meconium from vaginal opening
- No urination within 24 hr
- Mass in labia
- Ambiguous genitalia
- Bladder exstrophy

Male Genitalia

- Urethral opening at tip of glans penis
- Testes palpable in each scrotum
- Scrotum usually large, edematous, pendulous, and covered with rugae;
- Smegma
- Urination within 24 hours

Potential signs of distress or major abnormalities

- Hypospadias—Urethral opening on ventral surface of penis
- Epispadias—Urethral opening on dorsal surface of penis
- Chordee—Ventral curvature of penis
- Testes not palpable in scrotum or inguinal canal
- No urination within 24 hr
- Inguinal hernia
- Hypoplastic scrotum
- Hydrocele—Fluid in scrotum
- Masses in scrotum
- Meconium from scrotum
- Ambiguous genitalia
- Bladder exstrophy

Back and Rectum

- Spine intact; no openings, masses, or prominent curves
- Anal, Patent anal opening
- Passage of meconium within 48 hr
- **Common Variations or Minor Abnormalities**
- Green liquid stools in infant under phototherapy
- Delayed passage of meconium in very low–birth-weight neonates

Potential signs of distress or major abnormalities

- Anal fissures or fistulas
- Imperforate anus
- Absence of anal reflex
- No meconium within 36–48 hr
- Missing vertebrae
- Pilonidal cyst or sinus
- Tuft of hair along spine
- Spina bifda cystica

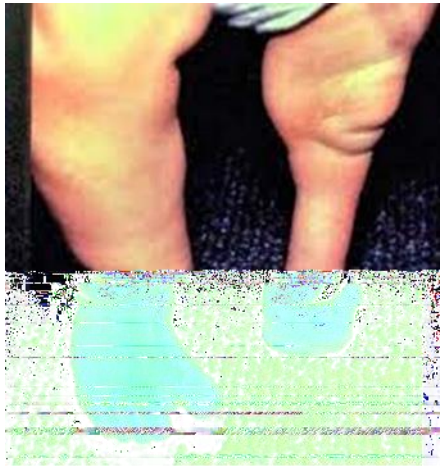
Extremities

- Ten fingers and toes
- Full range of motion
- Nail beds pink with transient cyanosis immediately after birth
- Creases on anterior two thirds of sole
- Symmetry of extremities
- Equal muscle tone bilaterally, especially resistance to opposing flexion
- Equal bilateral brachial pulses

Potential signs of distress or major abnormalities

- Polydactyly—Extra digits
- Syndactyly—Fused or webbed digits
- Hemimelia—Absence of distal part of extremity
- Hyperflexibility of joints
- Persistent cyanosis of nail beds
- Yellowing of nail beds
- Sole covered with creases

Hemimelia



- Fractures
- Decreased or absent range of motion
- Limitation in hip abduction
- Unequal gluteal or leg folds
- Unequal knee height
- Audible clunk on abduction of hip
- Asymmetry of extremities
- Unequal muscle tone or range of motion

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