Skin Deep: Examining the Physiologic Differences in Skin of Color

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Clinical Importance

Representation

Proper representation of and exposure to skin conditions across a diverse range of skin tones are essential for ensuring that medical professionals develop a comprehensive understanding of how these conditions manifest in skin of color.

Treatment

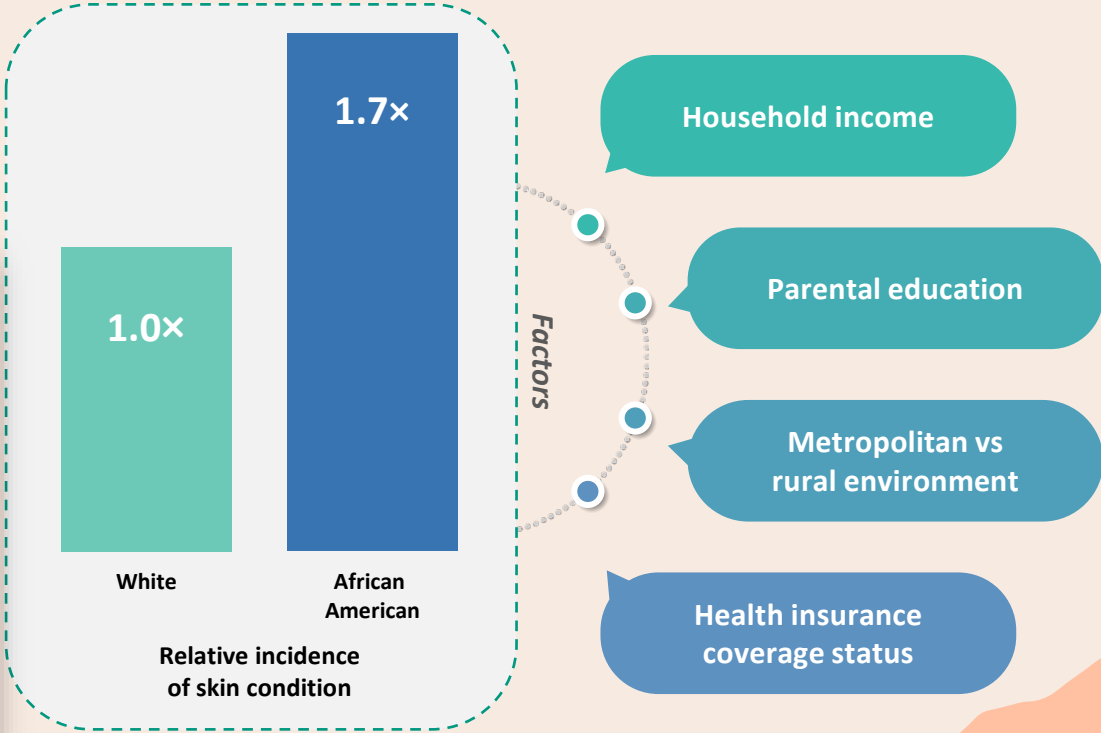
Understanding the physiological differences among patients with skin colors enable providers to deliver the most competent and personalized care to their patients with skin of color.

Diagnosis and Treatment in Infants With SOC is Based on Incomplete Data

- Data are limited to small cohorts of non-White infants or adults
- Disease progression in infants with SOC is unique
- Clinical decision making in infants with SOC is based largely on data in White populations

Because of the **assumptions** that **data** in predominately **White populations apply to infants with SOC Misdiagnoses** and **Suboptimal Treatments** are **Common**

Incidence of Skin Conditions May Be Increased in Children With SOC



Without this understanding, there is a risk of misdiagnosis and inadequate treatment, reinforcing healthcare disparities

Schachner L et al. *J Drugs Dermatol.* 2023; 22(7): 657.

Skin Color

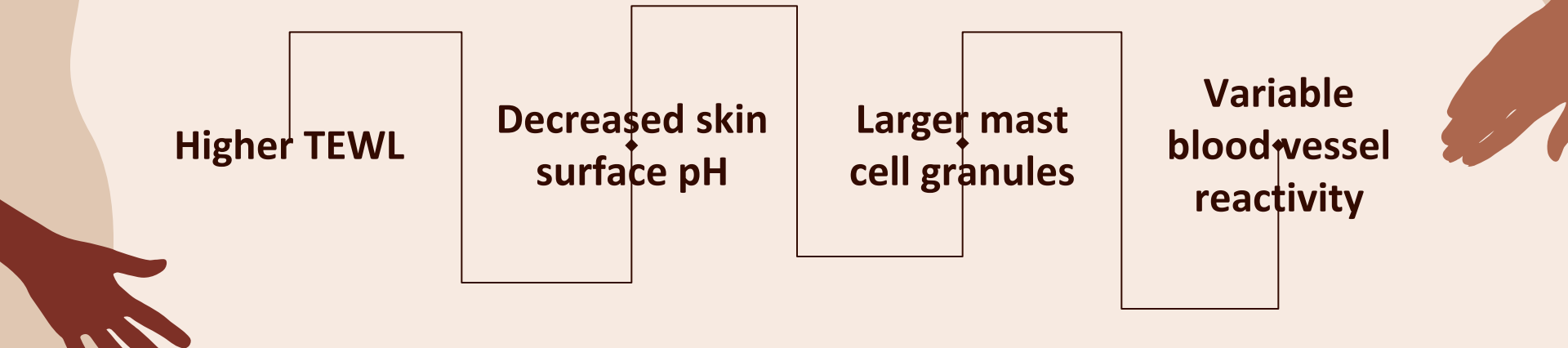
- Carotenoids
- Hemoglobin
- Melanin
- Oxyhemoglobin

Objective measurements

- pH
- TEWL
- Water content
- Corneocyte variability
- Blood vessel reactivity
- Elastic recovery / Extensibility
- Lipid content
- Surface microflora
- Mast cell granules
- Confocal microscopy

Black Skin compared to White Skin

Racial (ethnic) differences in skin properties: the objective data Am J Clin Dermatol. 2003;4(12):843-60.



Baby Skin Is Not Adult Skin

Infant Skin Undergoes a Maturation Process

Structure

- Stratum corneum and epidermal thickness
- Corneocyte size
- Surface roughness
- Collagen in the dermis
- Elasticity

Composition

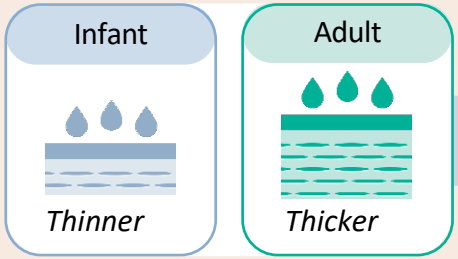
- Water content
- Natural moisturizing factor (NMF)
- Melanin
- Lipid content and organization

Function

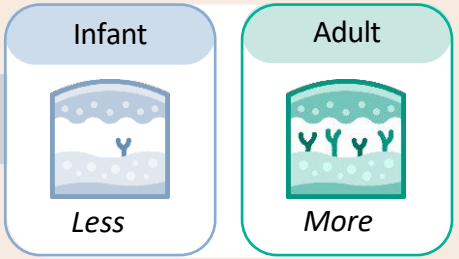
- Water handling properties
- Barrier function
- Skin reactivity
- Cell proliferation

Structural Differences Between Infants and Adults

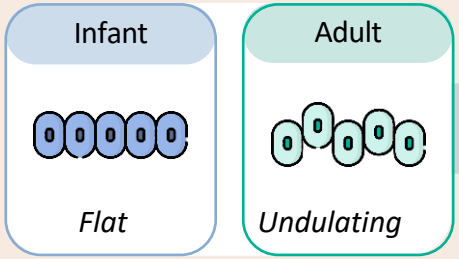
Epidermal thickness



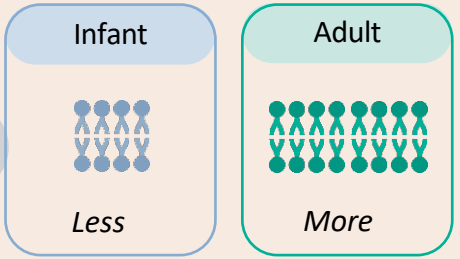
Cell attachments and epidermal cellularity



Dermo-epidermal junction



Lipids



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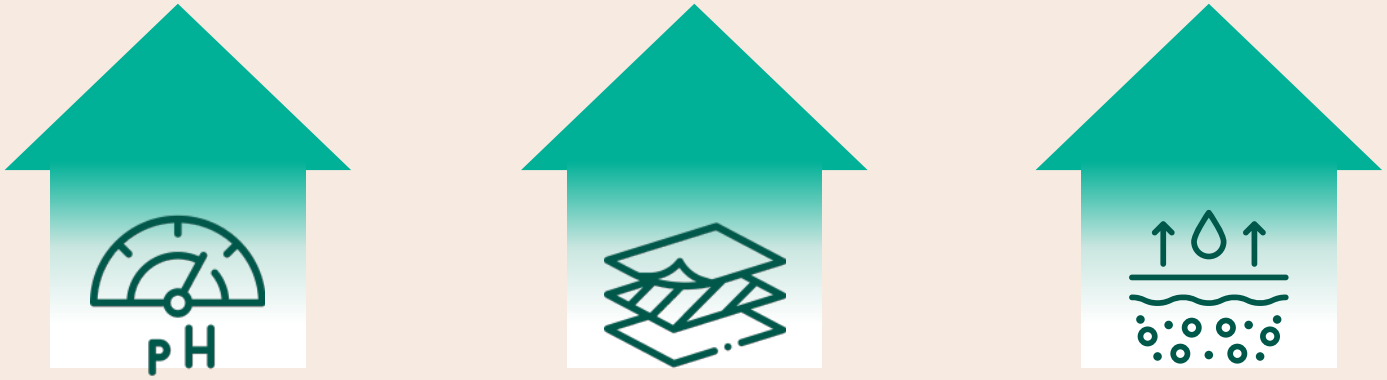
Key Differences Between Infant Skin Compared With Adult Skin

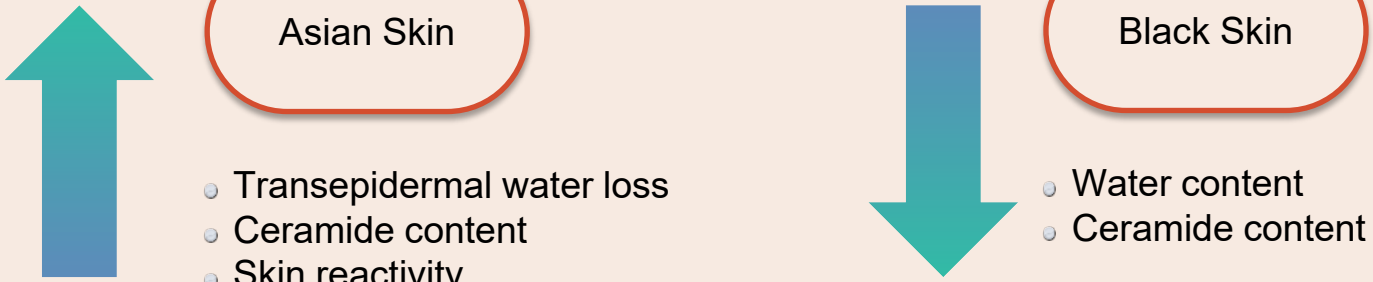
Differences between infant and adult skin in the **general population** are **also observed** in **SOC populations**



Infant SC is thinner with a higher pH, water content, and TEWL

Physical Differences Exist Between Racial/Ethnic Skin Types

Differences exist in biophysical measurements **between racial/ethnic backgrounds**



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Functional Differences Between Infants and Adults With SOC

	Infant	Adult
Melanin		
Sweat		
Water content		
NMF concentration		
SC pH		
Skin immune system		
Skin host defense proteins		

Difference in Immune Profiles

- **Increased** levels of **Th2 and Th22-related cytokines** (IL-13 and IL-22, respectively) as well as increased levels of **serum IgE** were found to be **significantly correlated with clinical severity** of Atopic Dermatitis in African Americans.

- Atopic Dermatitis in individuals with skin of color was found to be characterized by a **Th2/Th22-skewed immune profile** with an **attenuated Th1 and Th17 response**, especially when compared to Asian or White ethnicities.

1. British Journal of Dermatologist
2. Sanyal RD, Pavel AB, Glickman J, Chan TC, Zheng X, Zhang N, Cueto I, Peng X, Estrada Y, Fuentes-Duculan J, Alexis AF, Krueger JG, Guttman-Yassky E. Atopic dermatitis in African American patients is TH2/TH22-skewed with TH1/TH17 attenuation. Ann Allergy Asthma Immunol. 2019 Jan;122(1):99-110.e6. doi: 10.1016/j.anai.2018.08.024. Epub 2018 Sep 14. PMID: 30223113.

Genes

Greater than 150 genes have now been identified as having a direct or indirect effect on skin color.

Vitamin D has recently been discovered to regulate cellular proliferation and differentiation in a variety of tissues, including the skin.

Vitamin D and its Role in Skin of Color

- ➔ Vitamin D appears to have a **role in the pathogenesis and management** of conditions such as Atopic Dermatitis, Psoriasis, Vitiligo, Acne and Rosacea

- ➔ Individuals with skin of color produce **less vitamin D** compared to individuals with fair complexions during the same length of sun exposure

- ➔ Sufficient vitamin D levels have been linked to a **lower likelihood of developing Atopic Dermatitis**

- ➔ **Calcitriol** (a locally produced Vitamin D analogue) has been associated with **regulation** of several **skin functions**, including:
  - ◆ Inhibition of keratinocytes proliferation
  - ◆ Stimulation of keratinocyte differentiation
  - ◆ Barrier permeability formation
  - ◆ Promotion of innate immune response

Mesquita Kde C, Igreja AC, Costa IM. Atopic dermatitis and vitamin D: facts and controversies. An Bras Dermatol. 2013 Nov-Dec;88(6):945-53. doi: 10.1590/abd1806-4841.20132660. PMID: 24474104; PMCID: PMC3900346.

Increasing our awareness of differences in SOC can aid in our treatment decision making and strengthen physician-patient relationships

Thank You!

Do you have any questions?

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