Normal Changes and Differences in Skin

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In this excerpt adapted from "The Physiology of Skin and Its Ability to Heal," we look at the different characteristics of healthy human skin throughout a lifetime.*

Skin is known as the great protector, and one of its many functions is to provide a barrier to defend the body from the outside world. As wound clinicians, our understanding of the complexities of skin aids in our provision of assessment, treatment and wound management. However, we need to recognize that skin and its properties differ with the age and sex of the individual.

Infant Skin

Infant skin differs from adult skin in several ways. The thickness of infant skin is 40% to 60% that of adult skin. Weak rete ridges provide limited surface attachment to an immature dermis. As well, an infant's ratio of body surface area to weight is up to five times that of an adult. These factors place the infant at greater risk for skin damage.[1]

At birth, the surface layer of the skin is relatively neutral,

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with a pH of about 6.5. The acid mantle forms as a result of changes on the skin surface, such as the presence of sweat, sebum and normal micro-biota, and metabolic processes, such as lactic acid and free fatty acid production, within the stratum corneum. Over the first few postnatal weeks the skin's pH falls to about 5.5, a level that is beneficial for antimicrobial defence through the inhibition of the growth of pathogenic bacteria.[2]

Skin Changes in the Adolescent

Adolescence brings about the maturation of the hair follicles, sebaceous (oil-producing) glands and sweat glands in the skin. Stimulation of the sebaceous glands, caused by a surge in the sex hormones estrogen, androgen and progesterone, results in increased production of oil, or sebum. These sex hormones are also responsible for the development of apocrine glands in the pubic region and armpits. The resulting thick sweat mixed with bacteria on the surface of the skin can cause body odour. At the same time hair growth occurs in these areas.

An increase in the lipid content during this time enhances the heat-insulating properties of skin, improving temperature regulation. The higher fat content also helps to retain moisture, making the skin of teenagers and young adults less susceptible to drying out.[2,3]

Skin Changes in the Older Adult

As individuals age, skin goes through many changes based on genetics, environment, lifestyle and any existing chronic disease states. Despite individual variations, the normal aging process of all skin causes many predictable changes. Biochemical changes occur in collagen and elastin, the connective tissues underlying the skin that give skin its firmness (collagen) and elasticity (elastin), though the rates of loss

of skin firmness and elasticity differ from individual to individual. Also, as the skin becomes less elastic, it becomes drier. The underlying fatty tissue begins to disappear and skin begins to sag. The skin becomes less supple and wrinkles begin to form. Atrophy of subcutaneous fat in the hands, face, shins, waist (men) and thighs (women) results in sagging and folds. At this stage, skin is more easily injured, heals more slowly and tends to dry out more quickly.[3,4]

The dermis becomes increasingly avascular with age, leading to a reduction in blood supply. Langerhan's cells, which serve as macrophage and immune moderators of the epidermis, also decrease in number. There is

also a 50% decrease in the turnover of the epidermal layer.

The pH of the skin becomes more neutral (less acid) and thus more susceptible to bacterial growth and resulting infections. Interestingly, the pH value rises beyond 6 when a person actually experiences a skin problem or skin disease.

The skin's ability to perceive sensation to pressure and light touch is also reduced, along with an increased threshold for pain.

Melanocytes, the pigment-producing cells, decrease in number. Hair follicles also decrease in number and growth rate, with associated greying due to the decrease and loss of melanin.

Differences between Male and Female Skin

Skin is affected by sex hormones. Estrogen increases collagen and skin moisture and promotes wound healing, while testosterone stimulates oil production and the growth of facial hair. Of note, men and women have both sex hormones; skin is able to convert testosterone to estrogen and ovaries produce a small amount of testosterone.

Women's skin is generally thinner and less oily than men's skin. Therefore, women are more likely to experience wrinkles because thinner, drier skin is more prone to damage from the sun and cigarette smoke. Women also sweat less than men do and thus are more likely to suffer heat stroke.

During menopause the loss of sex hormones accentuates wrinkles. Estrogen-deprived skin thins, loses collagen and slows down its cell renewal.[5]

Impact on Care

For wound clinicians, knowledge of the anatomy and physiology of skin and its properties is essential to being able to prevent, assess, treat and manage acute and chronic wounds effectively. The take-home message here is "all skin is not equal."

References

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