Dry Skin in the Elderly

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Xerosis, or dry skin, is a common problem and its incidence and severity increase with age. It is the most common cause of generalised pruritus in the elderly. The cause of dry skin is not completely understood. It has a genetic component and is influenced by environmental factors, such as cold or dry climates, and the use of soaps and harsh cleansers. Age-related changes in the skin also can explain the dryness that tends to develop with age. The management of xerosis should be directed towards altering environmental factors and treating the signs and symptoms of the patient. Attention to the care of dry skin becomes more important as our population ages.

Key words: dry skin, xerosis, aging skin, stratum corneum, moisturisers.

Introduction

Xerosis, or dry skin, is a common problem and its incidence and severity increase with age. Data on the prevalence of xerosis in the elderly show a wide range of variation, from 29.5–85%.[1,2] Although dry skin is often a cosmetic problem, it also may affect quality of life. It commonly causes symptoms such as itching, burning, stinging and a feeling of tightness. It is the most common cause of generalised pruritus in the elderly.[3]

Dry skin occurs predominantly on the extremities, but also can be seen on the sides of the torso and on the face. Features include roughness, an increase in skin markings and a scaly appearance, with other possible features of redness and cracking developing as the problem worsens.

Dryness results when water content in the stratum corneum diminishes to a level below 10%, although this may be an oversimplification as electron microscopic studies of dry skin show a stratum corneum that is thickened, fissured and disorganised.[4]

Etiology: The Effects of Aging

The cause of dry skin is not completely understood. It has a genetic component and is influenced by environmental factors such as cold or dry climates and the use of soaps and harsh cleansers. Certain diseases such as chronic renal failure and hypothyroidism can cause xerosis, as can drugs such as isotretinoin.[5] Skin changes in the elderly also can explain the dryness that tends to develop with age. These changes can be attributed to both chronological aging and sun-induced damage (photoaging).[6]

In aged skin, changes occur in both the epidermis and the dermis (Table 1; Figure). The important changes in the epidermis occur in its uppermost layer, the stratum corneum. The stratum corneum is made up of cells called corneocytes and the intercellular substance ("the bricks and mortar"). There is inadequate formation of the stratum corneum intercellular lipids in older people. The intercellular lipids involved in the production of the intercellular lamellar bilayers of the stratum corneum are sphingolipids, free sterols and phospholipids, which are necessary to trap water and prevent excess water loss. However, in people older than 75 years, there is a reduced quantity of stratum corneum lipids,[7] leading to impairment of barrier function and barrier repair.[8] This may explain the elderly's increased susceptibility to environmental insults such as solvents and detergents, which act to extract these lipids.

Other changes in the stratum corneum in the elderly include an increase in the size of the corneocyte, greater accumulation of corneocytes and impaired desquamation due to a slower turnover of cells.[9,10] The Natural Moisturizing Factor (NMF)—found in stratum corneum cells and made up of amino acids, derivatives of amino acids and various salts—allows the stratum corneum to maintain adequate levels of water. NMF levels decline significantly with age.[11]

In the dermis of aged skin, both the number of fibroblasts and their ability to produce collagen are reduced compared to young skin.[12] The dermis thins by 20% and the skin loses its tensile strength. There is a reduction in size and function of the sweat and sebaceous glands, as well as a loss of blood vessels, resulting in less water movement from the dermis to the epidermis.[2,12] This is important since water moves upward from deeper layers to hydrate the stratum corneum. Only when relative humidity increases to 70–80% can atmospheric water contribute to stratum corneum hydration.

The desquamation of clustered keratinocytes, the decreased mechanical flexibility of the stratum corneum, and the changes in the dermis lead to the appear-

Table 1
Changes in Elderly Skin that Contribute to Dryness

Epidermal
Reduced quantity of stratum corneum intercellular lipids.
Slower turnover of cells.
Reduced levels of Natural Moisturizing Factor in stratum corneum cells.
Dermal
Reduced number and function of sebaceous glands.
Reduced number and function of sweat glands.
Reduced number of blood vessels.
Reduced water movement from dermis to epidermis.

Table 2

Six Rules for Treatment of Dry Skin in the Elderly

1. Prescribe a humidifier with relative humidity setting of 45–60%.
2. Recommend that room temperature be kept as low as tolerated and comfortable.
3. Recommend bathing with warm (not hot) water for 10 minutes daily to hydrate the skin.
4. Do not recommend bath oils for this age group due to the risk of slipping in the tub.
5. Caution against exposure to harsh soaps and other drying agents, such as powders.
6. Ask that moisturisers be used twice daily, once after the bath while the skin is still damp, and again at bedtime.

ance of fine white scales and cracking with increased skin markings and wrinkling.[13]

Management

The management of xerosis should be directed towards altering environmental factors and treating the signs and symptoms of the patient. The aim of treating dry skin is to restore the epidermal barrier of the skin and to maintain stratum corneum hydration (Table 2).

Humidity

The moisture in the air contributes to the water content of the stratum corneum and dryness tends to occur when relative humidity drops below 30%. Many patients only develop dry skin in the winter when the heated air in the house is extremely low in moisture. This may be more exaggerated with forced-air systems indoors and the cold wind outdoors, which evaporates moisture from exposed skin.[14]

Humidifiers, either attached to the furnace or freestanding (and regularly maintained), are recommended, as is adjusting the room temperature to the lowest that is comfortable and tolerated. When the relative humidity is set at or greater than 60%, the stratum corneum water content does not drop below the critical 10% level when clinical dryness becomes apparent. The normal stratum corneum water content is thought to be 20–35%.[4]

Bathing

There are two schools of thought on the recommended frequency of bathing in those with dry skin. One is to reduce the bathing frequency to once or twice per week, and the other is to bathe daily with the body totally immersed in water for 10 minutes or under the continuous spray of the shower for 10 minutes. The latter is the current recommendation, with certain adjustments.[2]

The soap chosen should be mild with low irritancy (e.g., Dove), and if the dryness is severe the use of soap may be limited to "dirty" areas such as the neck, underarms and groin.[15] Another option is the use of a soap substitute (e.g., Cetaphil lotion). The temperature of the water should be at or just below body temperature. The skin should be patted dry and a moisturiser applied within three minutes of exiting the tub to trap the moisture into the skin.[16,17]

(Personally, I do not recommend bath oils for the elderly. When I was a dermatology resident, I was asked to consult on an elderly patient with multiple pressure sores on the back of her head, elbows, buttocks and heels. She had put some oil in the bath to treat her dry skin and slipped repeatedly when trying to exit the tub. The superintendent found her in the tub two days later and took her to the emergency room for treatment.)

Moisturisers

Draelos defines moisturisers as externally applied compounds comprising multiple components, including occlusive ingredients and humectants that rehydrate the skin optimally[4] (Table 3).

Occlusive moisturising ingredients are oily substances that act to prevent the evaporation of moisture from the skin by forming a greasy film that impedes transepidermal water loss (TEWL). Petrolatum is the most effective occlusive moisturiser. It not only drops TEWL by 99%, but also permeates throughout the stratum corneum intercellular substance, allowing the initiation of the stratum corneum repair mechanisms despite its occlusive properties. The signal for barrier repair is TEWL and it cannot be initiated if TEWL drops to zero.[18]

Other occlusive moisturising ingredients include mineral oil (decreases TEWL by 30%), silicones such as dimethicone, and vegetable and animal fats such as cocoa butter, Crisco and lanolin.

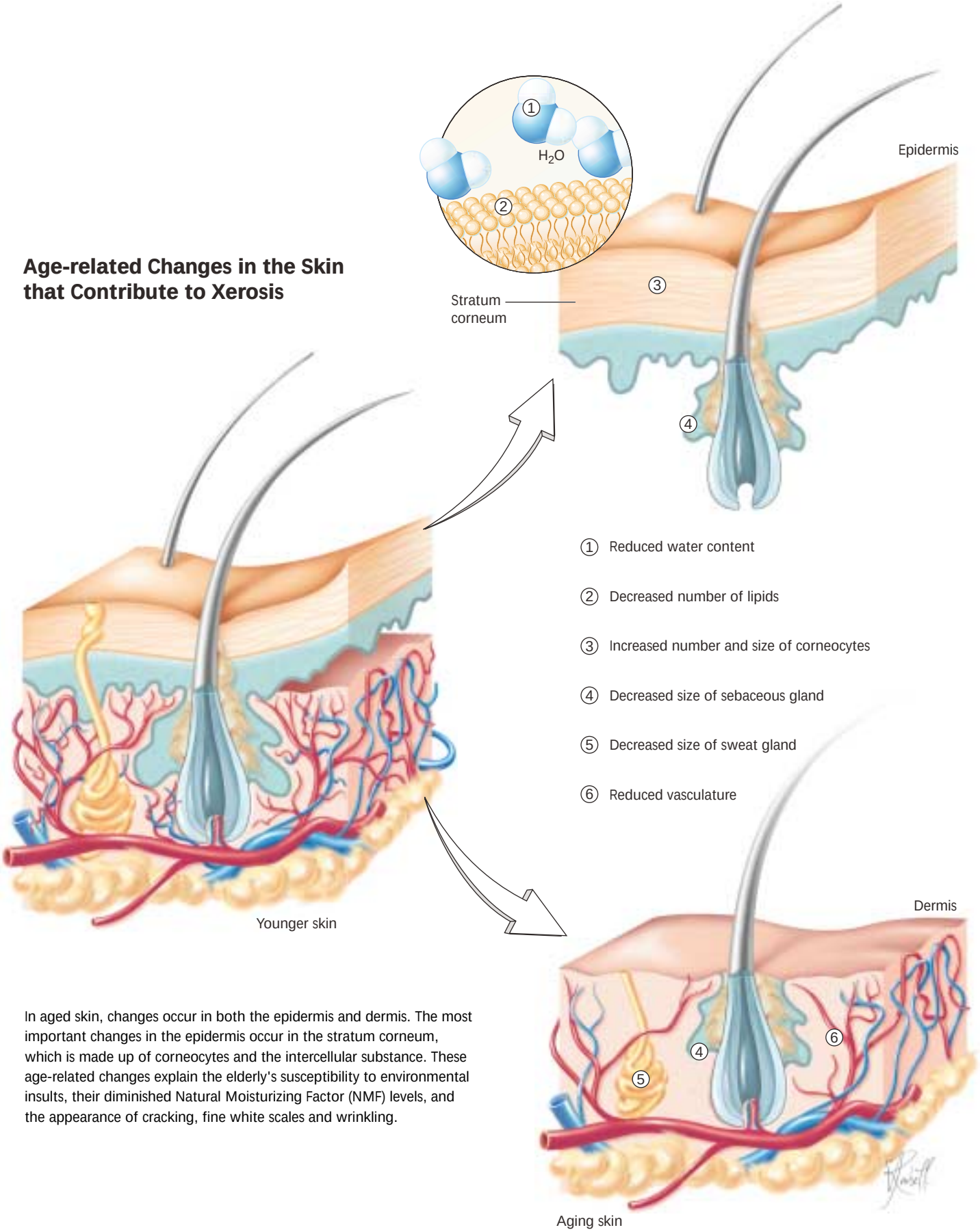
Humectant moisturising ingredients attract water from deeper skin layers to the stratum corneum. Humectants include glycerin, sorbitol, urea, sodium lactate,

Table 3

Moisturising Agents

Occlusive Agents	Humectants	Emollients
petrolatum (Vaseline)	urea	***Alcohols***
mineral oil	glycerin	octyl dodecanol
lanolin	sorbitol	hexyl decanol
silicones	hyaluronic acid	oleyl alcohol
Crisco	propylene glycol	***Esters***
paraffin	alpha-hydroxy acids	octyl stearate
beeswax	honey	myristyl myristate
cocoa butter	some vitamins	isopropyl myristate

Age-related Changes in the Skin that Contribute to Xerosis



In aged skin, changes occur in both the epidermis and dermis. The most important changes in the epidermis occur in the stratum corneum, which is made up of corneocytes and the intercellular substance. These age-related changes explain the elderly's susceptibility to environmental insults, their diminished Natural Moisturizing Factor (NMF) levels, and the appearance of cracking, fine white scales and wrinkling.

hyaluronic acid and propylene glycol.[19] Moisturisers that contain only humectants will increase TEWL when applied to a damaged or dehydrated stratum corneum, because they do not prevent the hydrated stratum corneum from losing its water content into the atmosphere. Hence, most good moisturisers have a humectant and an occlusive ingredient to block TEWL.[4]

Emollient ingredients include certain alcohols and esters. Alcohols such as octyl dodecanol, hexyl decanol and oleyl alcohol have excellent skin smoothing and moisturising properties, and patients should be advised that not all alcohols are drying. Esters that are good emollients include octyl stearate, cocoate, myristyl and isopropyl myristate and stearyl isononanoate.[5] Emollients fill in the spaces between the desquamating corneocytes, thus giving skin a smooth texture.[4]

Other additives to moisturisers include alpha-hydroxy (also a humectant) and beta-hydroxy acids, which increase corneocyte shedding and reduce corneocyte adhesion.[5]

Topical Steroids

Only if the skin becomes inflamed or eczematous (eczema craquelé) should a low-potency topical steroid ointment be used. 1% hydrocortisone ointment is usually very helpful.[20] The combination of urea and hydrocortisone in a cream base also may be quite effective.[21]

Conclusion

Attention to the care of dry skin becomes more important as our population ages. General measures reviewed in this article should be discussed with patients, in addition to the importance of moisturising to prevent or treat the condition. ◆

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