


Ageing and Wound Management

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Wounds in general and leg ulcers, pressure injuries and skin tears in particular are common problems in an ageing population. To fully understand the nature and causes of these chronic wounds it is essential to consider the main physiological effects of ageing on tissue and the factors that influence healing.

OUR POPULATION IS AGEING

- 14% older than 65
- Most rapidly increasing proportion is those over age 80

WOUND MANAGEMENT IS INCREASINGLY BECOMING CARE OF THE OLDER PATIENT WITH A WOUND

- Multidisciplinary model well-suited
- Geriatric medicine skills of doctor are important
- All clinic staff need skills in managing older patient

Ageing in Australia over the next 40 years

Australians will live longer and continue to have one of the longest life expectancies in the world.

In 2054-55, life expectancy at birth is projected to be 95.1 years for men and 96.6 years for women, compared with 91.5 and 93.6 years today.

In 2054-55, there are projected to be around 40,000 people aged over 100.

This is a dramatic increase, well over three hundred times the 122 Australian centenarians in 1974-75.

25% of the population will be over 65 years of age by 2054-55.

NORMAL AGEING

Systemic changes

- Reduced cardiac output
- Reduced haemoglobin
- Reduced lung capacity
- Reduced liver protein synthesis
- Reduced renal functions
- Impaired cerebral “reserve”
- Reduced hearing and vision
- Impaired muscle and joint function
- Impaired gait/balance
- General immunoparesis

Systemic Changes in the Elderly

Cardiovascular

- Decreased vascular elasticity
- Coronary blood flow and cardiac output ↓
- Peripheral vascular resistance ↑
- *Blood is less efficiently pumped around the body therefore possible problems of oxygen supply to tissues*

Systemic Changes in the Elderly

Gastrointestinal

- Protein synthesis by liver ↓
- Teeth, saliva taste sensation ↓
- Gut innervation & peristalsis ↓
- *Protein metabolism may cause protein deficiencies, no enjoyment in eating, all food tastes the same, ability to digest is slow so often they complain of always feeling full and so not interested in food.*

Systemic Changes in the Elderly

Genitourinary

- Nephrons and renal blood flow ↓
- Bladder strength and capacity ↓
- Glomerular filtration rate ↓

- *Continence issues, so they do not want to drink as much fluid as we would like and regularly suffer from bladder/renal infections, which make them very unwell and at risk of other problems. Also when incontinent urine may contaminate lower leg dressings.*

Systemic Changes in the Elderly

Pulmonary

- Elasticity of lungs and chest wall ↓
- Alveoli, capillaries, cilia ↓
- Vital capacity ↓
- *Poor lung capacity means they may have poor oxygen supply to the tissues and thus wound.*

Systemic Changes in the Elderly

Musculoskeletal

- Muscle power and coordination ↓
- Erosion and ossification of joints
- Thinner muscle fibres
- *Decreased strength means less energy, lack of exercise means poorer oxygenation of tissues and again possibly the wound.*

Systemic Changes in the Elderly

Nervous

- Vision and hearing acuity ↓
- Skeletal reflex time & pain threshold ↑
- Neural control of circulation and velocity of nerve impulse conduction ↓

Systemic Changes in the Elderly

Immunologic

- Delayed hypersensitivity reaction ↓
- T-cell and antibody responses ↓
- Autoantibodies ↑

- *This means the elderly patient is at more risk of infection, but also more prone to sensitivities.*

Drugs with a negative effect on wound healing

- Corticosteroids
- Cytotoxic drugs
- Nicotine
- Anti-platelet drugs/
Anti-coagulants
- Antibiotics
- Colchicine
- NSAIDS
- Vasoconstricting Drugs
- Anti RA Drugs
- Antiseptics
- Immunosuppressives

AGEING IS NOT A DISEASE

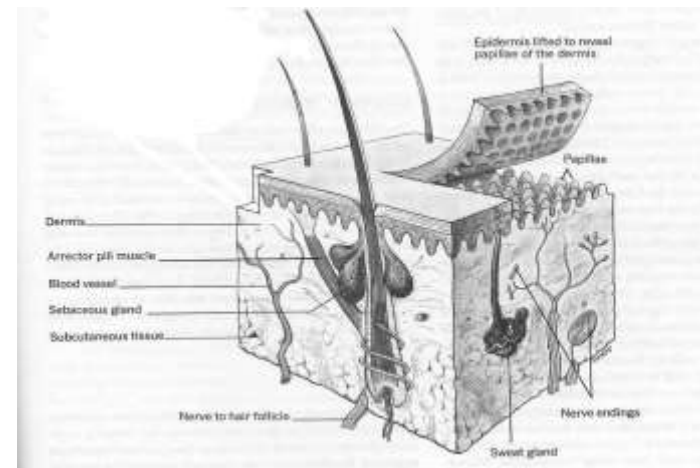
- **Normal ageing does affect wound healing**
- **Skin changes**
 - reduced inflammatory response
 - reduced dermal immune function
 - thinner dermis
and weakened dermal/epidermal junction
 - less elastin
 - reduced sweat and sebum
 - less water/more fat
 - reduced capillary epithelial migration
 - small blood vessels more fragile

The Skin

- Skin is often likened to an overcoat providing protection from the elements. Like an overcoat it will, with time, show signs of wear and tear. There are important changes in the structure and function of skin as it grows old that affect the medical and nursing management of common skin conditions.
- It is important to note that the consequences of an individual life-time's exposure to environmental hazards may compound and complicate any existing skin condition and will have to be taken into account during any process of assessment.

Changes in the skin with ageing

- Dermis loses 80% of its original thickness
- 40% less collagen
- Sebum and sweat production is reduced
- Epidermal layer separates more easily from the dermis(weakened dermal-epidermal junction)
 - Elastin fibres decrease in number but increase in size, thus making the skin stiff
- Decrease in Langerhan cells-thus the immune system functions
- Small blood vessels diminish by 40% (↑fragility of capillaries)
 - ↓ vitamin D, collagen and moisture
 - ↓ migration of capillary epithelial cells
 - ↓ epidermal turnover



The skin as we age

- The structure and function of an older person's skin reflects the cumulative effects of 'programmed' ageing and 'added' ageing. 'Programmed' ageing is the true biological process, whereas 'added' ageing refers to the damage caused from exposure to the environment.
- The skin may appear more transparent as the dermis gradually becomes thinner and underlying structures, in particular veins, become more prominent. Collagen fibres that provide structural support stiffen, while overall collagen content diminishes at a rate of 1 per cent per annum. Elastic fibres thicken and the skin loses its elastic recoil, causing creases and wrinkles to form.
- Skin care becomes more important as skin ages, and skin integrity is compromised by the combined effects of 'programmed' ageing, 'added' ageing and underlying medical conditions. Fragile skin can be further damaged by the inappropriate application of some skin care products.

The skin as we age

Fibroblasts, cells responsible for elastin and collagen synthesis, also decline in number. Noticeably, skin on the face, neck and upper arm sags and sebaceous glands atrophy, causing small yellow papules to appear. In women, sebum secretion reduces after the menopause, while men are not affected until about 80 years of age

Sweat glands become smaller and secrete less fluid, leading to increased dryness. Fragile, puckered skin is more susceptible to damage from shearing forces. Many older people suffer from xerosis (dry skin), particularly on the lower legs, elbows, forearms, and hands in winter. The skin feels rough and scaly and is often accompanied by a distressing, intense pruritus (itchiness). This dryness is due to poor hydration, as opposed to a reduction in sebum production



The skin as we age

Both endogenous factors, e.g. nutritional and endocrine status, and environmental factors, e.g. UV radiation, toxic compounds or free radicals, affect the functions of fibroblasts and the physical and chemical nature of the supporting macromolecules.

Environmental factors, particularly exposure to sun, accelerate the ageing of skin and are important in cutaneous carcinogenesis

British Journal of Dermatology (1990) 122, Supplement 35, 5-11.

The skin as we age

The physiological changes include:

- Impairment of the barrier function
 - Decreased turnover of epidermal cells
 - Reduced numbers of keratinocytes, fibroblasts,
 - Reduced vascular network around hair bulbs and glands.
- These changes result in fibrosis and atrophy, and decreases in hair and nail growth, vitamin D synthesis and the density of Langerhans cells

British Journal of Dermatology 122, Supplement 35, 13-20



Epidermis

Owing to generalized thinning of the epidermis and flattening of the dermal-epidermal junction, the skin in the elderly is more subject to detachment of the epidermis and, thus, blister formation. Between the third and seventh decades of life there is a decrease in the cell turnover rate of approximately 50%. Scaling of the scalp is reduced in the elderly.

British Journal of Dermatology 122, Supplement 35, 13-20.

Vascularization

A generalized reduction in the vasculature of the dermis and that surrounding the cutaneous

appendages is associated with a loss of the vascular response. Thermoregulation itself is impaired in the elderly, predisposing them to hypothermia. Some investigators have implicated the reduced vasomotor capacity of the dermal arterioles in the pathogenesis of heat stroke.

British Journal of Dermatology 122, Supplement 35, 13-20.



Immune function

The decline in cell-mediated immunity that occurs with ageing is well established.

Langerhans cells, which make up 3-4% of the epidermal cell population in a young subject, are reduced by 20-50% in the light-protected areas of skin in the elderly, and even more so in sun exposed regions. The increased susceptibility of the elderly to chronic skin infections reflects not only the alterations undergone by their immune systems, but also the reduced tissue perfusion and slow wound healing.

British Journal of Dermatology 122, Supplement 35, 13-20.

Photo-ageing of human skin

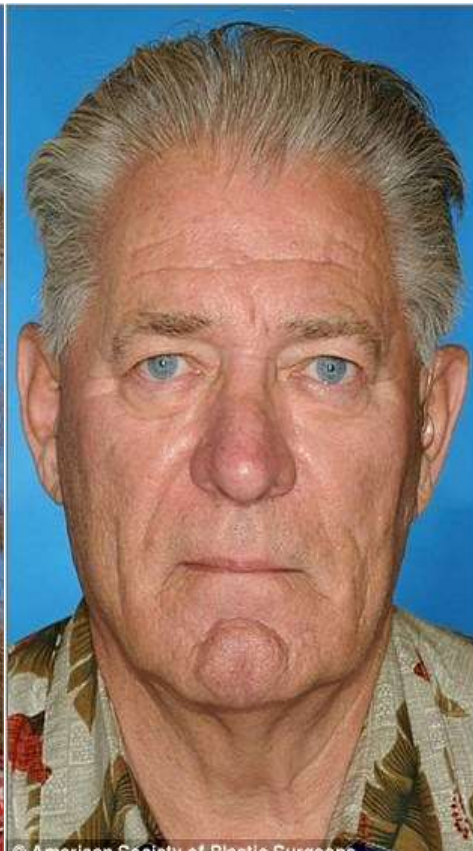
Chronic sun exposure causes photo-ageing of human skin, a process that is characterized by clinical, histological and biochemical changes which differ from alterations in chronologically aged but sun-protected skin. Within recent years, substantial progress has been made in unravelling the underlying mechanisms of photo-ageing

A well established way to protect skin against detrimental effects of sunlight is the application of organic and inorganic UV filters found in conventional sunscreen preparations. Newer formulas provide protection against UVB and UVA light and some even against infrared radiation.

Photodermatol Photoimmunol Photomed 2000; **16**: 239–244

Effect of Smoking and Sun on the Aging Skin

Two Sets of twins one smoker one non-smoker Observe the difference in the skin





NORMAL AGEING, FRAILITY & DISEASE

FRAILITY = combined effects of multiple diagnoses

- Reduced homeostasis
- Impaired capacity to vary function
- Increases mortality

DISEASE = pathological ageing

- Increases risk of frailty
- But, unlike frailty, often reversible

PRINCIPLES OF WOUND MANAGEMENT IN THE OLDER PATIENT

- Assess the patient
- Assess the wound
- Manage the patient
- Manage the wound
- Review patient and wound
- Prevent wound recurrence

WOUND MANAGEMENT IS MULTIDISCIPLINARY

- Medical
- Nursing
- Dietetic
- Pharmacy
- Podiatry
- Orthotics
- Others
- AND the patient



Conclusions

- The skin plays a vital role in protecting the body
- Ageing is associated with skin changes
- Looking after the ageing skin is very important.
 - Goods hydration, moisturizers and protection from damage are simple ways to ensure good skin health as we age
- Diseases can also affect skin health
 - And more common with age
 - But not an intrinsic part of ageing
- Wound management is multidisciplinary
- Older wounds do heal
 - but possibly more slowly
 - and we need to be smarter in how we approach them
- Be a master of care of older people with wounds
 - or risk become far less useful to your patients!