

Aging is a systemic phenomena...does it **cause** chronic wounds?

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Aging is the process of becoming older...

- Older usually are defined as ≥ 65 years
- Currently 13% of US population (35 Million)
- Will increase to 20% by 2030 (70 Million)

Cause is defined as

- events that provide the generative force that is the origin of something;
- a justification for something existing or happening;
- causal agent: any entity that produces an effect or is responsible for events or results give rise to.

wordnet.princeton.edu/perl/webwn

Chronic wound is one that does not heal in a timely manner or follow an orderly sequence of events.

Common chronic wounds are:

- Pressure ulcers
- Venous ulcers
- Diabetic ulcers

Are these chronic wounds caused by aging?

- Pressure ulcer: ischemia due to external pressure
- Venous ulcer: venous hypertension – with theories as to role of environment in healing
- Diabetic ulcer: trauma to neuropathic tissue, high glucose altering nutrient availability, tissue with alterations in blood flow

ALL OCCUR FREQUENTLY IN OLDER ADULTS

Older adults have many co-morbidities

- Average 75 year old has
 - at least 3 chronic illnesses
 - 5 different prescription drugs
- Top 3 causes of death are
 - Heart disease
 - Cancer
 - Stroke
- Top 3 behaviors linked to almost 35% of deaths
 - Smoking
 - Poor diet
 - Physical activity

Elderly hospitalized more

- Elderly hospitalized nearly three times as frequently as younger persons*
- Elderly account for about 39% of all hospital admissions (but only 13% of the population)
- Elderly hospital LOS is longer; they consume about 48% of all hospital days**

*Landefeld, 2003.

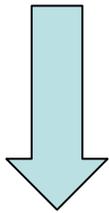
**Kozak, Owings, Hall, 2005.

Wounds are present in elderly, often with co-morbidities

- 14.8 million surgical procedures annually
- 8.6 million diabetics 60+ and 15-20% hospitalized in lifetime with wound causes
- 2% of population has venous disease, prevalence peaks in 60-80 year olds
- 5 -15% of hospitalized patients have pressure ulcers, more in older persons than younger

Data show that aging DOES affect all phases of healing

- Inflammatory
- Proliferative
- Remodeling



- Slowed healing
- Infection
- Dehiscence



Aging and the inflammatory phase

- Increased
 - platelet adherence
 - release of alpha granules (TGF-beta, TGF-alpha, PDGF)
- Decreased
 - nitric oxide
 - capillary permeability
 - decreased neutrophil diapedesis
 - Decreased growth factor production
- Delayed leukocyte arrival at injury
- Macrophages less phagocytic

Aging and the proliferative phase

- Decreased
 - re-epithelialization
 - collagen synthesis
 - angiogenesis (FGF, VEG-F, TGF-beta)
- ECM not broken down
 - increase MMPs (metalloproteinases)
 - decreased TIMPs (tissue inhibitors of metalloproteinases)

Aging and the remodeling phase

- Less collagenase activity & decreased TGF-beta (rarely see hyper-proliferative i.e., hypertrophic scars, keloids)
- Strength gain is slower
- Less tensile strength than in younger

Yet there are limits to the studies where findings on effects of aging on healing were generated...

- Concomitant conditions were not recorded or controlled for.
- Medications were not addressed.
- Sites from which tissue samples were taken were not reported.
- Designs often were cross-sectional rather than longitudinal.
- Measures of healing often examined intermediate outcomes.

When co-morbidities are controlled for, healing is ***not*** different in older and younger subjects.

Chronic wounds are ***caused by underlying pathology:***

- pressure...pressure ulcers,
- venous disease... venous ulcers,
- neuropathy, high glucose levels & vascular changes... diabetic ulcers.

If aging caused chronic wounds,
ALL older persons would have a
chronic wound...

Aging is a systemic phenomena. It may contribute to but does NOT cause chronic wounds...

