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Skin aging: a global health challenge

INTRODUCTION

Aging is a universal concern. Linked to aging are a series of physiological and pathological processes, among them changes in skin turnover, quality, and regenerative potential. Skin aging has long been viewed as more of an aesthetic problem than as a real functional health problem.

Nowadays, more people are reaching “old” age, resulting in an increase in both the proportion of the population that is of advanced age and in absolute global number of persons of advanced age.^{1, 2, 3} Skin aging must be thought of as a health issue that should be integrated into the global aging field, in which we know that each organ insufficiency can add to another and produce those difficult to treat co-morbid states well known by the geriatrician. Therefore, we must adopt a broader view of aging skin health than just concern over the skin or wound itself.

World demographics show us that, in all countries, the proportions and absolute numbers of those aged 65 and over and, among them, those aged 85 and over are steadily growing.^{1, 2, 3} This is the positive result of improved global health conditions, but this outcome leads to new challenges associated with aging. Among these challenges is skin aging and, more globally, coping with multiple aging organs and illnesses resulting in polymorbidities.

Recently, the concept of dermatoporosis has been developed, in which skin aging is compared to bone aging (osteoporosis), which includes both bone density and microarchitectural changes leading to osteoporotic fractures. On this background, skin aging, which has been characterised previously as an aesthetic phenomenon, is now clearly identified as an organ insufficiency to be considered parallel to renal or heart insufficiency, for example.^{4, 5, 6}

CONTRIBUTING FACTORS

Skin aging is the result of both intrinsic and extrinsic factors. Intrinsic factors are those that are genetically determined, lead to what some call chronologic aging, and include sex hormones levels and inner oxidative stress. Among other outcomes, fine wrinkles, skin thinning, laxity, and loss of elasticity are caused by chronologic aging.⁷⁻¹²

Extrinsic factors are all factors that, from the outside, enhance intrinsic skin aging and lead to profound wrinkles, pigmentary defect, and skin cancers. Photoaging, linked to sun exposure, is considered a major contributor to overall skin aging. Grossly, ultraviolet A radiation is responsible for skin aging and ultraviolet B radiation for skin cancers, which increase in incidence with age. Medications such as corticosteroids, immunosuppressants, and chemotherapeutic agents directly impact the skin. Other factors, such as tobacco, alcohol consumption, and air pollutants, certainly play important roles as well.^{13, 14}

Intrinsic factors can play a role in the extrinsic skin aging pathway; for example, skin pigmentation, which is genetically determined, plays a major role in the phototoxicity of sunrays. As a result, less pigmented skin exposed to sun will become thinner and weaker and have a lessened defensive role and capacity to rejuvenate than more pigmented skin that is similarly exposed to sun.

Extrinsic and intrinsic factors lead to skin weakness that translates into skin tears, deep dissecting hematomas, and wound-healing difficulties, which in turn can lead to lengthened hospital stays.

However, we should adopt a broader view on the global aging process and look at its consequences on other functions that can have direct or indirect



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Figure 1. Forearm and hand, typical thin skin with cutaneous hematoma and scars.



Figure 3. Deep dissecting hematoma.



Figure 2. Skin tears.



Figure 4. Dermatorporosis with multiple old and recent lesions.

effects on skin health. Among these aging consequences are sensitivity losses which will place the skin at risk from undetected injuries, other neurological deficits resulting in falls in which the skin tears and/or bleeds easily, and renal insufficiency or malnutrition, which are common in the elderly and result in further insults to the skin. With age, the number of diagnoses that can negatively impact skin integrity and/or repair capacity increases. These diagnoses include diabetes, conditions requiring anticoagulants, edema from cardiac insufficiency, peripheral arterial disease, and chronic venous insufficiency.

PREVENTIVE MEASURES

Protection of the skin is very important, and simple measures such as skin washing and systematic daily use of emollients have proven effective.¹⁵ However expensive, some retinoid based creams with hyaluronic acid have also proven effective.⁶

Skin protection efforts can extend beyond the skin itself. Such efforts may include establishing a safe environment to reduce falls and impacts and padding of limbs and

potentially dangerous everyday objects, such as a wheelchair.

Skin protection efforts can also involve carefully applying treatments of non-age-related skin problems in patients of advanced age. For example, in the case of perineal dermatitis, treatment must be rapidly applied following strict protocols.¹⁶

Special attention must be paid to smokers. Tobacco has both long-term and short-term effects on skin health. Quitting cigarettes proves very useful for wound healing and reducing postoperative problems, such as suture dehiscence and infection.^{17, 18}

WOUND TREATMENT

In aged skin, all stages of wound healing may be impaired, including

- Inflammation, with early increase in neutrophils, delayed monocyte infiltration, impaired macrophage function (reduced phagocytic capacity), increased secretion of proinflammatory mediators, and decreased vascular-endothelial-growth-factor production.

- Proliferation, with reduced response to hypoxia, delayed angiogenesis, and delayed collagen deposition with reduced fibroblast proliferation and migration. Delayed re-epithelialisation and reduced keratinocytes proliferation and migration will occur.

- Remodelling, with reduced collagen turnover, resulting in increased fibroblast senescence. This decreased activity usually leads to visually accelerated maturation and less visible scars.¹⁹

For this reason, special attention must be paid to wound care in the aging population. If wounds or skin tears appear, state-of-the-art treatments must be applied timely to optimise healing without further damage to the skin. Low adherence, moisture-maintaining dressings play an important role in this treatment.^{20, 21} For both prevention and treatment, an interdisciplinary approach will be crucial.

CONCLUSIONS

Our fragile and vital skin will age, and its protective and regenerative roles will diminish over time. Due to the ever-growing number of elderly and the fact that skin aging is a real health problem that complicates and is complicated by other co-morbidities, aging skin status must readily be assessed. Skin protection by emollients can ease the effects of aging on the skin. Minimising the impact of extrinsic factors in childhood by, for example, using sunscreen regularly and throughout life as well as avoiding tobacco, can also help optimise the health of aging skin.

Current wound-healing evidence has been based largely on either animal models or younger human skin models. Further research must now focus on how best to maintain skin health in the aging population. ■

REFERENCES

- United Nations, Department of Economic and Social Affairs, Population Division (2013). World Population Ageing 2013. ST/ESA/SER.A/348. <http://www.un.org/en/development/desa/population/publications/pdf/ageing/WorldPopulationAgeing2013.pdf>
- United Nations, Department of Economic and Social Affairs, Population Division (2015). World Population Prospects: The 2015 Revision, Key Findings and Advance Tables. Working Paper No. ESA/P/WP.241. http://esa.un.org/unpd/wpp/publications/files/key_findings_wpp_2015.pdf
- Jamison D. T., Summers L. H. et al. Global health 2035: a world converging within a generation. *Lancet* 2013; 382: 1898–955.
- Kaya G., Saurat J.-H. Dermatoporosis: A chronic cutaneous insufficiency/fragility syndrome. *Dermatology* 2007; 215:284-94.
- Kaya G. Dermatoporse : un syndrome émergent. *Rev Med Suisse* 2008 ; 4 : 1078-82
- Kaya G. New therapeutic targets in dermatoporosis. *J Nutr Health Aging*. 2012 Apr; 16: 285-288.
- Farage M. A. et al. Intrinsic and extrinsic factors in skin ageing: a review. *Int J Cosmet Sci*. 2008; 30: 87-95.
- Farage M.A., Miller K.W., Maibach H.I. Textbook of Aging Skin. 2010, https://books.google.ch/books?id=9-ALWZhXomAC&pg=PA37&hl=fr&source=gbs_toc_r&cad=3%20-%20v=onepage&q&f=false#v=onepage&q&f=false
- Kammeyer A. et al. Oxidation events and skin aging. *Ageing and skin research reviews*. 2015; 21: 16-29.
- Kottner J, EWMA Journal 2015; 2: 11-13 <http://ewma.org/ongoing/EWMA%20JOURNAL/EWMA%20Journal%20Oct%202015%20web.pdf>
- Oh D.M. ET AL. Sex hormones and woundhealing. *Wounds* 2006; 18 : 8-18.
- Rinnerthaler M. et al., Oxidative stress in aging human skin. *Biomolecules*. 2015; 21: 545-89.
- Krutmann J. et al. Pollution and skin: From epidemiological and mechanistic studies to clinical implication. *J. Dermatol. Sci.*, 2014; 76: 163-168.
- Wlaschek M. Solar UV irradiation and dermal photoaging. *Photochem. Photobiol.* 2001; 63; 41-51.
- Kottner J., et al., Maintaining Skin Integrity in the Aged: A Systematic Review. *The British Journal of Dermatology*. 2013; 169: 528-542.
- Skin dermatitis <http://www.hug-ge.ch/procedures-de-soins/prevention-des-dermites-du-siege-chez-ladulte>
- Sorensen LT, Karlsmark T, Gottrup F. Abstinence From Smoking Reduces Incisional Wound Infection: A Randomized Controlled Trial. *Annals of Surgery*. 2003; 238: 1-5.
- McDaniel JC, Browning KK. Smoking, Chronic Wound Healing, and Implications for Evidence-Based Practice. *Journal of wound, ostomy, and continence nursing* 2014; 41: 415-E2.
- Gould L., Chronic wound repair and healing in older adults: current status and future research. *Wound Repair Regen*. 2015; 23: 1-13.
- LeBlanc K. et al. Pratiques recommandées pour la prévention et le traitement des déchirures cutanées <http://cawc.net/images/uploads/wcc/6-1-leblanc-f.pdf>
- Xiaoti Xu BS et al. The current management of skin tears. *Am J Emerg Med* (2009) 27, 729–733.