

The Cheek Quiz: A Lively Cosmetic Exercise Demonstrating the Importance of Sun Protection

Julie R. Kenner, MD, PhD

UV light is a major contributor to the visual and functional decline in skin health over time. In order to more vividly highlight the importance of sun protection to patients, we created a playful yet demonstrative “quiz” to help reinforce this concept. We photographed the sun-exposed facial cheeks as well as the sun-protected buttock cheeks of women in 5 different decades of life (mid 20s–mid 60s), and randomly ordered the photographs for evaluation. Fifty participants were then asked to guess the correct decade of the “cheeks” from each anatomical site. More than three-fourths of quiz participants were 100% correct in guessing the subject age by evaluating their facial cheeks. In contrast, fewer than 5% of quiz participants were able to do so by looking at the buttock cheeks. This visual demonstration of the relative importance of UV exposure versus chronology in the perceived aging of skin offers an entertaining way to get patients involved in maintaining good skin health.

Skin aging is comprised of both intrinsic factors (innate/chronologic decline plus free radical damage caused by stress, illness, etc) and extrinsic factors (free radical/oxidative deteriorating damage caused by UV light, pollution, etc).¹⁻⁵ Experts agree the most important causal factor in extrinsic aging, and skin aging as a whole, is UV radiation damage (dermatoheliosis).⁶⁻⁸

The physical effects of intrinsic aging are inevitable and seen to similar degrees in all individuals over time. These changes are clinically expressed as thin, loose,

pale, finely-wrinkled soft skin.¹⁻⁸ In contrast, the physical effects of photodamaged skin are highly variable, much more profound, and can be seen with variable onset, as determined by the patient’s UV exposure and tolerability level. These latter effects are physically expressed as coarse yellowing of the skin with elastotic lay-down, deep wrinkles and furrows, irregular and often marked pigmentation, telangiectasias, bruising, and atrophy.¹⁻⁹

Both UVA and UVB radiation contribute to photoaging.^{1,8,9-12} Reactive oxygen species promote oxidation and damage to nucleic acids, proteins, and lipids as well as upregulation of transcriptional factors which increase metalloproteinases and proinflammatory mediators.^{11,13,14} These changes result in cellular damage, mutational events, losses and changes in collagen and elastin, impaired barrier function, and altered pigment lay-down, all of which contribute to the complicated orchestration of skin aging.

Dr. Kenner is private practitioner, Kenner Dermatology Center, Kailua, Hawaii.

The author reports no conflict of interest in relation to this article.

Correspondence: Julie R. Kenner, MD, PhD, Kenner Dermatology Center, 642 Ulukahiki St, Ste 104, Kailua, HI 96734 (jkenner@pol.net).

Dermatologists have been telling patients for years to wear sunscreen to protect against skin cancer and premature aging.¹⁵ The impact of this advice may be diluted by a variety of factors. First, the negative effects of sun on skin frequently are delayed, and have been culturally overwhelmed by society's long-time underlying message that tanned skin is healthy and beautiful. Second, optimal sun protection is difficult to achieve. Sunscreen labeling and recommended wear practices are far from ideal.^{10,16-19} Sunscreen consumers often only apply product when actively seeking sun, routinely under apply the recommended amounts of product, and do not reapply frequently enough (every few hours) to achieve continuous protection.^{16,17} Compounding this, many sunscreens are not broadly UV protective.^{20,21} While those in the industry know that sun protection factor (SPF) relates only to UVB protection, and that SPF levels higher than 30 do not confer any significant benefit, consumers infrequently are aware of this, and fall prey to the marketing of superhigh SPF formulas, which imply superbroad protection and durability. Consumers also are generally unaware that UVA light can penetrate windows (even some tinted windows) and is seen throughout the lit day year-round.⁸

Even when SPF-labeling changes are mandated by the US Food and Drug Administration, education regarding proper sun protection will need to be provided by health practitioners. In trying to guide patients on the use of skin products, we recently devised the "Topical Nutritional Pyramid" concept, in which the 8 basic groupings of cosmeceuticals are ordered according to relative importance or best scientific data regarding maintaining or rejuvenating skin health.²² This educational system is based on the universally familiar "food pyramid" paradigm and positions sunscreen at the critical foundation of this skin pyramid. When counseling patients on the relative attributes of using skin products for rejuvenation, proper use of sunscreen forms the backbone of this discussion.

To more visually emphasize to our patients the importance of sun protection, we designed an exercise contrasting extrinsic (UV-induced) versus chronologic aging by comparing buttock skin to facial skin. While structural differences in buttock and facial skin do exist with regards to density of melanocytes and glandular components (facial skin having more melanocytes and eccrine, apocrine, and sebaceous glands) as well as size of the subcutaneous fat pad (buttock having more), the most striking differences between these surfaces can be seen over time as a result of behavioral differences in exposure to UV light and resulting environmental oxidative

damage.^{2,4-8,23,24} The chronic bombardment of UV light overtime, regardless of body site, overwhelms the natural photoprotective capacity of skin, and produces the well-known accumulation of photochemical reactions expressed clinically as skin aging.⁴⁻⁸

In this small comparative "cheek" study, we challenged 50 patients to guess the decade of 5 volunteers aged 25, 35, 45, 55, and 65 years by examining independently their sun-exposed faces or their sun-protected buttocks. With diet and other behavioral practices such as exercise, smoking and stress levels equivalent within a given volunteer subject, we hoped to emphasize to patients the impact UV exposure alone can have on the aging of skin. The study format was in a quiz type model, as seen in Figures 1 to 3.

Over a period of 3 days, 50 patients who were being seen in the clinic for other reasons were asked if they would like to take part in The Cheek Quiz. Volunteers were given 5 minutes to examine the photographs of the 5 faces, and were asked to match each face to a corresponding decade and record their answers. Quiz respondents were told there was one face for each decade, without duplicates, and to make their best guess. These same 50 volunteers were then given another 5 minutes to examine the photographs of the 5 sets of buttocks and again asked to match each set with a different decade and record their answers. At the

How does sun age our skin?

Take a quiz....

Guess the correct age by looking at sun-protected versus sun-exposed skin.



*Ask the receptionist for the answer key when you have completed the quiz and see if you got the answer correct.

Figure 1. The Cheek Quiz.



Figure 2. Choices 25, 35, 45, 55, 65. See page 74 for answers.

conclusion, respondents were given the correct answers to the quiz, told their score, thanked for their participation, and reminded to wear their sunscreen.

RESULTS

With regards to guessing the correct decade of the sun-exposed facial cheeks of 5 individuals, 76% of the 50 polled volunteers were 100% correct in all of their

answers. That is, more than three-fourths of the tested population were readily able to distinguish the approximate chronological decade of all of the photographed people by looking at their sun-exposed skin. Few mistakes were made, and the average quiz score was 90% correct. None of the test takers scored 0%.

In contrast, with regards to guessing the correct decade of the sun-protected buttock cheeks of the



Figure 3. Choices 25, 35, 45, 55, 65. See page 74 for answers.

same 5 individuals, only 4% of our polled volunteers were 100% correct in matching the photograph to the proper decade. A full 26% of polled volunteers got every answer wrong (scored 0%), and the average quiz score was only 29%.

All volunteer participants taking the quiz expressed surprise and amazement (along with humor) during this exercise to discover how youthful and healthy sun-protected skin can look, regardless of chronological age. As a result, many participants vowed to increase their sun protection habits.

Aesthetic practitioners are well-aware that aging of skin is accelerated in areas exposed to chronic sunlight, a complex process known simply as photoaging. This study vividly highlights how exogenous photoaging contributes more to skin aging than chronology alone, and how determining physical age may be difficult without the externally derived marks of time (ie, UV exposure). The accumulated collection of wrinkles, pigmentary changes, atrophy, solar elastoses, and telangiectasias present in sun-exposed skin may be wired in anthropologically as a quick translation of

Answers

Figure 2

A. 35

B. 25

C. 65

D. 55

E. 45

Figure 3

A. 45

B. 65

C. 35

D. 55

E. 25

age, which may then play into behavior patterns and social interactions. When trying to convince patients how important photoaging is to premature aging, a study like this can provide a dramatic teaching aid.

CONCLUSION

The Cheek Quiz is a vivid and fun visual aide to educate patients on the benefits of sun protection with regards to maintaining the youthfulness of skin. While clearly immediately helpful to the aesthetic practitioner, expanding our tools to educate patients on the virtues of sun protection will have a broader impact on preventing skin cancer and other photodermatoses as well.

REFERENCES

- Farris PK, Rendon MI. The mechanism of action of topical retinoids for the treatment of nonmalignant photodamage, part 1. *Cosmet Dermatol.* 2010;23:19-24.
- Gilchrist BA. A review of skin ageing and its medical therapy. *Br J Dermatol.* 1996;135:867-875.
- Rokhsar CK, Lee S, Fitzpatrick RE. Review of photorejuvenation: devices, cosmeceuticals, or both? *Dermatol Surg.* 2005;31:1166-1178.
- Farage MA, Miller KW, Elsner P, et al. Structural characteristics of the aging skin: a review. *Cutan Ocul Toxicol.* 2007;26:343-357.
- Puizina-Ivić N. Skin aging. *Acta Dermatovenereol Alp Panonica Adriat.* 2008;17:47-54.
- Gray J, Hawk J, eds. *The Benefit of Lifetime Photoprotection. International Congress and Symposium, Series 231.* London, England: Royal Society of Medicine Press Limited; 1998.
- Tsourelis-Nikita E, Watson RE, Griffiths CE. Photoaging: the darker side of the sun. *Photochem Photobiol Sci.* 2006;5:160-164.
- Seité S, Fourtanier AM. The benefit of daily photoprotection. *J Am Acad Dermatol.* 2008;58:S160-S166.
- Hegedua F, Diecidue R, Taub D, et al. Non-surgical treatment modalities of facial photodamage: practical knowledge for the oral and maxillofacial professional. *Int J Oral Maxillofac Surg.* 2006;35:389-398.
- Pinnell SR. Cutaneous photodamage, oxidative stress, and topical antioxidant protection. *J Am Acad Dermatol.* 2003;48:1-19.
- Palmer DM, Kitchin JS. Oxidative damage, skin aging, antioxidants and a novel antioxidant rating system. *J Drugs Dermatol.* 2010;9:11-15.
- Fisher GJ, Voorhees JJ. Molecular mechanisms of photoaging and its prevention by retinoic acid: ultraviolet irradiation induces MAP kinase signal transduction cascades that induce Ap-1-regulated matrix metalloproteinases that degrade human skin in vitro. *J Invest Dermatol Symp Proc.* 1998;3:61-68.
- Fisher GJ, Wang ZQ, Datta SC, et al. Pathophysiology of premature skin aging induced by ultraviolet light. *N Engl J Med.* 1997;337:1419-1428.
- Fisher GJ, Datta SC, Talwar HS, et al. Molecular basis of sun-induced premature skin ageing and retinoid antagonism. *Nature.* 1996;379:335-339.
- Drake LA, Dinehart SM, Farmer ER, et al. Guidelines of care for photoaging/photodamage. American Academy of Dermatology. *J Am Acad Dermatol.* 1996;35:462-464.
- Taff J, Briley J, Fox J, et al. The changing attitudes and behaviors of sun protection. Poster presented at: American Academy of Dermatology 67th Annual Meeting; March 6-10, 2009; San Francisco, CA. http://www.aad.org/meetings/annual/Templates/_documents/ymjd60_3S1.pdf. Accessed December 16, 2010.
- Armstrong AW, Watson AJ, Makredes M, et al. Text-message reminders to improve sunscreen use: a randomized, controlled trial using electronic monitoring. *Arch Dermatol.* 2009;145:1230-1236.
- Autier P, Boniol M, Severi G, et al. Quantity of sunscreen used by European students. *Br J Dermatol.* 2001;144:288-291.
- Wulf HC, Stender IM, Lock-Andersen J. Sunscreens used at the beach do not protect against erythema: a new definition of SPF is proposed. *Photodermatol Photoimmunol Photomed.* 1997;13:129-132.
- Forestier S. Rationale for sunscreen development. *J Am Acad Dermatol.* 2008;58(suppl 2):S133-S138.
- Valins W, Viera M, Amini S, et al. Rating the 4-star UVA rating protection system. *Cosmet Dermatol.* 2010;23:308-312.
- Kenner JR. The topical nutritional pyramid: a method for educating patients on skin-rejuvenating cosmeceuticals. *Cosmet Dermatol.* 2010;23:180-184.
- Ackerman AB. Skin: structure and function. In: Ackerman AB, ed. *Histologic Diagnosis of Inflammatory Skin Disease: A Method Based on Pattern Analysis.* Philadelphia, PA: Lea & Febiger; 1978:3-80.
- Hood AF, Kwan TH, Mihm MC, et al. Normal histology of the skin. In: Hood AF, Kwan TH, Mihm MC, Horn TD, Smoller BR, eds. *Primer of Dermatopathology.* 3rd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2002:4-18. ■