Linking Dermatology and Dentistry
Part I: Looking Beyond the Oral Cavity

A Peer-Reviewed Publication
Written by Lisa Dowst-Mayo, RDH, BSDH

Abstract
Dental professionals are well educated in head and neck anatomy as well as full body pathology. We are in a unique position within the healthcare community to identify inconsistencies of the head and neck since we are commonly spending a significant period of time with our patients. Observing and examining exposed areas of the head and neck enables dental professionals to provide early identification, intervention and referral as needed. Part one of this course is designed to enhance the dental practitioner’s knowledge of common skin conditions. Part two will present treatment options for those conditions. By integrating evidence-based dentistry with evidence-based dermatology, comprehensive patient care will improve.

Educational Objectives
At the conclusion of this educational activity participants will be able to:
1. Review skin anatomy and physiology.
2. Discuss the chemistry behind aging skin including free radical damage to cells.
3. Discuss how human skin ages and why wrinkles, blemishes and hyperpigmentation increase with advancing age.
4. Identify skin lesions that need referral to a specialist.

Author Profile
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Author Disclosure
Lisa Dowst-Mayo has no affiliations with any company who would have a gained interest in the material published in this course. There was no corporate sponsor in the making of this course and the author is not employed by a company that would stand to profit off the publication of this course. All research is presented in an unbiased manner.

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Abstract
Dental professionals are well educated in head and neck anatomy as well as full body pathology. We are in a unique position within the healthcare community to identify inconsistencies of the head and neck since we are commonly spending a significant period of time with our patients. Observing and examining exposed areas of the head and neck enables dental professionals to provide early identification, intervention and referral as needed. Part one of this course is designed to enhance the dental practitioner’s knowledge of common skin conditions. Part two will present treatment options for those conditions. By integrating evidence-based dentistry with evidence-based dermatology, comprehensive patient care will improve.

Introduction
There is no fountain of youth in this world; however, there are ways to slow the natural aging process of the human body. This course will help the clinician identify skin abnormalities and dermatological discrepancies and suggest treatment options for patients.

There is a strong connection between dermatology and dentistry that is not always recognized or utilized by health care professionals. Dentists and dental hygienists should be at the forefront of identifying head and neck abnormalities, offering referrals when needed and/or providing prescriptions or over-the-counter medications based on findings. This course is designed to bring the clinician outside the oral cavity, focusing on skin lesions that can be diagnosed upon a thorough extraoral screening. We can also provide life-saving referrals when skin abnormalities are observed. Since patients can spend hours in our chair, under an overhead light, why would we not spend a couple of minutes scanning the epidermis? Other medical professionals do not have patients in such an ideal position to view the face, neck, ears and hairline.

Figures 1 and 2 demonstrate lesions that can be observed with a thorough extraoral screening including lifting the hair off the neckline.

Anatomy & Physiology of the Skin:
The largest organ in the human body is the integumentary system. It is the first line of defense from external insults and it interfaces with the external environment. The skin plays a key role by protecting against pathogens, preventing excessive water loss, temperature regulation, insulation, sensation, and the production of vitamin D. It is imperative to protect and maintain the health of this vital organ.

The skin contains many different structures and substrates.  

1. Epidermis: The outer layer of the skin. A basement membrane separates the epidermis from dermis. It is comprised of epithelial cells that form membranes of closely associated cells with an intercellular substance between them. Most epithelium has the capability of cell renewal by mitosis of the basal cells and that rate is determined by the location in the body. Skin cell turnover rates change dramatically throughout our lives, which in turn, affects the aging process of the skin.

2. Dermis: The connective tissue layer lying just under the epidermis. The dermis plays important functions in nourishing the skin and in thermal regulation. The dermis is comprised of two layers; the papillary and reticular layers. The dermis houses blood vessels, nerves, receptors, sweat glands, sebaceous glands and erector pili muscles.

3. Hypodermis: Made of loose connective tissue and elastin just below the dermis. It is the location of the connection between the skin and underlying structures such as muscles and bones. The hypodermis is primarily comprised of areolar and adipose tissues and its purpose is to supply blood vessels and nerves. The primary cell types are fibroblasts, macrophages and adipocytes. The hypodermis is responsible for 50% of total body fat content.

4. Hair follicle: Extends from the hypodermis to epidermis. It contains blood vessels and a portion of the surrounding connective tissue which enters from the bottom of the hair bulb. The hair follicle plays a major role in acne and other skin conditions.

5. Sebaceous glands: Primarily associated with hairs that open into the follicles, however, some open to the free surface of the skin. These glands consist of small clusters of cells. Sebaceous glands produce sebum which lubricates the skin and helps prevent the growth of bacteria. If the sebaceous gland does not produce enough sebum, the skin is dry. On the other hand, if it produces too much, the skin is oily. If sebum gets trapped in the pores, acne can develop.

6. Sebum: The oil on the surface of skin is a complex mixture of lipids (including glycerides), free fatty acids, wax esters, cholesterol esters, sweat and environmental agents. Sebum is produced when a sebaceous gland disintegrates. Sebum reduces water loss...
from the skin surface, protects the skin from infection and contributes to body odor.\textsuperscript{10}

Sebaceous glands on the forehead and chin are larger and more numerous than elsewhere on the body; up to 400-900 glands per square centimeter.\textsuperscript{28} Sebum production is under the control of sex hormones (androgens) made by the adrenal glands.

In females, the role of progesterone as it relates to sebum productions is still unclear. It has been noted that more sebum is produced the week proceeding a menstrual period when progesterone levels are higher.\textsuperscript{28} The amount of sebum can be reduced by certain systemic medications such as estrogens/oestrogens, anti-androgens/androgen antagonists or vitamin-A derivatives such as isotretinoin which will be discussed further in Part Two of this course.

Sebum composition of oils varies dramatically with age. Adult males will produce slightly more than adult females. Below is a timeline of sebum production by age.

- **Fetus:** produces vernix caseosa, a waxy protective layer
- **3-6 months old:** sebum produced resembles that of an adult
- **8 years:** Until the age of 8, sebum has less wax and squalene and more cholesterol
- **Puberty:** Sebum production increases, up to fivefold in men
- **20 years:** Sebum production declines in both men and women
- **Adult females:** Sebum declines after menopause associated with the changes in progesterone and estrogen. It’s this decrease in estrogen which slows down mitotic activity in the epidermal basal layer, reduces the synthesis of collagen and contributes to the thickening of the dermo-epidermal junction. These changes cause the skin to thin, atrophy, wrinkle, increase dryness and display delayed wound healing.\textsuperscript{4}

7. **Sweat glands (Sudoriferous):** Located deep in dermis or hypodermis. The sweat gland ducts open to the surface of the skin and are under control of the autonomic nervous system.\textsuperscript{10}

**Chemistry Behind Aging Skin**

Among the most dangerous agents on earth are free radicals, which significantly influence the overall aging process of our bodies. They are atoms or ions with an unpaired electron or open shell configurations, which makes them highly chemically reactive. (Figure 4). Free radicals are found in the air, solar radiation, foods and environmental pollutants.\textsuperscript{25,35} Since free radicals are found in the environment, they can have an adverse effect on the skin and lead to wrinkles, hyperpigmentation, dry skin, dark circles under the eyes, dull skin, and mutation of cells and DNA which can lead to cancer.

The Free-Radical Theory of Aging states that an organism ages because cells accumulate free radical damage over time.\textsuperscript{15,27} Antioxidants may help fight the aging process as they are reducing agents that limit oxidative damage to biological structures by pacifying or inactivating free radicals.\textsuperscript{12,39} Research into antioxidants has been ongoing since the 1920s and their uses in dermatological and dental conditions will be discussed in Part Two of this course.
Skin Conditions

Awareness of common skin conditions will help dentists and dental hygienists provide accurate differential diagnoses when a lesion or imperfection is identified extraorally. By performing a thorough screening of a patient’s skin while you are working in their oral cavity, the dental clinician will be better able to notice those less obvious or innocuous-appearing lesions on a patient’s skin that may otherwise go unnoticed. Accurately identifying lesions and thoroughly examining patients will save lives through early intervention and specialist referrals. Early diagnosis improves the patient’s prognosis.

Milia: Tiny keratin-filled cysts just below the epidermis. They are common in newborns. Common locations include; the face, nose, around the eyes or roof of the mouth. Milia are completely benign lesions but may bother a patient cosmetically. Referral to a dermatologist or esthetician for removal can be recommended if a patient desires. (Figure 5)

Whitehead: Medically termed a “closed comedo,” and lay termed a “pimple” or “zit.” A whitehead has no opening to the skin surface as does a blackhead. Since there is no opening, no oxidation will occur. Whiteheads can occur in groups or as a single lesion anywhere on the body.

Blackhead: Medically termed an “open comedo.” It is the most common finding in acne vulgaris and is caused by excessive oils that accumulate in sebaceous gland ducts. The lesions contain keratin and modified sebum and darken as they ionize. (Figure 6) They are most commonly associated with clogged hair follicles and appear as yellowish-brown or blackish dome-shaped lesions on the skin. This condition can be painful and pose a major cosmetic concern for patients. If blackheads are a chronic issue, especially accompanied by acne, referral to a dermatologist is indicated.

Acne: Affects 85% teenagers and is the most common skin condition in the United States. It is on the rise in adult women and occurs commonly during pregnancy, menopause or when women stop taking birth control pills due to the fluctuations in

Figure 4: Oxidation/Reduction

Figure 5: Milia

Figure 6: Blackhead
http://www.medicalnewstoday.com/articles/71615.php

Figure 7: Acne
hormone levels (see section above on sebum). Common locations for women are on lower part of the face; around the mouth, chin and along the jawline.

Acne develops when excess sebum, skin cells or bacteria accumulate on the skin. It is not just a pimple and can be accompanied by pain, multiple black/whiteheads, papules, cysts and/or infections. (Figure 7). Acne cases are graded 1-4 by dermatologists, based on severity. Most treatments take 4-8 weeks to become effective and will be discussed further in Part Two of this CE course.

FRECKLES
Freckles are clusters of concentrated melanin that are most often visible in individuals with fair complexions. They are medically termed "ephelids" and are not associated with an increased number of melanin producing cells (melanocytes) as moles are (Figure 8). People with freckles are more susceptible to the harmful effects of UV radiation. Research suggests they avoid overexposure to the sun, tanning beds and use sunscreen daily. It is important for dental professionals conducting extraoral cancer screening to be proficient in distinguishing freckles from moles so they can correctly identify higher risk lesions that need to be referred to a specialist for possible biopsy and further examination.

MOLES (NEVI)
Moles, medically termed nevi, are a very common condition. Almost every adult has at least a few moles, some have 10-40. According to the Mayo clinic, if a patient has more than 50 moles on their body they are at higher risk for developing melanoma. Moles are clusters of melanocytes that commonly occur on sun-exposed parts of the body. According to the American Academy of Dermatology, there are four different types of melanocytic nevi and some types increase a patient’s risk for developing melanoma.

**Common mole:** Common moles generally do not turn into melanoma. Common moles are usually present at birth although can be acquired until about the age of 40. (Figure 9). Traits of a common mole include:
1. Color: brown, tan, black, red, pink, blue, skin-toned, or colorless
2. Shape: round, flat, slightly raised or dome-shaped
3. Size: less than 5mm
4. Consistency: looks the same month-to-month

**Atypical mole:** Can look like a melanoma but it is not. They are generally larger than a pencil eraser, have an irregular shape, and display more than one color. If a dental professional suspects this type of mole, referral to a dermatologist is indicated to rule out melanoma. Atypical moles can appear anywhere and are common on the trunk, head, neck or scalp.

**Congenital mole:** Roughly 1 out of 100 people are born with congenital moles and they vary in size from small to giant. Cindy Crawford and Marilyn Monroe are two well known celebrities with moles on their cheeks that many refer to as “beauty marks.” Having multiple giant moles does increase the risk of melanoma.
**Spitz mole:** Commonly resemble melanoma. They are often pink, raised and dome-shaped, but can be brown, black or red as well as bleed or ooze. Spitz nevi commonly occur in the first two decades of life (Figure 10). A referral to a dermatologist is indicated to correctly diagnose and rule out a more serious condition.

All dental professionals should know the ABCDE’s of a melanoma to help distinguish a typical or low risk mole from a potentially malignant mole.

<table>
<thead>
<tr>
<th>A</th>
<th>Asymmetry</th>
<th>One half is unlike the other</th>
</tr>
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<tbody>
<tr>
<td>B</td>
<td>Border</td>
<td>Irregular, scalloped, poorly defined or demarcated</td>
</tr>
<tr>
<td>C</td>
<td>Color</td>
<td>Varies from one mole to another. Shades of tan, brown, black, white, red or blue</td>
</tr>
<tr>
<td>D</td>
<td>Diameter</td>
<td>Melanomas are usually greater than 6mm (the size of a pencil eraser) when diagnosed although they can be smaller</td>
</tr>
<tr>
<td>E</td>
<td>Evolving</td>
<td>A mole that looks different from others or changes in size, shape, color or consistency</td>
</tr>
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A differential diagnosis could include a multitude of disorders including; seborrheic keratosis, pigmented basal cell carcinoma, squamous cell carcinoma, hemangioma, sebaceous hyperplasia or lentigo.

**AGE SPOTS**
Age spots, also referred to as sun spots, liver spots, lentigo, or lentigines; will appear as flat, oval, hyperpigmented lesions with well demarcated borders that are gray, brown or black (Figures 11,12). They usually occur in sun-exposed areas of the skin such as hands, feet, shoulders and upper back. Age spots are very common after the age of 40 but can occur in younger patients. They are the result of years of exposure to UV light from the sun or tanning beds which accelerated the production of melanin within the base of the epidermis. 45

A differential diagnosis could include a melanoma, freckle, nevi, lentigo maligna also known as lentiginous melanoma or seborrheic keratosis. Diagnosis is made based on clinical appearance and generally requires no treatment but many doctors will perform a skin biopsy to rule out more serious conditions.

**ECZEMA/ATOPIC DERMATITIS**
A chronic skin disorder that involves itchy, rash-like, or scaly patches (Figure 13). It is caused by a hypersensitivity reaction in the skin and is common in patients who also suffer from allergies and/or asthma. 5 Patients may lack a certain protein in the skin which can contribute to a greater sensitivity to atopic dermatitis and is commonly thought to be an inherited disorder.
According to the American Academy of Dermatology, dry skin can affect any part of the skin but is common on the cheeks, scalp, forehead, eyelids or under eyes, knees, elbows, hands or feet. Dental professionals may have issues with eczema on their hands due to the number of times hand washing takes place and/or due to the type of antimicrobial soaps used. Scratching excessively can lead to infection, disturbed sleep or could cause the skin to thicken and darken permanently.

ROSACEA
Rosacea is a chronic skin condition which manifests as redness of the skin and may cause swelling and skin sores that resemble acne. Rosacea involves swelling of the blood vessels just under the skin and is of unknown origin. It is common in individuals 30-50 years of age, in fair skinned individuals and occurs more commonly in women. The clinical appearance is generalized redness, blushing easily, spider-like blood vessels (telangiectasia) of the face, red nose, acne-like sores that ooze or crust, burning or stinging of the face and irritated or blood-shot eyes.

ORAL LICHEN PLANUS (OLP)
Defined as a chronic, benign inflammatory condition involving destruction of basal cells of the surface epithelium, OLP can affect any lining mucosa in the body including the mouth and skin. Some research links OLP to an autoimmune response, however, no particular antigen has been found. Its etiology and host susceptibility still remain unclear. Statistics show OLP is more common in middle-aged women and affects 0.1-4% of the population in the United States, with 40% of the patients having cutaneous involvement. OLP can require long term management and treatment; however, patients may go through periods when they are symptom free or the disease clears on its own within a couple of years. Intraorally, OLP can present on the cheeks, tongue, lip and/or mucosa. Cutaneous lesions will appear as purple, polygonal, pruritic papules that are usually found in small clusters on flexor aspects of the extremities but tend to be self-limiting and may or may not clear up within 1-2 years. These lesions may leave pigmented spots on the skin after they disappear, as do many inflammatory lesions.
OLP is usually diagnosed based on visual presentation; however, many health providers will biopsy to confirm the diagnosis and rule out other conditions. A differential diagnosis may include; epithelial dysplasia, squamous cell carcinoma, lichenoid drug reaction, mucosal reaction to allergens such as cinnamon, foreign body or amalgam reaction, lupus erythematosus, dysplasia, candida, chronic ulcerative stomatitis or autoimmune diseases such as pemphigus.

PSORIASIS
A chronic, immune-mediated skin disease that also has systemic manifestations. The lesions may appear as with silver-white patches called scales or red-flaky patches that are itchy. It may look rash-like, be smooth or rough depending on the type (There are 5 types.) Psoriasis is not contagious and appears to be genetically linked. The progression of psoriasis is as follows:
1. The immune system sends faulty signals to skin cells causing them to grow too rapidly.
2. The new skin cells form in days rather than weeks and the body does not shed the excess cells.
3. The cells pile up on the surface of the skin and patches of psoriasis start to appear clinically.
Psoriasis can be triggered by infection, dry air/skin, trauma, medications (beta-blockers, lithium), stress, sunlight (too much or too little) or alcohol. The patches are common on the head and neck, especially along the hairline or back of the neck (Figure 14). Identifying psoriasis will help dental professionals decide whether they are looking at a simple, benign condition or a more dangerous condition that needs referral to a specialist.

SEBORRHEIC DERMATITIS (SD)
SD is defined as a chronic, benign relapsing inflammatory skin disorder clinically characterized by scaling, poorly defined erythematous patches or greasy yellow flakes in areas of high sebaceous gland activity; especially on the head and neck, scalp, hair line chest and upper back (Figure 15). The etiology is not fully understood, but it is thought to be caused by Malassezia yeasts, androgen hormones, sebum levels or immune responses and it affects 5% of the population. SD is exacerbated by stress, cold temperatures and drugs. A differential diagnosis may include; warts, moles, actinic keratosis, and skin cancer.

VERMILLION BORDER DETERIORATION
The vermilion border represents the change in the epidermis from highly keratinized external skin to less keratinized internal skin. According to the UK Cancer Research group, lower lip cancer accounts for 5% of all new squamous cell carcinoma diagnoses. The vermilion border and lips can be damaged by sun exposure and dental professionals should recommend a lip balm with zinc oxide to their patients.
ANGULAR CHEILITIS
Angular cheilitis is a chronic inflammatory process most commonly located on the labial commissure where deep cracks/splits, ulcers, bleeding or crusting can occur. It is commonly caused by candida organisms, bacterial infections and/or nutritional deficiencies. Treatment options will be presented in Part Two of this course.

ACTINIC CHEILITIS (AC)
Actinic cheilitis presents as a loss of sharpness around the border of the lip, atrophy of the vermilion border and darkening at the junction of the lip and skin of the face. AC is considered a potentially malignant disorder, which could turn into squamous cell carcinoma. Research results on the percentage of actinic cheilitis cases converting to cancer are controversial. Estimates vary dramatically from 1.4%-36%. Identification and treatment are commonly delayed because health care professionals overlook the condition as a harmless chronic inflammatory issue or dismiss changes as appearing non-threatening or alarming. If a dental professional sees such changes around the lips, an immediate referral to a specialist is needed.

The highest risk groups for AC are fair-skinned individuals with high levels of UV/sunlight exposure which accumulates throughout the lifetime. Clinical changes frequently occur around the 5th decade of life; however, this condition can occur at any age. The lip is insufficiently protected from radiation because of its thinner epithelium, thin layer of keratin, lower concentrations of melanin and lower secretions from sebaceous glands. Smoking may also increase a patient’s risk for actinic cheilitis. Dental professionals are in a unique position to thoroughly evaluate the lips while our patients are in a supine position, with an overhead light illuminating the area.

NONMELANOMA SKIN CANCER
Skin cancer can be divided into 2 categories: melanoma or non-melanoma. Basal cell carcinoma and squamous cell carcinoma are the most common forms of nonmelanoma skin cancers. According to the CDC, there were more than 2 million cases of skin cancer in the US in 2012. There were 76,250 new cases of melanoma with more than 9,000 fatalities. The CDC also estimates 65-90% of melanomas are caused by UV light.

BASAL CELL CARCINOMA (BCC)
Basal cell carcinoma is the most common form of skin cancer, accounting for more than 80% of cases. Most commonly affected sites include areas of the skin that are frequently exposed to the sun such as; the face, scalp, nose, ears, around metal eyeglass frames or the back of the hands. BCC grows slowly and occurs in the basal cells located in the lower epidermis. BCC rarely metastasizes and is usually asymptomatic.

Higher risk groups for BCC are individuals over the age of 40, people with light-colored or freckled skin, blue/green/grey eyes, blonde or red hair, a high number of moles (> 50), over-exposure to x-rays or other forms of radiation, family history of skin cancer, tanning bed use or frequent sunburns in early years of life. BCC presents clinically as a dome-shaped lesion with a pearly or wax-like appearance with rolled borders that may be white, light pink, brown or flesh-colored. Lesions may bleed occasionally; have visible blood vessels in or around the skin, oozing, crusting and/or an inability to heal. The lesion may flatten or sink in the center and have an absence of well-defined borders (Figure 16).

SQUAMOUS CELL CARCINOMA (SCC)
There are 700,000 new cases of squamous cell carcinoma diagnosed each year in the United States. It tends to develop on skin that has been exposed to the sun for years and is most frequently seen on the head, neck, mouth, lips or back of the hands. Other risk factors include advanced age, light-colored skin, blue/green/grey eyes, many previous x-rays or chemical exposures. Lesions on the leg are common in women and will spread to other parts of the body if not treated aggressively. People who use tanning beds are at greater risk and also contract SCC earlier in life. Early diagnosis is critical and with correct treatment, SCC is very curable.

Clinical presentations of SCC are nodules that grow, do not heal on their own, have a rough, scaly surfaces and/or flat reddish patches over 1 inch in diameter. Some lesions will appear as a pre-cancerous growth called an actinic keratosis (AK). In adults 40+ years of age, about 40-60% of SCCs begin as AK. AK lesions clinically present as small, pink, rough, dry, scaly patches or growths on the skin. They can itch or burn or be completely asymptomatic. AK may present as a sore that doesn’t heal or heals and returns at a later date. AK lesions can easily be mistaken for a multitude of other, non-cancerous dermatological issues because of their presentation and locations. They can occur in areas that are difficult to observe such as; behind the ears, along the hairline or under the collar of a shirt. It can be challenging for dental professionals to find and identify these lesions as AK and they may dismiss these growths as age spots, normal anatomy or non-threatening lesions in some situations. Dental providers need to

Figure 16: Basal Cell Carcinoma
check all areas of skin on the head and neck carefully during extraoral screenings; being sure to check behind the ears, around the clavicle and having long hair pulled up off the neck so the hairline and scalp can be visualized.

Conclusion
Due to our existing knowledge and education of the head, skin and neck anatomy, dental professionals can be leaders in identifying head and neck lesions and skin abnormalities.

Early detection and referral to a specialist for any suspicious lesions of the skin, regardless of how innocuous they may appear, cannot be overstated. Part 2 of this course will present current, research-based treatment options and educate clinicians on the use of antioxidants for the skin and the mouth.

References

Author Profile
Lisa Dowst-Mayo, RDH, BSDH graduated magna cum laude from Baylor College of Dentistry in 2002. She has been an active member of the American Dental Hygiene Association and has held numerous leadership positions both at the state and local levels. She is currently a full time professor at Concord Carref Career College in the dental hygiene department in San Antonio, TX. Lisa is a published autor, enthusiastic national speaker and can be contacted through her website at www.lisamayordh.com.

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Questions

1. Which of the following is a function of the skin?
   a. Protection from environmental factors
   b. Temperature regulation
   c. Production of Vitamin D
   d. All of the above

2. The skin structure responsible for nourishing the skin and for thermal regulation is the:
   a. Epidermis
   b. Dermis
   c. Hypodermis
   d. Sebaceous glands

3. As an infant, epidermal skin turnover rate is:
   a. 14 days
   b. 21-28 days
   c. 28-42 days
   d. 42-84 days

4. Which of the following is true regarding the hypodermis?
   a. Makes up 50% of total body fat
   b. Made of areolar and adipose tissues
   c. Supplies blood vessels and nerves
   d. All of the above

5. Which of the following is the stage of life of dramatically increased sebum production?
   a. 3-6 months
   b. 8 years
   c. Puberty
   d. Over 23 years of age

6. Free radical damage in the human body can lead to which of the following?
   a. Cancer
   b. Wrinkling of the skin
   c. Dull skin
   d. All of the above

7. Free radicals are found in the:
   a. Air
   b. Food supply
   c. Environmental pollutants
   d. All of the above

8. Which condition is defined as tiny white bumps on the skin that are common in newborns and children?
   a. Milia
   b. Whitehead
   c. Blackhead
   d. Acne

9. The medical term for freckles is:
   a. Lentigines
   b. Nevi
   c. Ephelid
   d. Milia

10. The medical term for a blackhead is:
    a. Closed Comedo
    b. Open Comedo
    c. Nevi
    d. Ephelid

11. Blackheads can contain which of the following structures?
    a. Keratin
    b. Modified sebum
    c. Cysts
    d. Both a & b

12. Which of the following increases the risk of melanoma development?
    a. 50+ moles on the body
    b. Absence of moles on the body
    c. Fair skin and blue eye color
    d. Both a & c

13. Which of the following descriptions of a mole should alarm a dental professional?
    a. One half is unlike the other
    b. Irregular borders
    c. Less than the size of a pencil eraser (<1mm)
    d. Both a & b

14. Another term used to describe age spots is:
    a. Nevi
    b. Ephelid
    c. Lentigo
    d. Common mole

15. Which of the following skin conditions is defined as a chronic skin disorder that involves itchy, rash-like or scaly patches usually diagnosed before age 6?
    a. Eczema
    b. Rosacea
    c. Oral Lichen Planus
    d. Psoriasis

16. According to the American Academy of Dermatology, eczema on the head and neck commonly occurs on the:
    a. Cheeks
    b. Scalp
    c. Eyelids
    d. All the above

17. A chronic skin condition that makes the skin red and may cause swelling and sores is defined as:
    a. Acne
    b. Eczema
    c. Rosacea
    d. Seborrheic dermatitis

18. Which of the following terms is used to define a chronic, benign inflammatory condition implicating cell-mediated cytotoxicity and involving destruction of basal cells of the surface epithelium?
    a. Seborrheic dermatitis
    b. Oral lichen planus
    c. Squamous cell carcinoma
    d. Psoriasis

19. Oral lichen planus can occur on which areas of the head and neck?
    a. Lip
    b. Oral mucosa
    c. Skin
    d. All the above

20. Seborrheic dermatitis consists of silver-white or red-flaky patches. Psoriasis is characterized by erythematous or greasy yellow flakes of the skin.
    a. Both statements are TRUE
    b. Both statements are FALSE
    c. The first statement is TRUE, the second is FALSE
    d. The first statement is FALSE, the second is TRUE

21. Psoriasis can be triggered by infection, beta-blockers, sunlight or alcohol. The patches are common on the head and neck, especially along the hairline or back of the neck.
    a. Both statements are TRUE
    b. Both statements are FALSE
    c. The first statement is TRUE, the second is FALSE
    d. The first statement is FALSE, the second is TRUE

22. A chronic inflammatory process most commonly located on the labial commissure where deep cracks/splits, ulcers, bleeding or crusting can occur describes which of the following conditions?
    a. Angular cheilitis
    b. Actinic cheilitis
    c. Actinic keratosis
    d. Squamous cell carcinoma

23. Which of the following is the most common form of skin cancer, accounting for more than 80% of skin cancers?
    a. Squamous cell carcinoma
    b. Basal cell carcinoma
    c. Melanoma
    d. Oropharyngeal cancer

24. According to the UK Cancer Research group, which area of the oral cavity accounts for 5% of all new squamous cell carcinoma diagnoses?
    a. Tongue
    b. Upper lip
    c. Lower lip
    d. Buccal mucosa

25. A loss of sharpness around the border of the lip, atrophy of the vermilion border and darkening at the junction of the lip and skin of the face which could be a precursor to cancer describes which of the following conditions?
    a. Basal cell carcinoma
    b. Vermillion border deterioration
    c. Angular cheilitis
    d. Actinic cheilitis

26. The CDC estimates 65-90% of melanomas are caused by:
    a. Being over the age of 50
    b. UV light
    c. Having light, fair colored skin
    d. Multiple sunburns throughout life

27. A dome-shaped lesion with a pearly or wax-like appearance with rolled borders that may be white, light pink, brown or flesh-colored describes which of the following condition?
    a. Actinic cheilitis
    b. Basal cell carcinoma
    c. Squamous cell carcinoma
    d. Actinic keratosis

28. Which of the following risk factors increases the likelihood of squamous cell carcinoma development earlier in life?
    a. Use of tanning beds earlier in life
    b. Having light, fair colored skin
    c. Having blue, green or grey eyes
    d. Having multiple sunburns throughout life

29. Actinic keratosis is a pre-cancerous lesion associated with which form of skin cancer?
    a. Squamous cell carcinoma
    b. Basal cell carcinoma
    c. Melanoma
    d. Oropharyngeal Cancer

30. Actinic keratosis lesions clinically present as small, pink, rough, dry, scaly patch or growths on the skin that come and go. They are always asymptomatic.
    a. Both statements are TRUE
    b. Both statements are FALSE
    c. The first statement is TRUE, the second is FALSE
    d. The first statement is FALSE, the second is TRUE
Part I: Looking Beyond the Oral Cavity

Educational Objectives

1. Review skin anatomy and physiology.
2. Discuss the chemistry behind aging skin including free radical damage to cells.
3. Discuss how human skin ages and why wrinkles, blemishes and hyperpigmentation increase with increasing age.
4. Identify skin lesions that need referral to a specialist.

Course Evaluation

1. Were the individual course objectives met?
   Objective #1: Yes No
   Objective #2: Yes No
   Objective #3: Yes No
   Objective #4: Yes No

2. To what extent were the course objectives accomplished overall?  5 4 3 2 1 0
3. Please rate your personal mastery of the course objectives.  5 4 3 2 1 0
4. How would you rate the objectives and educational methods?  5 4 3 2 1 0
5. How do you rate the author’s grasp of the topic?  5 4 3 2 1 0
6. Please rate the instructor’s effectiveness.  5 4 3 2 1 0
7. Was the overall administration of the course effective?  5 4 3 2 1 0
8. Please rate the usefulness and clinical applicability of this course.  5 4 3 2 1 0
9. Please rate the usefulness of the supplemental webliography.  5 4 3 2 1 0
10. Do you feel that the references were adequate? Yes No
11. Would you participate in a similar program on a different topic? Yes No
12. If any of the continuing education questions were unclear or ambiguous, please list them.

13. Was there any subject matter you found confusing? Please describe.

14. How long did it take you to complete this course?

15. What additional continuing dental education topics would you like to see?