SKIN CANCER AND INFLAMMATORY CONDITIONS

PART II: SKIN CARE AND PREVENTION

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Abstract

Skin is the body’s largest organ, and it serves as a vital shield of armor for the other organs. Protecting the skin is critical to maintaining good health and quality of life. Regardless of the cause, once injury and chronic wounds affect the skin, patients suffer both physically and emotionally. Medical professionals are called upon to develop skin care and wound prevention strategies to ensure long-term patient skin health and to identify risk factors before they have a negative effect on
their patients. Skin cancer and inflammation conditions, prevention and treatment are discussed.

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Pharmacology content is 0.5 hours (30 minutes).

**Statement of Learning Need**
Health care professionals are increasingly relied upon to educate the public about the prevention of skin injury, inflammation and cancer. Helping individuals understand early recognition of skin disease can prevent spread, and support cure.
Course Purpose
To provide nursing professionals with knowledge of skin disease recognition, and the importance of prevention and early detection.

Target Audience
Advanced Practice Registered Nurses and Registered Nurses
(Interdisciplinary Health Team Members, including Vocational Nurses and Medical Assistants may obtain a Certificate of Completion)

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article, and providing feedback in the online course evaluation.

Completing the study questions is optional and is NOT a course requirement.

1. Which of the following is characterized by impaired or inadequate absorption of dietary sources of protein and energy?
   a. Protein-calorie malnutrition.
   b. Protein malnutrition.
   c. Calorie malnutrition.
   d. Anemia.

2. Which of the following are formed as a result of a highly aggressive overgrowth of dense fibrous tissue which may extend further than the site of injury and do not revert spontaneously?
   a. Hypertrophic scars.
   b. Eschar.
   c. Keloids.
   d. Contracture scars.

3. Which of the following is used to reduce erythema by improving blood flow within excess scar tissues?
   a. Occlusive therapy.
   b. Laser therapy.
   c. Radiotherapy.
   d. Intraliesional cryotherapy.

4. All of the following are precursor lesions to melanoma EXCEPT?
   a. Common acquired nevus
   b. Dysplastic nevus
   c. Congenital nevus
   d. Purpura

5. The treatment of choice for sclerosing basal cell carcinoma is ____________________
   a. Curretage.
b. Cryotherapy.
c. Electrodessication.
d. Moh’s surgery.

**Introduction**

Skin cancer is one of the most common forms of cancer. It starts in the outer layers of the epidermis and then gradually moves into the deeper layers to affect the underlying structures such as blood vessels and nerves. This course addresses the identification of risk factors and early signs of skin cancer and other inflammatory skin conditions, including their prevention, management and treatment.

**Skin Cancer Risk Factors**

It is important to have knowledge of skin cancer risk factors so that preventive measures may be devised over time. The incidence of risk factors is correlated with the protective factors aimed at decreasing the risk of developing skin cancer. The risk factors of skin cancer outlined below are discussed in greater depth later in this course:

- Excessive UV light (*i.e.*, sun and tanning lamps) exposure
- Light colored hair, skin or eyes
- Familial history of skin cancer
- Advanced age (*i.e.*, over 50 years old)

**Types of Skin Cancer**

There are two major types of skin cancer: melanoma, and non-melanoma. Non-melanoma skin cancers respond well to treatment and their spread to other tissues can be prevented. The former
develops from a mole, which distinguishes it from the non-melanoma type of skin cancer. Non-melanoma is further classified into two types: basal cell carcinoma and squamous cell carcinoma.

**Basal Cell Carcinoma**

Basal cell carcinoma is the most common type of skin cancer. As its name suggests, it develops from the basal cells, which is found in the innermost layer of the epidermis and in the region around the hair follicles. It is often referred to as an epithelial tumor. Sun exposure is a major risk factor for the development of basal cell carcinoma. Its anatomic location is associated with embryonic fusion planes. The most commonly affected areas are the nose, forehead, head (including the scalp), and cheeks. It can also develop on the back or lower legs. 66
Basal cell carcinoma initially develops as a small lump that gradually increases in size. It has shiny edges. Other physical characteristics of basal cell carcinoma are:

- Wax-like papules with depressed center
- Pearl-like appearance
- Centralized or pigmented ulceration
- Bleeding, especially when traumatized
- Crusted
- Rolled (elevated) margins
- Translucent appearance
- Telangiectases over the surface
- Slow growth (about 0.5 cm over a period of 1-2 years)
- Black-blue or brown color

Most of the time, basal cell carcinomas are asymptomatic, i.e., they do not hurt, although they tend to become itchy and bleed when scratched. If left untreated, they slowly grow in size and can affect other adjacent or underlying tissues such as cartilage and bone. This type of non-melanoma is further subdivided into groups, namely:

- Nodular
- Infiltrative
- Micronodular
- Morphoeic
- Superficial

Of all these subtypes, nodular basal cell carcinoma is thought to be the most common. Nodular carcinoma appears cystic, pigmented, and
keratotic. It looks like a round, pearly, flesh-colored papule with telangiectases.

Infiltrative carcinoma appears as an infiltrating tumor in the dermal layer. It exists in thin strands between collagen fibers, masking their presence.

Micronodular carcinoma usually does not become ulcerated. It may appear yellow-white when stretched. It is usually firm with a well-defined margin.

Morphoeic carcinoma either appears as a white or yellow waxy sclerotic plaque, which does not usually ulcerate. It appears flat or slightly depressed, fibrotic, and firm.

Superficial carcinoma is usually found on upper chest or shoulders. It looks like an erythematous, well-circumscribed patch or plaque with a white scale.

Basal cell carcinoma does not always spread to other tissues unless left untreated. The presence of one carcinoma predisposes the individual to developing another one.66

Squamous Cell Carcinoma
The less common type of non-melanoma is the squamous cell carcinoma. It is reported in almost 20% of the cases of non-melanoma. Like basal cell carcinoma, it is often non-fatal. It usually starts in the keratinocyte cells of the epidermis. Sun exposure is also a risk factor for this type of skin cancer. It usually develops on parts of the head, neck and on the back of hands, and forearms. In rare cases, it can also be found in the vulvovaginal and anal regions.66

Squamous cell carcinoma usually presents as a shallow ulcer with elevated margins. A plaque, especially in areas most exposed to the sun, usually covers it. Other hallmark cutaneous characteristics include:

- Scaling
- Ulceration
- Crusting
- A cutaneous horn

Although less common, squamous cell carcinoma can also appear as a pink cutaneous nodule without overlying surface modifications. When it spreads to other parts of the head and neck, it may become enlarged preauricular, submandibular, or cervical lymph nodes. Sometimes nerves are affected by this tumor with the following signs and symptoms:

- Local pain
- Numbness
- Twitching or muscle weakness
- Visual changes (with cSCCs of the face)
Other Non-Melanomas

Other types of non-melanomas are less common. These include:

- Merkel cell carcinoma
- Kaposi’s sarcoma
- T cell lymphoma of the skin

Diagnosis

Guidelines for the diagnosis of squamous and basal cell carcinomas are as follows:\textsuperscript{69}

- Squamous cell carcinoma is a malignant skin tumor of keratinizing cells of the epidermis. It is locally invasive in nature and can metastasize.

- Basal cell carcinoma is a slow growing and locally invasive malignant skin tumor of the epidermis.

In the diagnostic studies, the confirmation of cancer is given after a positive excisional biopsy. Other laboratory studies, which are carried out in the diagnostic evaluation, include complete blood cell count, comprehensive serum chemistry panel and lactate dehydrogenase level. Imaging studies are also required in patients who have been newly diagnosed with skin melanoma to ensure the absence of any clinically occult distant disease. Sometimes, ultrasonography is done to diagnose the involvement of lymph nodes. Positron emission
computed tomography (PET) scan is done to detect other sites of metastasis.\textsuperscript{120}

**Melanoma**

Melanoma is a malignant type of skin cancer and is considered to be the most serious among all types of skin cancer. It is a neoplasm of melanocytes. Its incidence is growing. The tumor starts in the melanocytes, the pigment-producing cells of the skin. It can appear either as a new mole or as changes to the existing moles.\textsuperscript{121}

Melanoma appears initially as an alteration in the size, shape, color or feel of a mole. It generally has a black or black-blue region and may even appear as a new mole. The appearance of the mole is asymmetrical, with ragged or blurred edges, uneven color, which continuously changes over a period of few weeks or months.\textsuperscript{114}

Melanoma mostly occurs on exposed skin surfaces such as head, neck, between the shoulders and hips. It can also appear on the lower legs
or between the shoulders and the hips. However, it rarely appears on people with dark skin and, if found to occur, it appears on the skin under the fingernails, under the toenails, on the palm of the hands or on the soles of the feet.\textsuperscript{125}

The prognosis of melanoma skin cancer depends on the depth of tissue invasion. Exposure to sunlight especially intermittent intense exposure to sunlight is considered a major risk factor in its spread.\textsuperscript{121}

Melanomas develop in two stages: \textit{radial and vertical}. It is during the radial stage that malignant cells grow in a radial pattern in the epidermis. Over time, most melanomas progress into the vertical stage in which the malignant cells penetrate the dermal layer and metastasize. There are four types of malignant melanoma including:

1. Superficial spreading melanoma
2. Nodular melanoma
3. Lentigo maligna melanoma
4. Acral lentiginous melanoma

Superficial spreading melanoma is the most common and usually occurs in adults. It can appear anywhere in the body but more so on
the upper back of both men and women and on the legs of women. Nodular melanoma is a nodular lesion, which usually appears dark brown or reddish brown in color. It can rapidly invade the dermis right from its onset. Nodular melanomas sometimes resemble blood blisters, hemangiomas, dermal nevi or polyps. Lentigo maligna melanoma, if untreated, exhibits horizontal or radial growth involving the epidermis.

Acral lentiginous melanoma is found on the palmar and plantar surfaces, digits and subungual areas (under the finger or toe nails). It occurs equally in all the ethnic groups. The melanomas that cannot be classified in any of these classes are simply known as malignant melanoma. Clinically, lesions are grouped according to their depth:
- Thin: 1 mm or less
- Moderate: 1-4 mm
- Thick: >4 mm

**Risk Factors**

There are several risk factors for the melanomas, including:
- Presence of existing precursor lesion
- Genetics
- UV radiation exposure
- Sunburn
- Chemicals
- Viruses
- Presence of changing mole
- Previous history of melanoma
- Immunosuppression
• Freckling
• Sun sensitivity

The existence of precursor lesions can indicate melanoma. These include the following nevi:
• Common acquired nevus
• Dysplastic nevus
• Congenital nevus
• Cellular blue nevus

Presentation

The features associated with melanoma lesions are:
• Increase in size
• Changes in shape and color
• Changes in dimensions (i.e., more than 5 to 7 mm)
• Irregular margins
• Presence of ulceration, inflammation and bleeding

Diagnosis

A total body skin examination during a physical exam is vital in the evaluation of patients with atypical nevi or melanoma. This should be done initially and during all subsequent visits. This is especially important because the majority of melanomas are asymptomatic and usually discovered serendipitously. In fact, a study found that most melanomas diagnosed during a 3-year period were asymptomatic and were only found because a dermatologist performed a total-body skin examination.
Experienced visual inspection is a critical factor in distinguishing a melanoma from other common benign pigmented skin lesions, such as lentigo simplex, junctional nevus, compound nevus, intradermal nevus, blue nevus, solar lentigo, and seborrheic keratosis. There are several techniques used to aid in the total body skin examination. Examples include serial photography, epiluminescence microscopy, and computerized image analysis.

Epiluminescence microscopy utilizes magnifying lens to examine an oiled lesion. Computerized image analysis keeps images in storage for future reference and comparison over time. During a skin examination, dermatologists must assess the total number of nevi present on the skin and try to differentiate between typical and atypical lesions. The ABCDE system is a tool that has been employed to aid in this differential diagnosis of the existing lesions.69

**ABCDE System:**

**A:** Asymmetry refers to different halves of the skin lesion that are not matching with each other.
**B:** Border irregularity describes the edges, which are ragged, notched or blurred.

**C:** Color variation includes non-uniform pigmentation, tan, brown or black, blue, black-blue or red are present around the lesion.

**D:** Diameter of 6 mm or more is considered to be significant for diagnosis.

**E.** Evolving change in size, shape and color.

**ABCDE rule for the early detection of melanoma**

- **A:** Asymmetry
- **B:** Borders (the outer edges are uneven)
- **C:** Color (dark black or have multiple colors)
- **D:** Diameter (greater than 6 mm)
- **E:** Evolving (change in size, shape and color)
Clinical application of the ABCDE system has been associated with an improvement in the detection of suspicious lesions. Dermoscopic evaluation of suspected lesions may also help in clearly demonstrating the need for biopsy. The subsurface features play a significant role in suggesting the need for biopsy.\textsuperscript{82} It is also equally important to conduct a lymphatic exam in patients diagnosed with melanoma. Melanoma may spread through the lymphatic drainage resulting in the involvement of regional lymph nodes.

\textit{Detection and Identification}

Guidelines have been laid out for detection and identification of melanoma, which include:\textsuperscript{69}

1. Seven-point checklist:
   A seven-point checklist should be utilized for assessing melanoma.

2. Routine check and examination:
   There should be routine check and examination of the skin by healthcare professionals during other clinical examinations. Any suspected pigmented lesion should be immediately referred to the appropriate specialist.

3. Attempt at early detection:
   The recommended practice is to attempt to detect melanoma as early as possible by both the healthcare staff as well as the patient.
4. Proper training:
   Healthcare professionals should have proper training in the accurate identification of melanoma.

5. Education of high-risk individuals:
   High-risk individuals should be properly informed about correct ways of sun protection, about the diagnostic features of skin melanoma. They should also be encouraged to perform regular self-skin examination.

6. Promotion of awareness:
   Brochures and leaflets as well as interactive computer-based learning modules should be initiated for individuals to raise awareness about prevention of skin cancer.

7. Proper magnification:
   When a patient presents with melanoma, it is essential that proper magnification of the lesion be done during examination. Clinical history of any changes in the lesion, a past history of skin lesions, and family history of skin lesions should be documented.

8. Confirmational biopsy:
   Suspicious skin lesions should be biopsied for confirmation.

**Staging System For Cutaneous Melanomas**

In 2002, the American Joint Committee on Cancer (AJCC) Melanoma Task Force issued a revision of the staging system for cutaneous melanomas to reflect the results of their multi-institutional study of
17,600 patients. Staging remains similar to the traditional tumor-node-metastasis (TNM) classification system.

In this staging system, melanomas are classified based on their local, regional, and distant features, as outlined below:

- **Stage I and II** - Localized primary melanoma that is confined to the epidermis
- **Stage III** - Metastasis to single regional lymph node basin (with or without in-transit metastases),
- **Stage IV** – Distant metastatic disease

*Management and Treatment of Skin Cancer*

In case of malignant melanoma, wide local excision is recommended, with the depth and breadth of the excision dependent on the spread and the size of the melanoma. In case of metastatic disease, lymph glands may also have to be excised along with any other affected tissues. Certain skin areas may not be suitable candidates for surgery because of their anatomical location.\(^{121}\)

Malignant melanoma is often resistant to chemotherapy. Chemotherapy has often yielded poor results and, as such, no specific chemotherapeutic regimen has been recommended to improve survival. Dacarbazine is the only chemotherapeutic agent to date that has shown clinically significant effects against melanoma. Nonetheless, response rates to monotherapy with dacarbazine are only at 10-20%.
Moreover, even therapy with multiple chemotherapy agents has not yielded better response rates.

Surgical excision is also useful in excluding squamous cell carcinoma in case of lesions that are larger than 0.5 cm in diameter. Mohs’ micrographic surgery, involving gradual excision of lesions using serial frozen section analysis and precise mapping of excised tissue until the tumor is completely removed, is especially useful in cases where minimum tissue removal is needed. It is the surgical approach of choice for difficult and high-risk squamous cell carcinomas.

Chemotherapy is also used in cases of superficial and multiple lesions especially on the face and head. The most commonly used drug is 5-fluorouracil (5-FU), which is a pyrimidine antagonist. It can be administered topically in the form of solutions or creams. Higher concentration of this topical formulation may be required in regions (except head and neck) because of the considerable thickness of the skin. Its recommended application is twice daily over a period of two to five weeks. Topical corticosteroids are also used to reduce inflammation.82

Additionally, other therapies such as carbon dioxide laser, topical tretinoin, chemical exfoliation, and facial dermabrasion are also used. Liquid nitrogen is used in cryotherapy as the treatment of choice in many cases of skin cancer. Cryotherapy in combination with curettage and desiccation are especially beneficial in the treatment of superficial
tumors where lesions are less than 2 cm in diameter. Sometimes
curettage may also be used along with cryosurgery or
electrodessication. Radiotherapy has been used in cases where
patients refuse surgery, metastasis is present, or as an adjunct to
surgery in case of high-risk tumors.\textsuperscript{82}

In the treatment of basal cell carcinoma, cryotherapy, curettage or
electrodessication have low cure rates especially when treating
sclerosing and recurrent tumors. The treatment of choice in this case
is Mohs’ micrographic surgery for sclerosing basal cell carcinoma and
large tumors in areas where it is difficult to treat them. Radiotherapy
has been found to produce high cure rates but has the same
limitations in the case of squamous cell carcinoma. Other therapies
which have been used occasionally include oral retinoids, topical
tretinoin, carbon dioxide, neodymium-YAG lasers, topical 5-
fluorouracil, and chemotherapy in those cases where surgery is not
possible and metastasis has occurred.\textsuperscript{82}

Chemotherapy is not indicated in advanced stages of skin cancer. In
some cases especially if the metastases is widespread, palliative care
is recommended over aggressive chemotherapy, surgery, and tumor
removal.\textsuperscript{121}

Interferons are another chemotherapeutic agent used in skin cancer.
They act as biologic response modifiers that promote the phagocytic
activities of macrophages. They also promote the formation of free
radical in these white blood cells as well as the activity of natural killer
cells. A good example is the novel agent, peginterferon alfa-2b (IFN alfa-2b). This agent is an immunomodulatory cytokine that promotes phagocytic and lymphocytic activity. It is indicated as adjuvant therapy after definitive surgical resection. A study trial found that the drug arrested the recurrence of skin cancer for about 9 months or more in patients who took the drug. In another trial, the drug showed significant improvement in survival rates, which was similar to another anticancer agent, ganglioside GM2/keyhole limpet hemocyanin (GMK) vaccine. It was the findings of this study that led to FDA approval of its regimen of 52 weeks as adjuvant therapy.

A monoclonal antibody agent, ipilimumab, has also shown promising results in the treatment of metastatic melanoma. It is a CTLA-4 blocker, which was also recently approved by FDA for unresectable or metastatic melanoma.

Another novel anticancer agent introduced recently in the market is the BRAF inhibitor, vemurafenib (Zelboraf). It received FDA approval for the treatment of unresectable or metastatic melanoma with BRAF-V600E mutation. Other recently approved anticancer agents for skin cancer are:

- Trametinib (Mekinist)
- Dabrafenib (Tafinlar)
- Pembrolizumab (Keytruda)
Trametinib is a MEK inhibitor approved for the treatment of melanoma with BRAF V600E or V600K mutations. On the other hand, dabrafenib is a BRAF protein kinase inhibitor also approved for the treatment of melanoma with BRAF V600E mutation. Lastly, pembrolizumab is another monoclonal antibody that blocks the interaction between PD-1 and its ligands.

Although high dose interferon therapies have shown promising results, their serious adverse effects and toxicities must be balanced with their benefits. The majority of patients who received a high dose interferon report flu-like symptoms, with about one-fourth experiencing severe fatigue. Neurologic and psychiatric side effects are also common. As a result, a variety of alternative regimens have been investigated.

Another non-surgical option for skin cancer treatment is vaccines. The use of vaccines in skin cancer may be classified into two distinct groups: 1) Polyvalent tumor-cell vaccines, and, 2) Gangliosides and peptides. Polyvalent tumor-cell vaccines offer melanoma-specific antigenic targets to the immune cells, thereby initiating specific antibody and T-cell responses. A good example is a vaccine currently undergoing Phase III trials at the John Wayne Cancer Center. Ganglioside and peptide vaccines stimulate antibody and T-cell activity in a more precise manner. A study conducted at Memorial Sloan-Kettering Cancer Center has shown that ganglioside GM2 administered in combination with bacille Calmette-Guérin (BCG) improved RFS and OS in Stage III melanoma patients.
Lastly, recent studies have found that external-beam radiation may play an important role as an adjuvant therapy for melanoma treatment. This type of therapy is particularly useful postoperatively for patients with several positive lymph nodes or with extracapsular spread. Although radiotherapy is useful as an adjuvant and palliative treatment, surgery remains the primary treatment approach for the majority of localized melanomas.

**Prevention Of Skin Cancer**

Prevention of skin cancer is aimed at reducing and/or eliminating the risk factors. The promotion of healthy behaviors is often emphasized such as sun protection, smoking cessation, healthy and balanced diet, and avoidance of excessive sun exposure.\(^7\)\(^7\)\(^8\)

Dietary and nutritional tips on preventing skin cancer include:\(^7\)\(^7\)

- A healthy diet made up of vitamin D. Good sources include food or vitamins.
- Antioxidant supplements can also provide additional protection against the damaging effects of ultraviolet rays. It provides endogenous protection by helping in the repair of damage caused by reactive oxidative species and stress.
- Oral vitamin C supplements (500 mg per day) may offer protection against sun damage.
- Some commercially available supplements for photo protection contain β-carotene, which can prevent skin cancer when taken for a substantial period of time. Mixtures of carotenoids or long-
term dietary intake of carotenoid rich diet is recommended to provide basal protection to the skin.

- Vitamin A supplementation or its intake through dietary modification can inhibit the development of skin papilloma and also has a marked effect on preventing skin cancers.
- Coenzyme Q10 also possesses cutaneous healing effects and can protect the skin against the oxidative stress resulting from sun exposure.
- The polyphenols present in green tea are also photo protective in nature and can prevent the UVB light induced non-melanoma skin cancer. Oral consumption of green tea can inhibit chemical carcinogens as well as UV radiation induced skin carcinogenesis.

**Chemoprotective Agents**

The use of certain drugs has been reported to reduce the risk of skin cancer. These include the following:

1. Topical opaque cream containing 5% ascorbic acid which has been proven to be helpful in enhancing collagen formation, protecting against damage from UVA and UVB rays, rectifying pigmentation problems, and also improving inflammatory conditions of the skin.
2. Topical application of vitamin E, which can help in protecting the skin from photo damage. It is a powerful antioxidant and also has UV absorptive properties.
3. B-carotene is considered to be an effective oral protective agent.
4. The topical application of green tea has also been found to be useful in offering protection against carious types of skin carcinogens. In fact, topical application of green tea is largely
associated with the reduction of UVB-induced oxidation of lipids and proteins and also prevention of depletion of antioxidant enzymes in the body.

5. Isotretinoin has been used orally to prevent the development of new skin cancer in patients with xeroderma pigmentosum.

A study has shown that the use of NSAIDs, such as celecoxib, may be associated with a reduction in risk of non-melanoma. This finding is very new and further studies are needed before its use can be routinely recommended. Moreover, the drug itself is associated with serious side effects such as bleeding and cardiovascular complications.\textsuperscript{100}

DFMO (alpha-difluoromethylornithine) is another drug, especially in those with a history of non-melanoma skin cancer, that has been found to be useful in the prevention of recurrence of skin cancers.\textsuperscript{100}

**Self-Care**

Certain self-care prevention measures to prevent skin cancer incidence include:\textsuperscript{93}

- Avoiding tanning, such as using tanning beds as well as intentionally baking under the sun, which can cause skin cancer or wrinkles because of the harmful ultraviolet radiation emitted by the tanning lamps and sun. Repetitive, frequent, and cumulative sun exposure is a risk factor for skin cancer.
• Avoiding the sun between 10:00 AM to 4:00 PM since this is the period when the sun is strongest.

• Always wearing protective clothing such as long sleeved shirts, full pants, wide brimmed hat and sunglasses when going out in the sun. Dark and tightly woven clothing is effective in providing protection from the sun. If required, some dermatologists can also recommend the use of photo-protective clothing.

• Using adequate sun protection. It is important to wear broad sunscreen cream with a sun protection factor of at least 30 or more since it offers protection against both ultraviolet A and ultraviolet B radiation. It should be applied at least 15 minutes before stepping out into the sun and reapplied after every 2 hours. An adequate amount of sunscreen should be applied on the uncovered areas of the skin such as the lips, ears tips, and back of the hands and neck.

• Avoiding sunburn by staying away from water, snow or sand since they can reflect the damaging rays of the sun.

• Avoiding the sun during treatments with medications that induce photosensitivity and reactions. There are certain medications, both available on prescription as well as over the counter, such as antibiotics, which increase the sensitivity of the skin towards sun and hence increase the risk of skin cancer.
Prognosis For Cutaneous Melanoma

Generally speaking, there are two most important prognostic factors for cutaneous melanoma of the head and neck. These include the thickness of the tumor and the status of the regional lymph-node basin.

These prognostic factors can be further classified depending on tumor node metastasis (TNM) staging. Tumor thickness is the most important factor in localized lesions whereas the presence or absence of ulcers is considered to be the more important factor in predicting outcomes. In patients with nodal melanomas, the most important prognostic factor is the number of positive lymph nodes. Tumor burden within the lymph nodes and presence of ulcers of the primary tumor are also important factors.

On the other hand, in patients with distant metastasis, the anatomic site is the most important prognostic factor. Patients with cutaneous and subcutaneous tissue or distant lymph node involvement can expect better prognosis than those with cancer metastasis to the lungs or visceral organs.

Chronic Inflammatory Conditions

Chronic inflammatory conditions involve a number of diseases that often lead to increased medical care and a high burden on the health system. These are often life-long conditions that sometimes remit but also tend to recur as flares or episodic events whereby the affected
individual may require adjustments in treatment, lifestyle and supportive care to address symptoms. This section reviews various types of inflammatory skin conditions, including triggers and autoimmune factors causing the disease to manifest.

**Psoriasis**

Psoriasis is defined as a chronic inflammatory skin disease mediated by immune dysfunction. It is characterized by rapid growth rate of skin cells. It can be identified as thick red patches with silvery scales on the skin. The most common region of the skin where these patches develop are the elbows, knees, lower back, face, palms, and soles of feet. It can also affect other areas such as fingernails, toenails and mouth. Anyone can develop psoriatic diseases including children.\(^{101}\)

It is a complex disease with multiple factors playing a role in its development. Specifically, these factors include genetics and immune-mediated components. The latter’s involvement is the reason why successful treatment involves immune-mediating, biologic agents.

The pathogenesis of psoriasis is not fully understood. There are several theories that attempt to explain its pathogenesis, including the following:

- Infectious trigger
- Traumatic insult
- Stressful life event
However, it is important to note that many patients present with none of these factors.

Generally, once the disease is activated, massive leukocyte migration occurs to the dermis and epidermis, which leads to the appearance of the characteristic psoriatic plaques. Specifically, a high number of activated T-cells infiltrate the epidermis and induce keratinocyte proliferation. This immune response can be seen via histologic examination and immunohistochemical staining of psoriatic plaques, which will show a large mass of T cells inside the psoriasis lesions.

It has been shown in a study that a psoriatic patient with twenty percent body surface area (BSA) has around eight billion circulating T cells in the blood and about twenty billion T cells concentrated in the dermis and epidermis of psoriasis lesions. After the T-cell activation, a deregulated inflammatory process occurs next resulting in the formation of inflammatory mediators such as tumor necrosis factor-α [TNF-α], interferon-gamma, and interleukin-12 (IL-12). It is the booming presence of these cytokines that is responsible for the appearance of the majority of the features of psoriasis. Higher levels of TNF-α are particularly associated with psoriasis flares.

Presentation

The symptoms of psoriasis are outlined below:

- Aggravated chronic erythematous scaly area
- Sudden appearance of multiple small areas of scaly redness
- Recent history of streptococcal throat infection, viral infection, immunization, use of antimalarial drug, or trauma
- Family history of cutaneous inflammatory conditions
- Pain (especially in erythrodermic psoriasis and psoriatic arthritis)
- Pruritus
- No fever
- Dystrophic nails
- Chronic rash with recent joint pain
- Joint pain without noticeable skin changes

In psoriasis, the skin is affected first then maybe followed by the eyes. The eyes are not usually affected and only account for about 10% of cases. When the eyes are affected, the most common presentation is redness and tearing due to conjunctivitis or blepharitis. Symptoms that do not relate to the eyes include rash and psoriatic arthritis. The rash may be pruritic, painful, or uncomfortable. Psoriatic arthritis may present with joint stiffness, pain, throbbing, and erythema. The joints of the fingers, toes, wrists, knees, and ankles, are the most commonly affected.

**Treatment**

The aim of the treatment is to inhibit the rapid growth of the affected skin cells in order to reduce inflammation and remove scales. The treatment is classified in three broad categories, which include:

1. Topical treatments
2. Light therapy
3. Oral and parenteral drugs
Topical treatment involves the use of topical corticosteroids, vitamin D analogs such as calcitrol, retinoids, immunomodulators, coal tar preparations, anthralin and moisturizers. Topical treatment is effective when psoriasis is detected at its early stages and treatment is initiated immediately. Simple and non-allergenic moisturizers such as petrolatum jelly are helpful. Their daily application to the affected area is inexpensive and a successful adjuvant to psoriasis treatment. Moisturizers should be applied immediately after a bath or shower to minimize itching and tenderness.

Natural or artificial ultraviolet (UV) light is utilized to treat psoriasis. Phototherapy has been found to be effective in treating as well as preventing the recurrence of psoriasis. It may be administered either individually or in combination with other treatments. In fact, daily sun exposure is considered to be the simplest form of treatment of psoriasis. Other simple treatment measures include sea bathing and relaxation.

A good example of artificial UV light treatment is psoralen-ultraviolet A (PUVA) therapy. Psoralen, a photosensitizer, may be ingested before the start of light therapy. PUVA treatment can cause adverse effects such as conjunctival hyperemia and dry eye, especially if appropriate UV protection is not used. However, if proper eye protection is used, these effects seldom appear. Psoralens are not always widely available and may be challenging to obtain.
According to the American Academy of Dermatology guidelines (AAD), PUVA is effective in obtaining long-term remissions. On the other hand, its chronic use especially in Caucasian patients can lead to increased risk of squamous cell carcinoma (SCC) and possibly malignant melanoma.

Another type of light therapy is called the narrowband ultraviolet B (UVB) therapy. The AAD guidelines recommend UVB over broadband ultraviolet A therapy. However, both narrow and broadband UV therapies are less effective than PUVA. This is especially true in nail psoriasis because of the nail plate, which serves as a barrier to light. Patients with guttate psoriasis are particularly responsive to phototherapy.

In case of severe psoriasis, treatment with oral drugs or injections such as retinoids, hydroxyurea, or disease modifying antirheumatic drugs (i.e., methotrexate) or immunosuppressant (i.e., cyclosporine) becomes necessary. The latter is only given for limited periods of time because it has many severe side effects.

It should be noted that routine use of systemic retinoids and hydroxyurea is not recommended. These agents can impair proper wound healing. Among the retinoids, acitretin is recommended over isotretinoin in psoriasis. Patients on retinoids are placed on 3-year pregnancy prohibition after treatment. A combination of biologic agent with an immunosuppressant has shown significant positive effects.
Patients on systemic steroids should be cautioned against abruptly discontinuing therapy without medical advice. Doing so can lead to withdrawal symptoms, exacerbation of psoriasis, or appearance of a new form. A new form of psoriasis is known as guttate psoriasis, which is more severe and aesthetically unpleasant than the pre-existing lesion. New forms may also appear as a more threatening pustular or erythrodermic psoriatic flare.

Non-prescription tar formulations may also be used, particularly in conjunction with topical corticosteroids. The novel foam formulations are more convenient to apply than their traditional counterparts. Anthralin, topical corticosteroids, salicylic acid, phenolic compounds, and calcipotriene (a vitamin D analog) may also be used. Systemic corticosteroids are usually not used because they are ineffective and can aggravate disease when discontinued.

A combination therapy with a vitamin D analog (calcipotriol and calcipotriene) or a retinoid such as tazarotene and a topical corticosteroid is recommended over monotherapy with each agent.

Sometimes, patients will present with severe flare-ups of psoriasis and require emergency treatment. Severe psoriasis usually appears guttate, erythrodermic, or pustular. The goal of emergency treatment is to restore the barrier function of the skin, which can be achieved through cleaning and bandaging.
Prevention

There are many lifestyle modifications and self-care techniques that can help treat and prevent the recurrence of psoriasis. These are reviewed in the following sections, and clinicians are encouraged to address lifestyle patterns with patients during initial and follow-up visits.

Diet:

Research studies have shown that there is a definite link between diet and psoriatic disease. It has been observed that a change in the diet regimen and use of nutritional supplements can bring about positive changes in psoriasis symptoms. Moreover, studies have also pointed out that weight loss, nutritional supplements, anti-inflammatory diet, and gluten free diets can have significant effects on preventing psoriasis.

Intolerance to gluten has also been linked with psoriasis because of its immune inflammatory response. It has been suggested that a gluten free diet can be helpful in improving psoriasis and reducing the severity of the condition in people with celiac disease.

Weight Loss:

Obesity is a major risk factor for psoriasis and studies have suggested that a higher body mass index (BMI) is associated with an increased risk of developing and aggravating psoriatic symptoms. In this
context, weight loss can have a positive influence on the efficacy of the treatments and prevention of recurrence.

Additionally, fats also release pro-inflammatory mediators, i.e., cytokines which trigger inflammation. Weight loss can therefore decrease inflammation and prevent symptom flare ups.

Nutritional Supplements:
Vitamin D, vitamin B12, selenium and omega-3 fatty acids have been shown to be beneficial in people with psoriasis.

Anti-inflammatory Diet:
A diet comprised of anti-inflammatory foods can help in improving the condition, reducing the severity, and in preventing recurrence. Examples of food in this diet include cold water fish, flaxseeds, olive oil, pumpkin seeds, walnuts, colourful fresh fruits and vegetables.

Certain foods such as fatty red meats, dairy products, processed foods, refined sugars and nightshade vegetables such as potatoes, tomatoes should be avoided in a diet for psoriasis as they can either cause or aggravate the inflammation.\textsuperscript{104}
**Self-Care**

The most important aspect of psoriasis treatment is self-care. The majority of psoriasis cases are mild and can easily prevented through simple skin care. These include the following measures:\(^9^5\)

- **Moisturization:**
  
  The psoriatic skin should not be left dry. Proper moisturization should be ensured using lotions or creams or with the help of special moisturization soaks or baths.

- **Avoid excessive UV light exposure:**
  
  Excessive sun or artificial UV light exposure can aggravate the psoriatic skin. Direct sunlight exposure should be completely avoided especially between 10 a.m. to 4 p.m. Sunscreen of SPF 15 or above should be applied generously on all exposed surfaces at least 15- 30 minutes before going out.

- **Avoid harsh and drying products:**
  
  Skin products with drying effects or consist of harsh chemicals should be avoided.

- **Use sun protective clothing:**
  
  This is encouraged to protect from the harmful effects of the sun.
• Proper hygiene:
  It is essential for daily baths to be taken since it can help eliminate scales and calm the inflamed skin.

• Avoid excessive alcohol and smoking:
  Alcohol consumption and smoking should be completely avoided, whenever possible since they may also stimulate inflammatory response.

• Avoid medications that aggravate psoriasis:
  There are certain medications which have been suggested to aggravate psoriasis such as beta blockers, nonsteroidal anti-inflammatory drugs or lithium.

• Avoid skin injuries and stress:
  Bug-bites, burns, scrape wounds or cuts can lead to the formation of skin patches. An injury to the skin adjacent to the nail while trimming can also trigger a flare up.

• Avoid psychological stress:
  Stress and anxiety are associated with psoriasis flare ups.

**Skin Warts**

Warts are defined as a small, generally painless growth on the skin; and, are caused by the human papillomavirus (HPV). Warts are mostly harmless in nature but may appear embarrassing and itch or hurt especially the ones on the foot.
The HPV is contagious. It may spread through direct or indirect contact. It is resistant to desiccation, freezing, and long-term accommodation outside host cells. In addition, autoinoculation can occur, which can lead to spreading local lesions. Its incubation period is usually about 1-6 months; however, latency periods have been known to be as long as 3 years, and sometimes lasting longer.

Types of Warts

There are many types of warts, which are outlined below:

- Common warts
- Filiform warts
- Deep palmoplantar warts
- Flat warts
- Butcher’s warts
- Mosaic warts
- Focal epithelial hyperplasia
- Cystic warts

Common warts are also scientifically known as verruca vulgaris. They present as hyperkeratotic papules with rough and irregular surfaces. Their sizes vary between 1 mm to larger than 1 cm. They are most commonly found on the hands and knees, although, they can be found in other parts of the body as well.

Filiform warts, as their name suggests, are long and thin growth lesions. They are often found on the face around the lips, eyelids, or nares.
Deep palmoplantar warts are also scientifically known as myrmecia. They initially start as small shiny papules and develop into deep endophytic, sharply defined, round lesions with a rough keratotic surface. They often appear surrounded by a smooth, albeit, calloused skin. They penetrate the inner skin layers and are more prone to becoming more painful than common warts. They are usually found on weight bearing skin regions, such as the metatarsal head and heel. Additionally, warts can also be found on the hand under or surrounding the nails.

Flat warts are also scientifically known as verruca plana. As their name suggests, they usually present as flat or slightly elevated flesh-colored papules with evidence of mild hyperkeratosis. Their sizes vary between 1-5 mm and more. They can occur in large numbers all over the body as grouped or confluent lesions. Unlike other warts where they have specific areas of growth, flat warts can grow anywhere on the skin. They may also present as a linear distribution due to severe scratching or trauma (Koebner phenomenon). These lesions can regress and cause inflammation.

Butcher's warts were named so because they mostly occur in patients who frequently do manual work with raw meat. Their appearance is similar to common warts although hyperproliferative cauliflowerlike lesions often accompany them. They are usually found on the hands.
A mosaic wart is a cluster of small warts. When the skin surface is peeled, the angular outlines of tightly packed single warts can be visible. They usually occur on the palms and soles.

Focal epithelial hyperplasia is also known as Heck disease. Unlike other warts, it occurs in the oral cavity, particularly on the lower labial mucosa. Other parts of the mouth where it can grow are the buccal mucosa and the tongue. It presents as several flat-topped pink and white lesions. Its size can vary anywhere between 1-5 mm, with some lesions combining into plaques. It is most prevalent in children of American Indian or Inuit descent.

Cystic warts are also known scientifically as plantar epidermoid cysts. They present as nodules on the weight-bearing surfaces such as the sole. These nodules are often smooth with noticeable ridges that can become hyperkeratotic. In case these lesions are incised, cheesy material can be seen.

Management

Warts can be treated with the help of over the counter wart formulations. The only exception is when the warts are located on the face or genitals in which case, should be treated by healthcare professionals.

Wart removal agents are topically applied after the gentle removal of dead skin. Treatment usually lasts for several weeks to months, depending on the severity. After application, the wart is covered with a
bandage to prevent further spread. Adjuvant treatment options include:

- Special foot cushions to help alleviate the pain
- Socks

In case of a more advanced warts, other treatment strategies can be used ranging from strong topical applications to surgical techniques to remove warts. These strategies are listed below:

- Stronger topical agents, such as imiquimod
- A blistering solution
- Cryotherapy, which utilizes freezing temperature to remove the wart
- Electrocautery or electrosurgery, which involves burning the wart to remove it
- Curettage, which involves scraping off the wart with a sharp tool such as a knife, or a small spoon shaped tool. Curettage and electrosurgery or burning may be used together to treat a wart.
- Excision
- Laser treatment for difficult warts
- Chemical peels such as salicylic acid, tretinoin and glycolic acid.
- Immunotherapy for difficult warts; one procedure in immunotherapy makes use of diphencyprone, which helps in removing the warts completely.

Another procedure makes use of interferon shots to boost the body’s immune system and help it fight against the causative virus. New warts have the tendency to rapidly form around old ones, which is why
it is strongly recommended that dermatologists treat new warts as soon as they appear in order to prevent newer ones from forming.

**Vaccines**

Vaccines against the human papilloma virus (HPV) can protect males and females from warts. The HPV vaccines are safe and effective. They are administered in three doses over a period of six months. The vaccine is most efficacious when given at ages 11 or 12 years old, before becoming sexually active. This is to allow the body to develop immunity prior to coming in contact with the virus.\(^{103}\)

There are three vaccines available, which are Cervarix, Gardasil and Gardasil 9. Gardasil and Gardasil 9 protect girls and young women from genital warts and anal cancer. Only one vaccine, Gardasil, is available for boys and young men to offer protection against genital warts and anal cancers.\(^{103}\)

**Self-Care**

There are self-care measures that can help manage, treat, and prevent warts, including the following:\(^{92}\)

- Avoid direct contact with warts. This includes avoiding contact with own warts.
- Avoid picking at warts since this can spread the virus.
- Avoid use of contaminated instruments such as nail clippers or pumice stone on healthy skin.
- Avoid habits such as nail biting or nibbling around the skin close to the fingernails.
- Grooming techniques should avoid brushing, clipping or shaving region with warts.
- Clean hands carefully especially after touching warts or sharing common use items such as exercise equipment.

**Necrotizing Fasciitis**

Necrotizing fasciitis is a rapidly spreading bacterial infection with secondary necrosis of subcutaneous tissues. It is commonly known as “flesh-eating disease”. Necrotizing fasciitis can quickly progress to a life threatening condition, which makes rapid diagnosis and treatment very important. Surgery may also be required in certain cases to prevent further spread of infection.\(^\text{102}\)

The infection is uncommon and difficult to diagnose. It is a rare type of soft tissue infection which basically affects the superficial fascia and leads to an extensive damage to the surrounding tissues.\(^\text{122}\)

The risk factors for necrotizing fasciitis include diabetes, chronic disease, immunosuppressive drugs, such as prednisolone, malnutrition, age over 60 years, peripheral vascular disease, renal failure, preexisting malignancy, obesity or misuse of intravenous drug administration.\(^\text{117}\) Traditionally, the causative agent held accountable for this infection is the group A beta-hemolytic *Streptococcus* (GABS). The bacteria often affect the extremities first, usually the foot and leg.
Recent studies have shown that other than GABS, anaerobic bacteria are also present in the majority of necrotizing soft-tissue infections. The anaerobic bacteria population can easily proliferate in hypoxic soft tissues such as those that have recently undergone recent surgery, trauma, or medical compromise.

Facultative aerobic bacteria can also grow because of the compromised immune response. Patients with necrotizing fasciitis have lower levels of polymorphonuclear neutrophils (PMNs) because of the hypoxic wound. This growth enhances the oxidation or reduction potential of the wound site, promoting an environment that sustains prolific anaerobic proliferation, and thus, acceleration of infection.

In necrotizing fasciitis, group A hemolytic streptococci and Staphylococcus aureus, alone or together, are usually responsible for starting infection. Once the wound is compromised, other aerobic and anaerobic bacteria can thrive and add to the infection. Some of these pathogens are:

- Bacteroides
- Clostridium
- Peptostreptococcus
- Enterobacteriaceae
- Escherichia coli
- Proteus
- Pseudomonas
- Klebsiella
Treatment

Treatment should be initiated after diagnosis is confirmed. The treatment modalities include:

- Surgical debridement
- Appropriate antibiotics
- Adequate oxygenation of the infected tissues
- Combination therapy

The most important aspect of the treatment protocol is early detection and diagnosis of the disease. This allows for early treatment which should include extensive debridement and antibiotics. Surgical debridement is the primary treatment modality in each case to prevent fatal consequences.\textsuperscript{122}

In case of complete limb or internal organ involvement, amputation may be the best course of action. This is necessary because of irreversible necrosis, gangrene, and vast toxicity. Immediate surgery is indicated in this case to ensure a higher likelihood of survival.

After surgical debridement, patients should be treated empirically with a course of broad spectrum antibiotic. The antibiotics of choice in this type of infection are:\textsuperscript{122}

- Penicillin + clindamycin + gentamicin, or
- Ampicillin/sulbactam, or
- Nafcillin, or
- Cefazolin + metronidazole combinations
After successful surgical debridement, daily antibiotic dressings should be done. The topical antibiotic, silver sulfadiazine (Silvadene), is the most commonly used agent. It has broad-spectrum antibacterial activity with a favorable side effect profile. The current cream formulation of silver sulfadiazine is made up of a lipid-soluble carrier, polypropylene glycol. When formulated with poloxamer 188, a water-soluble component, the active drug can be washed without difficulty from the wound, enabling comfortable and convenient dressing changes.

In case of sulfa allergies, alternative topic agents may be used, such as Polysporin, Bacitracin, and Bactroban. Mafenide may also be used as an alternative agent because of its greater ability to penetrate eschar than silver sulfadiazine. It is the topical agent of choice in cutaneous infections that do not respond to silver sulfadiazine.

Hyperbaric oxygenation therapy is also used to enhance tissue oxygenation in both healthy and infected soft tissues. A hyperbaric oxygenation at 2.5 to 3.0 atmospheres (atm) twice daily for 90 minutes followed by surgical debridement is usually recommended until the infection has been completely cleared off.122

Prevention

The Centers for Disease Control and Prevention (CDC) has laid down the following recommendations to prevent the disease:122
1. Hand hygiene:
   Proper and adequate hand washing can prevent the spread of streptococcal infections especially after coughing, sneezing, before preparing food, or eating.

2. Examination:
   Patients with sore throats should get themselves examined for complications.

3. Quarantine:
   Patients with a documented streptococcal throat infection should be advised against mingling or being in crowded areas at least 24 hours after the last antibiotic dose.

4. Skin care and hygiene:
   It is important to ensure that skin is intact.

5. Immediate treatment of infections:
   Patients with an infected wound and fever should get treated immediately to prevent complications, such as necrotizing fasciitis.

6. Wound cleaning and wound care:
   Proper wound care measures should be followed to prevent bacterial skin infections. Some of these measures include:  
   • Covering open or draining wounds with clean and dry bandage.
   • Administering first aid to any type of wound even if minor.
• Avoiding whirlpools, hot tubs, or swimming pools in case of open wounds or active infection.

• Keeping hands clean at all times through frequent washing with soap and water or using alcohol based hand sanitizers.

**Cellulitis**

Cellulitis is a non-contagious bacterial skin infection affecting the subcutaneous connective tissues. It is characterized by red, painful, inflamed and hot skin. It most commonly occurs on the legs, but can infect other parts of the body as well.\textsuperscript{105}

**Diagnosis**

On physical examination, the following findings may suggest cellulitis and provide a clue as to the causative pathogen:

• Streptococcal infection is characterized by skin infection in the absence of underlying drainage, piercing trauma, eschar, or abscess.

• *Staphylococcus aureus* infection (community-acquired MRSA) is often characterized by violet color of the skin

• *Vibrio* and *S. pneumoniae* present with bullae which indicates a more serious or systemic infection

Severe infection is characterized by:

• Malaise, chills, fever, and toxicity

• Lymphangitic spread
• Circumferential cellulitis
• Pain disproportionate to examination findings

Findings that indicate emergency treatment include:
• Violet bullae
• Cutaneous hemorrhage
• Skin sloughing
• Skin anesthesia
• Rapid progression
• Gas in the tissue
• Hypotension

In case of mild cellulitis, no workup is needed. Mild cellulitis is characterized by:
• Limited area of involvement
• Minimal pain
• No systemic signs of illness (*i.e.*, fever)
• No risk factors for serious illness (*i.e.*, advanced age, immunocompromised status)

*Treatment*

There are several factors that decide the treatment modality for cellulitis, namely the:
• Cause of infection
• Severity of infection
• Health status of the patient
In case of mild symptoms, the infection can be easily treated with a course of oral antibiotics. Flucloxacillin, a beta lactam antibiotic, is the most common agent used in the treatment of mild cellulitis. Acetaminophen or ibuprofen is indicated in case symptoms of pain or fever are present.\textsuperscript{107}

In case of severe cellulitis, antibiotics are administered parenterally, which may be switched to oral route once the initial symptoms have subsided. In many cases a broad spectrum antibiotic is used as it acts on a wide range of bacterial strains.\textsuperscript{107}

**Prevention**

It is necessary to mention that all cases of cellulitis cannot be prevented. However, preventive measures can be employed to reduce the risk of developing cellulitis. These include:\textsuperscript{106}

- Prompt treatment of skin wounds
- Maintaining good hand hygiene
- Skin moisturization

Prompt treatment of skin wounds:

Wounds such as cuts, grazes, or bites should be kept clean at all times. This may be achieved by:\textsuperscript{106}

- Washing or cleansing the damaged skin under running water
- Applying an antiseptic cream or ointment on wounds after cleansing
• Dressing or covering wounds with plaster or bandage. The plaster or bandage should be regularly changed to prevent further damage to the wound from a dirty or wet bandage.

Maintaining good hand hygiene:

Hands should be regularly washed with mild soap prior to and after treating or touching a wound or infected skin. The fingernails should be kept trimmed and cleaned at all times especially in cases of patients with itchy skin conditions, such as atopic eczema or chickenpox. By observing proper hand hygiene, the risk of skin damage and infection can be considerably reduced.\textsuperscript{106}

Skin moisturization:

Skin should be kept moisturized at all times. This is especially important in patients with skin prone to drying or cracking. Dry and cracked skin are more susceptible to injuries and wounds, and subsequently, bacterial infection.\textsuperscript{106}

Avoid recurrent cases:

In case of recurring cases of cellulitis, long term use of antibiotics is recommended to prevent further infections. In certain cases such as lymphedema, a two week course of antibiotic is administered to prevent cellulitis.\textsuperscript{106}
Self-care

Self-care is important to alleviate the symptoms, improve the rate of recovery, and also prevent recurrent cases of cellulitis. Self-care measures to manage and prevent cellulitis include the following:

1. Adequate hydration:
   Patients should have adequate fluid intake to avoid dehydration.

2. Leg and arm elevation:
   The affected leg should be raised with the help of pillows or a chair to reduce pain and swelling. The affected arm should be raised above the elbows.

3. Joint movement:
   Avoid excessive joint movement of the wrists or ankles.

4. Use of protective clothing:
   Protective clothing should be worn to avoid injuries to skin, such as cuts and grazes.

5. Fungal treatment:
   Prompt treatment of fungal infections.

Other interventions to prevent cellulitis include the use of compression stockings and treatment of toe web intertrigo, venous insufficiency and leg edema.
**Erysipelas**

Erysipelas is a sub category of cellulitis characterized by upper dermal lymphatic flow involvement. It is a skin infection that is mostly caused by streptococcus bacteria. It can affect both children and adults. The risk factors for erysipelas include:

- Cuts on the skin
- Presence of skin sores or ulcers
- Improper drainage through the veins or lymph system

Erysipelas is easily identified by its many signs, such as blisters, fever, shivering and chills, inflammatory lesion on the skin, lesion with raised edges and sores or ulcers on the cheeks and bridge of the nose.\(^{85}\)

During history taking, patients are often unable to pinpoint or recall a particular event such as skin trauma or infection that may have elicited the infection. Prodromal symptoms such as malaise, chills, and high fever, usually present prior to the appearance of skin lesions (usually within 48 hours). When prompted for other signs and symptoms, patients usually point out pruritus, burning, tenderness, and erythema as major symptoms.

**Treatment**

The treatment of erysipelas involves the administration of beta lactam antibiotics, such as penicillin. In severe infection, antibiotics are given through parenteral route. The severity of the infection dictates the
chosen antibiotic regimen. Erythromycin may also be given as an alternative antibiotic in cases of patients allergic to penicillin.

Oral or intramuscular penicillin is adequate for the majority of uncomplicated erysipelas. Treatment duration is usually 5 days, which can be extended if infection has not resolved by then.

In case of facial involvement, vancomycin is initially administered. Ceftriaxone, cefazolin, dicloxacillin, erythromycin, and nafcillin are the other antibiotics which may be used in the treatment of erysipelas.

**Prevention**

It is important to maintain healthy and intact skin. Any kind of skin injury such as cuts or scrapes should be completely avoided to reduce the risk of erysipelas. The prevention of recurrence is through adequate treatment of erysipelas as well as venous and lymphatic stasis or wounds. Antibiotics such as macrolides and penicillin are also recommended to prevent erysipelas in individuals with multiple risk factors.

Other interventions used to prevent erysipelas include use of antibiotics, anti-inflammatory agents, compression stockings, treatment of toe web intertrigo, venous insufficiency and leg edema.
**Fungal Infections**

Fungal infections to the skin and nail are often treated topically and, if resistant to topical treatment, oral antifungal medications may be used. Although not generally dangerous, fungal infections range from mild skin to serious organ diseases that can seriously compromise a person’s health if not properly treated. The sections below cover various forms of fungal infection.

**Fungal Nail Infection**

Fungal nail infection is also referred to as onychomycosis. It is a commonly occurring condition where the fingernails or toenails are infected with fungus, causing the nails to become discoloured, thick, and susceptible to breaking or cracking. Toenails are more prone to developing infections than fingernails. A fungal nail infection can be identified by a discolored, thick, or fragile nail which is generally not painful. The fungal nail infection involves infection of a part or all of the toe nail unit including the nail plate, the nail bed, and the nail matrix.

Onychomycosis generally do not present with symptoms, thus, patients usually seek treatment upon onset of outward physical appearance of the infected nail. As the disease develops, and if left untreated, it may impair an individual’s ability to stand, walk, and exercise. Additionally, patients may report numbness and tingling sensations, pain, discomfort, and loss of dexterity. Patients may also worry about loss of self-esteem and lack of social interaction. There are many risk factors for onychomycosis including:
• Previous nail injury or nail surgery
• Diabetes
• Weakened immune system
• Impaired blood circulation
• Pre-existing skin infection called Athlete’s foot

*Treatment*

It is difficult to treat a fungal nail infection and antifungal treatment is imperative to cure the infection. Topical antifungals are often recommended but they have not been found to be very effective. Oral antifungal agents, such as terbinafine and azoles (such as itraconazole), have better cure rates. The first line treatment for onychomycosis is oral terbinafine administered over a period of 6 weeks for fingernail infection and 12 weeks for toenail infection. Alternative agents include:

• Fluconazole
• Ketoconazole
• Griseofulvin

Topical ciclopirox has also been used and is slightly effective in toe nail infections.76

Sometimes, surgical debridement or scraping off the affected nail is also necessary. This is especially true in cases where the infective organism is resistant to antifungal agents. Laser treatment has also been tried to treat fungal nail infection with successful results.67 The laser emits high intensity light, which can completely destroy the
fungus causing the infection. This is a safe and effective procedure. In fact, research studies have found its cure rates to be about 90%.\textsuperscript{109}

Chemical nail removal may also be recommended in cases of infected nail plates. In this procedure, the nail plate is removed using a paste made up of 40% urea. The paste is applied to the infected nail, left overnight, and washed off in the morning. The entire procedure is repeated every night following the filing of nails. If the procedure is done correctly, the nail is expected to dissolve in about two weeks’ time. This procedure is painless. The use of antifungal nail paint is usually recommended during the development of new nail to prevent recurring infection.\textsuperscript{109}

\textit{Prevention}

Self-care measures to prevent fungal nail infection include:\textsuperscript{96}

- Keep hand and feet clean. It is important to keep hands and feet clean and dry at all times to prevent infection.
- Trim nails regularly. Clip fingernails and toenails short and keep them clean. Do not pick at the skin around nails.
- Avoid walking barefoot in public places such as locker rooms and public shower.
- Avoid sharing grooming items such as nail clippers or other items.
- Avoid the use of nail polish or artificial nails since they can further aggravate the infection by trapping moisture.
- Ensure proper hygiene is practiced in nail salons before undergoing a procedure.
• Practice hand hygiene. This is always important in preventing any type of infection.
• Wear socks made of fabric such as wool, nylon and polypropylene since they absorb moisture and keep the feet dry. It is also recommended to change socks regularly.
• Wear shoes that can reduce humidity such as open-toe footwear.
• Spray antifungal agent on the feet and inside of the shoes to prevent infection.

_Fungal Skin Infection_

Fungal skin infections are commonly referred to as dermatomycoses. They are a fairly common cutaneous disorder. Fungi are the causative pathogens behind this type of infection. Examples include Malassezia, Candida (not C. albicans), Trichosporon, Rhodotorula, Cryptococcus or Aspergillus, Geotrichum, Alternaria.

Risk factors for dermatomycoses include: _damaged skin, and mild debility_. These two factors make the skin more susceptible to fungal invasion and infection, especially among men.¹²⁴

Dermatomycoses can affect any area on the skin including the feet, nails, groin, hands and many other places as well. They also affect the hair, nails, and skin. Tinea pedis, also known as Athlete’s foot is the most commonly occurring fungal skin infection. Other commonly occurring fungal skin infections include:

• Tinea corporis (ringworm of the body)
- Tinea capitis (ringworm of the scalp)
- Tinea cruris (jock itch)

**Treatment**

The goal of the treatment is to offer symptomatic relief to the patient, cure the infection, and prevent recurrence. It is important to adhere to the recommended duration of therapy which is generally 2 to 4 weeks.\(^\text{123}\)

Topical antifungal preparations in the form of creams, ointments, paints, and powders have been used successfully to treat dermatomycoses. Some oral antifungal agents have also been used.\(^\text{124}\) The antifungal agents are aimed at relieving the itching, burning, cracking, and scaling of the skin. Some notable examples include:\(^\text{123}\)
- Clotrimazole
- Miconazole
- Terbinafine
- Tolnaftate
- Butenafine

**Prevention**

Dermatomycoses can be effectively prevented from spreading to other areas of the body as well as other people through the measures listed below.\(^\text{124}\)
- Do not share bath mats or towels with others.
- Do not stand barefoot on the bathroom floor.
- Seek the help of a chiropodist to know how to disinfect shoes which may have been the source of infection
- Maintain proper skin hygiene. This is an essential step in preventing fungal infections. Wash skin in warm soapy water, rinse before drying, and lastly dust with mild antifungal talc.
- Dry skin adequately. Special care should be taken while caring for the skin between the toes and on the foot, which should be kept dry at all times.
- Practice hand hygiene. Always wash hands thoroughly after applying an antifungal product on an affected area.
- Use astringent such as a surgical spirit between the toes at bedtime to remove any residual moisture on the skin.
- Wear breathable shoes. Footwear should be made up from natural materials to facilitate proper airflow. Cotton or wool socks and shoes of pure leather are the recommended fabrics for individuals who are at high risk for fungal skin infections.
- Do not share footwear with others.
- Use antidandruff shampoo at least twice a week.

To prevent recurrence of skin fungal infection, it is important for health providers to inform patients to complete the prescribed course of the antifungal treatment to ensure complete eradication of the infection. Lastly, a topical antifungal preparation should be used regularly on the bottom of the feet and on the nails twice a week to prevent recurrence of fungal infection.
**Lichen Planus**

Lichen planus is a self-limiting disease of the skin. It is an inflammatory condition characterized by the appearance of flat topped and polygon shaped papules and plaques on the skin. It is not contagious. It is difficult to diagnose the condition in its early stages.

Lichen planus commonly appears on the skin surface of the extremities, especially the wrists, and in skin areas exposed to trauma. It can also appear on oral mucosa, genital mucosa, the nails and the scalp.\(^8\) It has several subtypes. The clinical presentation of lichen planus has several variations, which are as follows:

- Hypertrophic lichen planus
- Atrophic lichen planus
- Erosive or ulcerative lichen planus
- Follicular lichen planus (lichen planopilaris)
- Annular lichen planus
- Linear lichen planus
- Vesicular and bullous lichen planus
- Actinic lichen planus
- Lichen planus pigmentosus
- Lichen planus pemphigoides

**Diagnosis**

When studied under direct immunofluorescence, findings such as globular deposits of immunoglobulin M (IgM) and complement mixed with apoptotic keratinocytes is frequently seen. When tissue samples are examined, the following characteristic histopathologic features can be seen:
• Hyperkeratotic epidermis and irregular acanthosis with concentrated thickness in the granular layer
• Degenerative keratinocytes under the epidermis
• Apoptotic keratinocytes
• Linear deposits of fibrin and fibrinogen in the basement membrane zone
• Lymphocytic infiltration in the upper dermal layer
• Histiocytic cells with several Langerhans cells

_Treatment_

As mentioned previously, lichen planus is a self-limiting and non-contagious disease. Therefore, treatment modalities are usually simple and straightforward. The treatment duration is usually 8-12 months. In most of the cases, individualized treatment is based on the following factors:

• Severity of the condition
• Extent of lesion development
• Patient’s response to treatment

The two main problems associated with treatment of lichen planus are that: 1) the treatments are based on anecdotal evidence, and 2) spontaneous remissions occur in most of the patients.83

Topical corticosteroids are the first line agents in lichen planus. They have been effectively used to treat the early symptoms of the disease. A twice-daily application of topical ointment or cream on the affected
area for a period of two to three weeks is initially recommended. Intralesional injections of triamcinolone acetonide are recommended in case of resistant or hyperkeratotic lesions.

The most commonly used treatment for lichen planus is the use of oral corticosteroids. The dosage and regimen depends on the patient and the disease condition. In some cases, parenteral corticosteroids are also used. Alternative treatments can be tried in case of corticosteroid resistance. These include:

- 30 mg of acitretin daily for eight weeks
- Phototherapy using psoralens
- Griseofulvin
- Cyclosporine
- Dapsone
- Hydroxychloroquine

In case of oral lichen planus, a topical corticosteroid is the first line of therapy. Other topical medications such as topical cyclosporine, systemic corticosteroids, topical and systemic retinoid and oral PUVA (ultraviolet light therapy) may also be used.

**Prevention**

The preventive management of lichen planus includes:

- Lifestyle changes such as healthy diet and exercises
- Body cleansing to eliminate toxins such as bowel cleanse, dental check ups, etc.
• Various traditional and natural therapies.

**Actinic Keratosis**

Actinic keratosis is a commonly occurring dermatological problem that is mostly associated with non-ionizing radiation or chronic exposure of the sun. It can eventually develop into squamous cell carcinoma if left untreated. It is the skin disorder with the highest malignancy risk.

**Presentation**

Actinic keratoses develop in three phases: initial, intermediate and late.

- **Initial Phase:**
  The lesions start as small, palpable rough spots that may be invisible to the eye.

- **Intermediate Phase:**
  The lesions grow bigger in size and become red and scaly.

- **Late Phase:**
  The lesions enlarge further, sometimes growing to several centimeters in size.

Actinic keratosis is mostly prevalent with the elderly population, especially those who have fair skin and history of sun sensitivity. The lesions usually develop in regions that have received chronic sun
exposure, including the face, ears, and, in men, bald scalp, as well as in the dorsal forearms and hands.

It is not unusual for patients to develop several lesions within one part of the body. Sometimes, they develop so close to each other that they produce confluent actinic keratosis over a relatively large area. The following subtypes of actinic keratosis are:

- Brown or pigmented
- Atrophic
- Bowenoid
- Lichen planus–like
- Exaggerated hyperkeratosis

**Treatment**

The treatment of actinic keratosis includes the use of:

- Topical drug therapy
- Surgical or chemical elimination of the lesions
- Photodynamic therapy
- Cryosurgery
- Curettage or electrodessication
- Chemotherapeutic agents such as 5-fluorouracil and aldara

Other medications that received FDA approval for the treatment of actinic keratosis are:

- Imiquimod cream
- Ingenol mebutate gel
• Topical diclofenac gel

_Prevention_

It is important to take proper preventive measures for actinic keratosis since it carries the risk of developing into cancer or can be an early sign of skin cancer.

Generally, sun protection is the most important primary preventive measure against actinic keratosis and skin cancer. The following sun-safety measures can help prevent the development of new patches or prevent recurrence of previous cases.\(^{86}\)

• Restrict the time spent in the sun and hence avoid getting a sun tan or sunburn. Over exposure to sunlight can increase the risk of the development of actinic keratosis or skin cancer.

• Use a sunscreen regularly to reduce the risk of the development of actinic keratosis. A broad spectrum sunscreen with a sun protection factor of at least 15 should be applied on exposed skin prior to going outdoors. It should be applied at least 20 minutes before going out in the sun.

• Use sun protective clothing and gear to prevent any sun caused damage.

• Avoid tanning beds or tan accelerating agents.

• Regularly examine the skin to check for any patches or lesions.
Use oral and topical retinoids.

**Eczema (Atopic Dermatitis)**

Eczema is also referred to as atopic dermatitis. It is a chronic and recurrent inflammatory and pruritic condition of skin. Eczema can be easily identified by its characteristic features, such as:

- Dry skin
- Lichenification
- Eczematous lesions

**Diagnosis**

The following findings are usually seen in patients diagnosed with atopic dermatitis.

- Pruritus
- Eczematous lesions that change with age
- Chronic and relapsing course
- Early age of onset
- Atopy (IgE reactivity)
- Dry skin
- Personal history of asthma, hay fever, or atopic diseases in a first-degree relative in patients younger than 4 years.
Treatment

The basic treatment approach to eczema is prevention of triggers, which can stimulate flare ups. It involves avoiding the following skin irritants:

- Scented moisturizers and other topical products
- Bubble baths, shampoos and solvents
- Wool, nylon, grass, sand, pollens, house dust
- Mites, animal dander
- Pro-inflammatory foods

There are many pharmacologic agents used to treat and manage the symptoms of eczema, namely:

- Moisturizers, such as petrolatum and aquaphor
- Topical steroids, such as hydrocortisone
- Immune modulators, such as tacrolimus

Once diagnosed, patients may be given a course of topical corticosteroid preparations. They are the drug of choice in eczema to reduce both inflammation and to relieve itching. They are generally safe and effective.

Wet dressings are may also be used in the treatment of eczema. Initially, emollients are applied to the affected skin and then covered with bandages soaked in warm water. Wet dressings are usually reserved for severe cases of eczema or flare ups for a few days. They
are typically applied 3 to 4 times daily and left on the skin for 15 minutes to an hour.

Certain immunomodulators such as tacrolimus and pimecrolimus have also been used in the treatment of eczema. They help control inflammatory responses of the skin upon topical application and have proven to be of benefit especially in patients with a steroid contraindication. They are reserved for short-term treatment and should not be used for a long time.

Topical and oral antibiotics have been also suggested to play a role in the treatment of infections on eczema-affected skin. Most infections are caused by the gram-positive bacteria, *S. aureus*. Antibiotic solutions may also be added to bath water to prevent and treat any kind of skin infections. Pharmaceutical preparations with anti-pruritic activity have also been used to relieve the itching associated with eczema. Other alternatives such as oatmeal bath additives and pine tar preparations may also be used to relieve itching. Oral medicines such as cyclosporine and phototherapy have been used to treat severe cases of eczema.

**Self-Care**

Self-care for individuals with eczema includes the following:

- Avoid triggers that can aggravate eczema or cause eczema.
- Avoid overheating in the winter and using dehumidifiers in the summer to prevent excessive drying of the skin.
• Avoid alkaline soap and mild soaps. Instead, use soap and shampoo substitutes.
• Use bath oils.
• Shorten bath times.
• Dry properly after bathing. Brush skin with the palms or gently pat dry with a towel.
• Use moisturizers or emollients to prevent and manage itching and scratching.
• Avoid scratching

**Shingles**

Shingles is an infectious viral disease caused by the virus varicella zoster virus. It is also known as herpes zoster. The viral infection is a result of the reactivation of the virus, which initially causes chicken pox. Shingles is usually self-limiting and its most notable symptom is painful rashes. However, it can also lead to serious complications such as post-herpetic neuralgia (PHN).

Shingles develop in three stages, known as the:
• Pre-eruptive stage
• Acute eruptive stage
• Chronic phase (PHN)

*Treatment*

Pharmacological agents for the treatment of shingles are aimed at:
• Reducing the severity of illness
• Reducing the duration of the illness
• Providing analgesia and pruritic relief
• To prevent complications, such as post-herpetic neuralgia

Antiviral medications, such as acyclovir, valacyclovir and famciclovir, have been used to treat shingles. The antiviral drug regimen should be started as soon as the rash appears. Additionally, analgesics such as acetaminophen, non-steroidal anti-inflammatory drugs, tricyclic antidepressants, opiates, anticonvulsants, capsaicin, and topical anaesthetics are also recommended to alleviate pain, malaise, and fever by shingles.

Wet compresses, calamine lotion, Burrow’s solution, zinc oxide formulations, and colloidal oatmeal baths are used as alternative therapy to provide relief from the symptoms of shingles.72

Prevention
The most effective prevention strategy to reduce the risk of shingles and its complications (i.e., post-herpetic neuralgia) is vaccination. There are two types of vaccines which can prevent the occurrence of shingles, which are the:91
• Chickenpox vaccine (varicella)
• Shingles vaccine (varicella-zoster)
Chickenpox Vaccine:
In addition to routine childhood immunization, the varicella vaccine has been recommended for adults as well. It reduces the risk of skin complications associated with chicken pox.91

Shingles Vaccine:
The current shingles or herpes zoster vaccine is approved by the FDA for adults aged 50 years or more. It helps to reduce the progression and the severity of the disease. It also reduces the risk of post-herpetic neuralgia.

The shingles vaccine is a preventive measure that can only be used in people who have not had the infection yet. It means that it does not have any beneficial effect on individuals who already had the infection. Because the vaccine contains a live attenuated virus, it is not recommended for use in people with weakened immune systems.

Other steps to prevent Herpes zoster infection include:79

- Avoid social contact until and after the lesions have dried. This means that people should not return to work until their lesions are dry and crusted.

- Avoid contact with high risk individuals, such as pregnant women, premature infants born to susceptible mothers, and immunocompromised patients of all ages.
Measles

Measles is a highly contagious viral infection. Also known as rubeola, it is an acute disease caused by a virus in the Paramyxovirus family. It can easily be transmitted by way of the following:\(^7^4\)

- Airborne respiratory droplets
- Close personal contact with infected individuals
- Direct contact with contaminated nasal or throat secretions

The virus can remain active and contagious in the air or on infected surfaces for up to 2 hours. It may also be transmitted by an infected person (up to 4 days) to another before the eruption of the characteristic rashes.

Despite the widespread vaccination against the virus, there are still many measles outbreaks in the recent years, which have resulted in epidemics and significant death toll. This is especially true among young and malnourished children.

Measles are identified by fever, rash, cough, and runny nose and eye infections. The first sign of measles is usually a high fever (more than 40° C) that usually lasts for 4-7 days. Malaise, fever, anorexia, and the classic triad of conjunctivitis, cough, and coryza characterize this prodromal phase. The characteristic enanthem usually presents 2-4 days following the prodromal phase and lasts for 3-5 days. Small spots, called Koplik spots, are also often visible within mucosal lining
of the cheeks. The exanthem typically presents 1-2 days following the Koplik spots, which may be accompanied by mild pruritus.

Generally, the rash develops about two weeks following viral exposure. It usually appears first on the face and upper neck and later spreads to the extremities. In case of uncomplicated measles, the entire duration of illness, from late prodromal to resolution of fever and rash, is about 7-10 days.

**Treatment**

There is no specific antiviral agent indicated for the treatment of measles. In case of complications, such as bacterial infections, antibiotics may be administered. The treatment modalities available are largely aimed at reducing or managing symptoms, and preventing complications. Symptomatic treatment involves administration of:  
- Fluids to prevent dehydration  
- Analgesics and anti-inflammatory agents to treat fever, malaise, and pain

**Prevention**

Preventive measures include isolation of infected individuals and timely vaccinations.

Infected patients should be completely excluded from social interactions in places such as childcare, preschool, school and work for at least 4 days after the onset of the rash. A hospitalized patient
should be kept in isolation and all standard precautions for prevention of transmission should be observed.\textsuperscript{78}

\textit{Immunization}

The best way to prevent measles is through the administration of measles, mumps and rubella (MMR) combination vaccine. Children over the age of 9 months or adults in contact with measles, infection may be prevented by immediate vaccination within 72 hours of first contact. If 3 to 7 days have passed following the contact, then immunoglobulin administration may be more effective in preventing subsequent infection.\textsuperscript{78}

In case of infants less than 9 months of age, the risk of developing measles may be prevented through the timely administration of immunoglobulin within 7 days of first contact. This is then followed by a Measles, Mumps and Rubella (MMR) vaccine after reaching 12 months of age. It is important to note that a gap of 5 to 6 months between immunoglobulin and MMR vaccine must be observed.\textsuperscript{78} Measles vaccine is also important in preventing a resurgence of measles and promoting immunity.\textsuperscript{90}

\textbf{Corns and Calluses}

Corns and calluses are specific regions of hardened skin which develop in parts of the skin often subjected to excessive pressure or friction. In most of the cases, they are seen on the feet and cause pain and discomfort during walking. Corns and callouses may become infected,
particularly in an individual with diabetes, and may require referral to a foot specialist and/or surgeon for excision and possible debridement that may require ongoing wound management follow-up, as in the case of an infection and delayed healing.

Treatment

The treatment is aimed at removing the cause of the pressure or friction, and also at scraping off the hardened part of the skin.\textsuperscript{112}

- **Excision:**
  A podiatrist can excise the thickened skin to alleviate pressure on the tissue beneath the corn.

- **Foot care products such as special rehydration creams, protective corn plasters, customised soft padding or foam insoles, small foam wedges, which are placed between the toes, and special silicone wedges can be used to provide relief and reduce pressure.**

- **Salicylic acid can be used to soften the top layer of dead hardened skin so that it can be easily removed. The topical salicylic acid products are mild and do not cause any sort of pain to the patient.**

Prevention

There are many approaches to help prevent the development of corns and calluses. These include:\textsuperscript{113}
• Avoiding tight shoes. There should be ample space for the movement of toes within the shoes.

• Wearing protective coverings such as felt pads, non-medicated corn pads or bandages. These should be worn over areas which have a tendency of wearing against the footwear.

• Wearing padded gloves when using hand tools. On the other hand, the handles of tools can be covered with cloth tape or padded covers.

• Keeping feet dry. Feet should be completely dried after washing and a special moisturizing foot cream should be then applied.

• Removal of hardened skin. Hardened skin can be removed gently with the help of pumice stone.

• Reporting foot pain. Foot pain should not be ignored and immediate medical help should be taken.

**Vitiligo**

Vitiligo is a skin condition characterized by the loss of brown color pigment from some areas of skin which leads to the appearance of irregular white patches. It occurs when the immune system destroys the cells that produce melanocytes, the cells responsible for producing melanin. It is an autoimmune skin disorder with unknown etiology.$^97$
Vitiligo lesions usually present as:

- White or hypopigmented
- Typically well demarcated
- Round, oval, or linear in shape
- Concave margins
- Size varies between millimeters to centimeters
- Enlarged and concentrated on the center over time at an unpredictable rate

Vitiligo lesions usually affect the hands, forearms, feet, and face.

_Treatment_

It is difficult to treat vitiligo. Early therapy for vitiligo is comprised of the following:  

- Phototherapy
- Topical applications of corticosteroid creams or ointments, immunosuppressant creams, such as pimecrolimus and tacrolimus or topical drugs such as methoxsalen
- Skin grafting for severe cases

_Prevention_

Vitiligo cannot be prevented. The lack of skin pigment put patients at greater risk of skin damage from ultraviolet radiation, which is why they should use high SPF sunscreen when going out in the sun.
Vitamin D supplementation is also needed in vitiligo patients to prevent conditions such as rickets, especially in adults.\textsuperscript{111}

**Contact Dermatitis**

Contact dermatitis is an inflammatory skin reaction. It is characterized by redness, soreness or inflammation following direct contact with an allergic substance. It is listed as two classes:

1. Irritant dermatitis
2. Allergic contact dermatitis

There are many factors which can cause skin irritation and lead to contact dermatitis. Examples are cement, hair dyes, wet diapers, pesticides or weed killers, rubber gloves, shampoos, adhesives, antibiotics, Balsam of Peru, fabrics and clothing, fragrances in perfumes, cosmetics, soaps and moisturizers, nail polish, permanent wave solutions, nickel or other metals, poison ivy, poison oak, poison sumac and certain other plants as well, and rubber or latex gloves and shoes.\textsuperscript{131}

**Treatment**

There are various treatment strategies to treat contact dermatitis, including:\textsuperscript{134}

- Minimizing exposure to allergens
- Avoiding allergens completely
- Use of emollients
- Application of topical corticosteroids
• Administration of oral corticosteroids

Treatment involves initial identification of the irritant responsible for the allergic reaction. Avoiding or reducing contact with the irritants will help to avoid exacerbation of the symptoms of contact dermatitis. Emollients are used to treat the symptoms and help soothe the inflamed, scaly skin.134

Topical corticosteroids are recommended to be used in patients with significant inflammation or redness of the skin. The severity of the disease and the type of allergen causing the condition is helpful in deciding the regimen of the topical corticosteroid to be used.

In severe cases, oral corticosteroids are prescribed. The corticosteroids may be prescribed for 5 to 7 days depending on the condition of the patient.134

Prevention

There are several general strategies which can be followed to prevent contact dermatitis. These are listed below.133

• Avoid irritants and allergens:
  It is important to identify allergens causing skin irritation or eliciting allergic responses from the skin.
• Wash and bath regularly:
  Skin should be washed immediately if suspected to have come in contact with the allergen. A mild, fragrance free soap is recommended for use and must be completely rinsed off. Any clothing or other items that may have come in direct contact with allergenic substance should also be washed thoroughly.

• Wearing protective clothing:
  If susceptible to allergic skin reactions, then wearing protective gear such as face masks, gloves, goggles and other protective items is necessary.

• Using suitable skin care products:
  If the skin care product, such as make-up or skin cleanser has allergens that may cause contact dermatitis, the product should be changed. A product with ingredients that is not irritating should be used.

• Using Emollients:
  Frequent applications of emollients are helpful to maintain skin hydration and protect it from allergens and irritants. Emollient soaps are a good choice to prevent skin from drying. Emollient skin cleansers are especially good for the skin of the hands, which often require frequent washing.

• Applying barrier products:
  Barrier products can create a protective layer on the skin and protect it from skin irritants and allergens. When used
appropriately, barrier creams are efficient in reducing contact with the skin irritant.

- Moisturizing:

  Moisturizers should also be applied frequently as they are helpful to restore the outermost layer of the skin, keeping it hydrated and plump.

- Dietary modifications:

  Some foods, such as lentils, nuts and oats, contain nickel and must be avoided since they can act as skin allergens for some people and cause contact dermatitis.

**Impetigo**

Impetigo is defined as a highly contagious skin infection which is mainly seen in infants and children. It appears as red sores on the face, especially around the nose and mouth, which may later burst and develop into crusts.\(^\text{128}\)

Impetigo is caused by streptococcus or staphylococcus bacteria. These pathogens enter the skin through breaks sustained from injuries or trauma.\(^\text{126}\) Secondary skin infections of existing skin lesions from cuts, abrasions, and bites, can also occur. Methicillin-resistant *S. aureus* (MRSA) and gentamicin-resistant *S. aureus* strains have also been reported to cause impetigo.
Impetigo enters the skin through skin breaks via common mechanisms, such as:

- Scratching
- Dermatophytosis
- Varicella
- Herpes simplex
- Scabies
- Pediculosis
- Thermal burns
- Surgery
- Trauma
- Radiation therapy
- Insect bites

There are two types of impetigo: Non-bullous, and Bullous. Non-bullous impetigo starts as an erythematous macule that quickly develops into a vesicle or pustule. When the pustule ruptures, it releases its wet contents and then dries off, resulting in crusted, golden colored exudate over the site of rupture. It may spread to other areas through scratching and subsequent autoinoculation.

Bullous impetigo presents as a small or large, superficial, fragile bullae. They often rapidly and spontaneously appear, rupture, and dry. Because of this, collarettes, are often the only evidence visible at the time of presentation. They usually present on intact skin although they may also infect current lesions to form generalized lesions. Usually,
they do not cause redness at the site of rupture or the surrounding skin.

**Treatment**

If impetigo is not treated actively, it usually clears off within 2 to 3 weeks by itself. When treatment is initiated, the condition clears off much sooner and the risk of passing on the infection to others is also prevented. Antibiotics, topical or oral, are recommended for the treatment of confirmed cases of impetigo. If the cause of impetigo is another co-existing condition, such as eczema, then treatment is also required for that condition.\textsuperscript{135}

Topical antibiotics are recommended to be used on the affected area at least three to four times a day for at least seven days. Before application, the skin should be cleaned and cleared off crust. They should be applied with clean hands, which should be immediately washed with soap and after application. Rubber or latex gloves can also be used to apply the cream in order to prevent the spread of the infection.\textsuperscript{135}

In case of severe infections, oral antibiotics are prescribed. They are used for a period of 7 days and taken 2 to 4 times in a day. It is important for the patient to be educated to complete the prescribed course of treatment to prevent recurrent infection. If the infection is widespread and remains untreated after the use of topical or oral antibiotics then further treatment may be required.\textsuperscript{135}
Prevention

A patient diagnosed with impetigo should be kept in isolation to prevent the infection from spreading. It is important to keep the patient secluded for at least 48 hours after starting treatment or after the sores have stopped forming blisters or crusts. Impetigo is not infectious once the crusts have cleared. The basic prevention strategy involves taking steps to prevent the spread of infection. This includes the following steps.

- **Isolation:**
  
The patient should not attend work, school, nursery or playgroups until the sores have dried or the crusts cleared off or until 48 hours after the start of treatment.

- **Avoid sharing:**
  
  Infected people should not share their flannels, sheets or towels with others. All the items used by the impetigo affected person should be washed with hot water.

- **Bandaging:**
  
  Sores should be covered with bandage after washing them with a mild soap and water.

- **Nail trimming:**
  
  Nails should be trimmed properly to minimize injury to the sores when scratching.
• Maintain cleanliness:

Use gloves made of rubber or latex to apply antibiotic ointment on the affected area.

• Avoid touching sores:

Patients should be advised to not scratch the affected areas.

• Hand washing:

Patients should be advised to wash hands frequently and especially after touching the sores.

• Contact with newborn:

Infected individuals should avoid any contact with newborn babies.

Prevention of Recurrence

It is imperative that cuts, scratch or scrape on the skin be kept clean and any skin condition that can compromise the integrity be completely cured. In some cases where the recurrence of the infection occurs frequently, the bacteria may be residing in the nose and an antiseptic nasal cream may be required to clear the infection.\textsuperscript{136}

Stasis Dermatitis

Stasis dermatitis is a condition that commonly appears in the lower extremities. It occurs when blood accumulates in the veins of the lower legs. The primary cause of stasis dermatitis is venous
insufficiency. The condition is identified by the presence of itching and inflammation of the skin, which leads to further damaging changes in the skin.\textsuperscript{132}

\textit{Treatment}

The main goal of the treatment is to reduce the clinical symptoms of venous insufficiency and edema. The different approaches used in the treatment include:

- Phototherapy
- Ligation
- Compression therapy

In some cases, ligation of the vessels is done to treat arteriovenous fistula or incompetent perforators.

Phototherapy has been used to treat refractory cases of stasis ulcers. Non-coherent intense pulsed light has been utilized to treat pigmentation associated with stasis dermatitis.

Compression therapy has also been recommended. Compression of the legs with compromised arterial circulation is very helpful. This may be achieved through the use of specialized stockings and end-diastolic compression boots. Specialized stockings are used to deliver controlled pressure gradient to stimulate circulation in the leg. They should be applied early in the morning so that it facilitates resolution of edema.
that has developed overnight. Elastic wraps, compression boots and other sophisticated compression devices like end-diastolic compression boots are also used to treat stasis dermatitis.

Whenever possible, patients with stasis dermatitis should elevate their legs and change their position frequently to stimulate blood flow to the lower extremities.

In some cases, allogeneic cultured dermal substitutes have been used to treat the condition. In case of inflammation, topical steroids may also be used. Care should be taken to avoid the use of topical steroids for long periods of time because they may lead to serious side effects. Nonsteroidal anti-inflammatory agents, tacrolimus, and pimecrolimus have also been proven to be useful in the management of stasis dermatitis.

Systemic therapy with prostaglandin-E1 and pentoxifylline has been used to reduce inflammation associated with stasis dermatitis.

Since stasis dermatitis is a condition that is prone to infection, it is essential to treat the open erosions with a topical antibiotic such as bacitracin or polysporin to prevent infections. Some of these antibiotics are dicloxacillin, cephalixin, cefadroxil, and levofloxacin.
**Prevention**

The primary strategy in stasis dermatitis is to prevent skin drying. This may be achieved by the following methods.\textsuperscript{130}

- Reducing the time spent bathing or showering.
- Using warm water for bathing instead of hot water.
- Using bath oil.
- Using fragrance-free cleansers and skin products.
- Drying adequately after bathing or washing.
- Applying moisturizer on the damp skin to lock in the moisture. Moisturizers with oil or cream are preferably used.
- Controlling symptoms of peripheral edema to prevent stasis dermatitis.

**Skin Care And Topical Products**

Topical products are essential to an effective skin care routine and wound management. There are a wide variety of topical products in the market. These include skin cleansers, barrier products and moisturizers. These are further described in the sections below in terms of selection, benefits of each product and recommended applications to support healthy skin and healing.

**Skin Cleansers**

Skin cleansing is important in maintaining the integrity and overall health of the skin.\textsuperscript{137} Skin cleansers can be defined as surface-active agents such as emulsifiers, detergents, surfactants or soaps, which reduce the surface tension of the skin and aid in the removal of dirt,
sebum, microorganisms, and exfoliated corneum cells through the process of emulsification.\textsuperscript{142}

\textit{Properties of a skin cleanser}

An ideal skin cleanser will clean the skin without causing any:\textsuperscript{142}

- Irritation
- Damage
- Disruption to the skin structure or the moisture barrier

The moisture skin barrier is effective in providing protection against transepidermal water loss, adverse reactions due to chemical exposure or xenobiotics, and preserving moisture to maintain the skin’s smoothness and flexibility. It is important that the skin cleanser does not disrupt or disturb the moisture skin barrier as it may lead to various dermatological problems.\textsuperscript{142}

\textit{Composition of skin cleansers}

Skin cleansers generally consist of:\textsuperscript{142}

- Water
- Surfactants, which help in emulsification of the dirt
- Moisturizers, which help in hydrating the skin and keeping the skin barrier intact
- Binders, which are the stabilizing force of the formulation
- Lather enhancers
- Fillers
- Preservatives to prevent microbial growth
• Fragrance to mask the smell of the ingredients used
• Dyes or pigments in some cases

Benefits of the skin cleansers
Skin cleansers primarily help the skin to get rid of the bacteria present in the clogged hair follicles. A thorough cleansing of skin helps in the removal of the dirt and dead cells from the skin surface.¹³⁹

The moisture present in the skin cleansers help to maintain hydration and also to restore barrier function. The emollients inhibit the evaporation of the skin moisture by forming a thin layer of water on the surface of the skin.¹⁴²

Types of skin cleansers
There are different types of skin cleansers including surfactants, soaps, dermatological bars, antiseptic foams, and antibacterial washes.

Surfactants are part of many personal hygiene products, such as soaps, beauty bars, dermatological bars or cakes, liquid cleansers including facia liquid cleansers, antiseptic foaming solutions, antibacterial washes and emulsions. Soap is a combination of fats and oils enriched with lanolin, sweet almond oil, or glycerine to alleviate the dryness of the skin.¹⁴²
Liquid cleansers are complex formulations including anionic, non-ionic and silicone constituents. Liquid cleansers are mild and offer antibacterial activity. It helps to maintain the physiological pH of the skin. Antiseptic foams and antibacterial washes have been found to be of use in the adjunctive treatment of acne. These washes can reduce P. acnes and also prevent secondary infections.\textsuperscript{142}

\textit{Complications of skin cleansing}

Sometimes, in individuals with oversensitive skin, the use of skin cleanser in any form can lead to skin irritation and other skin related problems. Overwashing of the skin may lead to some negative effects, including the following conditions.\textsuperscript{144}

- Altered pH of the skin, thus compromising the skin barrier function. The alkaline pH of soaps especially can increase the number of acne causing bacteria.

- Increased risk of dry skin through excessive evaporation which may trigger dermatitis.

- Excessive dryness of the skin due to de-fatted skin.

- Disruption of the surface of the skin after water loss and entry of chemicals. This makes the skin more prone to infections and other skin problems.

- Risk of infection. Impetigo may be caused as dry skin is more susceptible to Staphylococcus aureus infection.
• Risk of irritant contact dermatitis either from excessive drying of the skin or the presence of specific surfactant in the skin cleanser. Cleansers used as adjuncts in acne treatment should be used with caution as they may cause dryness and irritation.

• Additives such as alcohols, gels, or alphahydroxy acids in the cleanser may cause stinging sensation in the skin.

• Contact urticaria from fragrances, preservative or benzoyl peroxide present in the skin cleanser.

• Certain skin cleansers are comedogenic and block the pores in the skin which may eventually progress to the development of acne. Scrub cleansers may cause an inflammation of the acne pimples because they tend to break open the clogged pores.

• Allergic reaction may occur. Some individuals are allergic to cleansers or a specific constituent in them such as botanicals (chamomile, lavender oil, and rose oil), preservatives, fragrances, emollients, or rosin.

• Protein contact dermatitis may occur due to the presence of some cleansers made of peanut oil or oatmeal in some people.

**Hypoallergenic skin cleansers**

Hypoallergenic skin cleansers are products that do not cause allergy. This means that the substances liable to cause allergic reactions or contact allergy in the skin are not used. These cleansers are mild, fragrance-free, and non-irritating to the skin. For acne patients,
hypoallergenic skin cleansers are oil free and non-comedogenic as well. It is important to note however that individuals with very sensitive skin may experience allergic reaction even with hypoallergenic skin cleansers.144

**Skin Barrier Products**

The skin is an organ that acts as a barrier against dehydration and absorption of harmful chemicals from the external environment. If the skin barrier is damaged, it leads to various skin problems such as contact dermatitis and atopic dermatitis. This is the reason that routine washing and bathing should be done carefully in patients with wounds and skin injury to prevent further damage and disruption to the skin. In fact, the function of the skin as a barrier should be reinforced whenever necessary. This is why skin barrier products are important.147

Barrier products are designed to protect the skin by reducing excessive exposure to moisture. Emollients, on the other hand, are lipid emulsions and help in soothing and hydrating the skin.141

*Moisture associated skin damage*

There are many factors such as incontinence, excessive perspiration, and presence of wound exudate put the skin at risk of damage from prolonged exposure to moisture. Moisture-associated skin damage can be identified by an inflammation of the skin which may occur with or without skin erosion, or secondary cutaneous infection. The commonly
occurring moisture-associated skin damage includes incontinence-related dermatitis, periwound moisture-related dermatitis, and peristomal moisture associated dermatitis.\textsuperscript{141}

\textit{Properties of barrier products}

An ideal barrier product should include the following benefits for the individual using it. It should be:

- Suitable for application on both intact and broken skin.
- Hypoallergenic in nature.
- Transparent
- Easy to apply
- Breathable
- Have protective properties
- Not cause any pain to the user

\textit{Barrier products and their role}

Barrier products have been used to protect the skin from moisture damage. There is a wide variety of barrier products available today, which may make selection a bit challenging. A complete assessment of the patient and review of the interventions already given should be considered before prescribing a barrier product.\textsuperscript{141} Most barrier products perform the dual function of treatment and prevention of dermatological disorders.\textsuperscript{145}
**Barrier product and the incontinent patient**

The skin of an incontinent patient should be cleaned following each episode of incontinence using a non-soap mild cleanser and applied with a suitable barrier product. The barrier product should be compatible with incontinence products. Barrier creams are only applied on intact skin and should not be used on broken skin while barrier films may be used on both broken and intact skin.\(^{141}\)

In case of sensitive skin, antibacterial agents such as benzalkonium chloride and cetrimide can sensitize the skin and must be avoided. Likewise, perfumed barrier products should also be avoided in incontinent patients.\(^{145}\)

**Barrier products for patients with wound exudate**

Even though wound exudate is essential part of wound healing, an excess of it may damage the periwound skin and further deteriorate the wound. Application of an appropriate barrier product can help in the protection of the periwound skin. Barrier film applicators are used for smaller wounds while barrier film sprays are preferably used for large wounds.\(^{141}\)

**Barrier products for peristomal skin**

Barrier products may sometimes also contain an ingredient that exhibits mild hydrating properties. In mild cases of broken skin, silicone-based barrier wipes are useful when used under adhesive stoma products. This allows patients to independently manage their own stoma. In fact, some patients prefer these wipes to traditional barrier creams.\(^{141}\)
**Types of barrier products**

There are three types of barrier products intended for different clinical purposes. These are listed below.

- **Generic products:**

  Traditionally barrier products are available in the form of creams that consists of a lipid-water emulsion base with metal oxides, such as zinc or titanium. They are applied as a thin layer on the skin. They effectively repel the moisture from the skin and are considered reliable barrier products. A major disadvantage with these barrier products is that they can cause barrier incontinence. Also, some of their ingredients may also trigger allergic reactions.\(^{141}\)

- **Barrier products without antimicrobial:**

  Some barriers are specifically intended for use in patients who are incontinent and provide a physical barrier without offering any antimicrobial properties. These barrier products when applied on the skin appear as transparent coating, which are breathable and can last for up to a period of 72 hours.\(^{145}\)

  Today, there are many silicone-based products that are new, synthetic, and non-irritant. They are available in the form of creams, films, and wipes. When applied, they form a thin, protective polymer film.

  The silicone barrier products do not leave any residue upon drying, do not interfere with the adhesion of the dressings, and do not produce stinging sensation upon application.\(^{141}\)
Products such as paraffin or dimethicone are also used but they leave a layer of water repellent substance on the skin surface. They also have to be replaced more frequently as they can be rubbed off through clothing or pads or absorbed into the skin.\(^{145}\)

- **Antimicrobial barrier products:**

  Antimicrobial barrier products are meant to protect skin affected by incontinence from infection. They exhibit antibacterial or antifungal properties. Antimicrobial barrier products are available in the form of cream or ointment with zinc oxide, dimethicone or paraffin as constituent.\(^{145}\)

**Moisturizers**

Moisturizers are skin care formulations that are used to prevent and treat dry skin conditions, protect sensitive skin, improve skin tone and texture, and conceal imperfections of the skin.\(^{143}\) Moisturization also helps reduce microbial dispersion from the skin.\(^{140}\)

**Role of moisturizers**

Dermatologists prescribe moisturizers for the prevention and treatment of irritant contact dermatitis. Moisturizers perform the basic function of increasing the hydration level of the skin. However, some studies have also shown that long term use of moisturizers may lead to an increase in the susceptibility of the skin to skin irritants.\(^{138}\)
Moisturizers have skin protective effects, such as:

- Hold water in the outermost skin layers
- Act as temporary barrier
- Contain humectants emollients
- Prevent microbial dispersion from the skin

Clinical trials have proven that the use of a moisturizer has a beneficial effect on protecting the skin barrier function and skin hydration. The use of moisturizer can also prevent irritant skin reactions.\(^{146}\)

*Types of moisturizers*

There are many types of moisturizers available and the choice should be based on:

- Skin type
- Age of the user
- Presence of any particular skin conditions

It should also be kept in mind that there are certain factors that affect skin type when considering how to use moisturizers. Skin type usually changes depending on several factors, including:

- Environmental factors
- Hormonal changes
- Pregnancy
- Menopause
- Comorbidities
The four different types of skin include:\(^{143}\)

1. Normal
2. Dry
3. Oily
4. Sensitive

*Moisturizers for normal skin*

In moisturizers designed for normal skin, their function is to maintain the normal hydration of the skin. They are mostly water-based formulations. They contain lightweight oils or silicone derived from ingredients such as cyclomethicone making them light and non-greasy.

*Moisturizers for dry skin*

Moisturizers for dry skin are heavy and oil-based. Their function is to restore the moisture content of the skin. Petroleum-based moisturizers are preferably used for dry and cracked skin. These formulations are retained for longer periods than creams and are effective in preventing excessive water loss from the skin through evaporation.

*Moisturizers for oily skin*

Oily skin is susceptible to acne and breakouts. It requires moisturization after using skin care formulations after cleansing. Light, water-based moisturizers are effective in protecting oily skin after washing. Oily skin requires non-comedogenic products, which will not result in skin clogging.
Moisturizers for sensitive skin

Sensitive skin frequently suffers from signs of skin irritations, such as redness, itching or rashes. This is why a moisturizer with soothing properties is preferred. Moisturizers with soothing ingredients, such as chamomile or aloe vera, are good for sensitive skin. In addition, these products should not contain allergens in the form of fragrances, preservatives, or dyes. Skin care products which may contain an acidic ingredient should also not be used for sensitive skin.

Moisturizers for aging skin

Aging skin has the enhanced tendency to become drier as the oil-producing glands gradually become less active. An oil-based moisturizer which contains a petroleum base is good for mature skin. The moisturizers should also contain antioxidants or alpha hydroxyl acids to prevent and alleviate wrinkles.

Antioxidants, alpha hydroxyl acids, and petroleum base help in retaining the moisture and prevent the skin from turning dry and flaky. Moisturizers with glycerine and hyaluronic acid are also effective in minimizing the fine lines or wrinkles and in plumping up the skin.

Self-care routine to use moisturizer

Moisturizers are most effective if used appropriately and routinely. Some self-care tips in using moisturizers include:

- Try different moisturizers before choosing a final product.
• Use sun protection.
• Choose a moisturizer with ingredients that suits individual skin types and moisturizing needs.
• Apply moisture on wet skin to help trap the moisture in the surface cells.
• Moisturizers frequently applied should be applied after washing hands, before venturing outdoors in cold weather and right after showering or bathing. The skin on the hands is most susceptible to get irritated because of its tendency to be exposed to different types of skin irritants.

**Summary**

This course provided learning about skin cancer and common inflammatory skin conditions, including the pathophysiology, diagnosis, presentation, treatment and various prevention measures. Skin was discussed as an organ that acts as a barrier against dehydration and the absorption of harmful chemicals from the external environment. Damage to skin leading to various skin problems was emphasized. Routine self-care and prevention strategies was also emphasized to support clinicians to educate patients to care for skin for healing and to maintain health.

Clinicians caring for patients during routine clinic check-ups or in an acute care setting should reinforce the function of the skin as protective barrier whenever possible. Skin health and the various products available are many, which clinicians should discuss with
patients before choosing a type of skin product to treat a disease, wound or simply to maintain healthy skin.

While some skin conditions can be easily treated with over the counter or non-prescription remedies, its important for the clinician to perform a thorough history and evaluation of a skin condition and to screen for something more serious, such as a dangerous inflammatory condition or skin cancer. Prevention and self-care are necessary aspects of patient care and follow-up. Teaching tools are available for patients to avoid harmful exposure in the environment or through chemicals that could damage skin and cause vulnerability to serious health conditions.

Supporting patients to understand their skin type and predisposition to disease is an important part of the routine health physical and evaluation process. Future research and evidence supporting best practice is continuously evolving within the dermatology literature, practice guidelines and varied health organizations promoting public awareness to prevent skin cancer and inflammatory diseases.

**Please take time to help NurseCe4Less.com course planners evaluate the nursing knowledge needs met by completing the self-assessment of Knowledge Questions after reading the article, and providing feedback in the online course evaluation.**

Completing the study questions is optional and is NOT a course requirement.
1. Which of the following is characterized by impaired or inadequate absorption of dietary sources of protein and energy?
   a. Protein-calorie malnutrition.
   b. Protein malnutrition.
   c. Calorie malnutrition.
   d. Anemia.

2. Which of the following are formed as a result of a highly aggressive overgrowth of dense fibrous tissue which may extend further than the site of injury and do not revert spontaneously?
   a. Hypertrophic scars.
   b. Eschar.
   c. Keloids.
   d. Contracture scars.

3. Which of the following types of acne scars appear as relatively broad depressions with steep and well-defined margins as well as a flat, "u-shaped" base?
   a. Ice pick scars.
   b. Box-car scars
   c. Pitted scars.
   d. Rolling scars.

4. Which of the following non-surgical modalities can minimize scar formation by reducing the pro-inflammatory or pro-fibrotic cytokine levels?
   a. Occlusive therapy.
   b. Laser therapy.
   c. Radiotherapy.
   d. Intralesional cryotherapy.
5. Which of the following is used to reduce erythema by improving blood flow within excess scar tissues?
   a. Occlusive therapy.
   b. Laser therapy.
   c. Radiotherapy.
   d. Intralesional cryotherapy.

6. All of the following are precursor lesions to melanoma EXCEPT?
   a. Common acquired nevus
   b. Dysplastic nevus
   c. Congenital nevus
   d. Purpura

7. The treatment of choice for sclerosing basal cell carcinoma is __________.
   a. Curretage.
   b. Cryotherapy.
   c. Electrodessication.
   d. Moh’s surgery.

8. The treatment of choice for advanced stage of skin cancer is __________.
   a. Radiotherapy.
   b. Palliative care.
   c. Electrodessication.
   d. Aggressive chemotherapy.
9. Which of the following is a topically applied chemoprotective agent for use in sun protection?

a. Vitamin D.
b. Vitamin B.
c. Coenzyme Q10.
d. Ascorbic acid.

10. Which of the following are formed as a result of a highly aggressive overgrowth of dense fibrous tissue which may extend further than the site of injury and do not revert spontaneously?

a. Hypertrophic scars.
b. Eschar.
c. Keloids.
d. Contracture scars.

11. The American Joint Committee on Cancer (AJCC) Melanoma Task Force issued a revision of the staging system for cutaneous melanomas in 2002 where melanomas are classified based on:

a. regional, local, and distinct features
b. *local, regional, and distant features
c. local, general, and metastasis features
d. local, systemic and metastasis features

12. Stage I and II in the AJCC staging system involves:

a. *localized primary melanoma confined to the epidermis
b. metastasis to single regional lymph node basin with in-transit metastases
c. metastasis to single regional lymph node basin without in-transit metastasis
d. distant metastatic disease
13. True or False. Stage IV in the AJCC staging system involves: distant metastatic disease.
a. *True
b. False

14. The two main problems associated with treatment of lichen planus are:
a. treatments are based on anecdotal evidence.
b. spontaneous remissions occur in most of the patients.
c. only 50% of patients respond to treatment.
d. *Both a and b above.

15. Phototherapy has been used to treat
a. skin cancer.
b. deep tissue wounds.
c. *refractory cases of stasis ulcers.
d. burn injuries.

16. Severe flare-ups of psoriasis may require emergency treatment and the goal of treatment is to
a. aggressive anti-inflammatory medication.
b. *restore the barrier function of the skin.
c. remission.
d. Both a and c above.

17. Topical opaque cream containing 5% ascorbic acid has been proven
a. to be helpful in enhancing collagen formation,
b. protecting against damage from UVA and UVB rays.
c. improving inflammatory conditions of the skin.
d. *All of the above.

18. True or False. Fungal infections range from mild skin conditions and never involve serious organ diseases.
a. True
b. *False
19. **Cellulitis is a __________________ bacterial skin infection affecting the subcutaneous connective tissues, characterized by red, painful, inflamed and hot skin.**
   a. *non-contagious
   b. contagious
   c. highly infectious
   d. Both b and c above.

20. **Compression of the legs with compromised arterial circulation may be achieved through**
   a. use of specialized stockings
   b. end-diastolic compression boots.
   c. *Both a and b above.
   d. None of the above.

21. **The basic treatment approach to eczema is**
   b. antioxidant vitamins.
   c. choosing a dry arid area to live.
   d. avoiding meat in the diet.

22. **Eczema flares may be caused by the following skin irritants:**
   a. Scented moisturizers and other topical products
   b. Wool, nylon, grass, sand, pollens, house dust
   c. Pro-inflammatory foods
   d. *All of the above.

23. **Among the risk factors for necrotizing fasciitis include**
   a. age over
   b. age over 40
   c. *age over 60 years
   d. age over 75.
24. Hyperbaric oxygenation therapy used to enhance tissue oxygenation in both healthy and infected soft tissues is recommended at ___________ atmospheres (atm) twice daily for 90 minutes followed by surgical debridement for skin infection.
   a. 1.5 to 2.0
   b. *2.5 to 3.0
   c. 3.5 to 4.0
   d. 4.5 to 5.0

25. The best way to prevent measles is through the administration of
   a. high dose vitamin D supplementation.
   b. Relenza (orally).
   c. *measles, mumps and rubella (MMR) combination vaccine.
   d. Both b and c above.

26. Topical corticosteroids recommended for inflammation or redness of the skin, may be prescribed in severe cases for
   a. *5 to 7 days
   b. 7 to 10 days
   c. 2 weeks
   d. no less than 12 – 14 days.

27. Salicylic acid can be used to
   a. anesthetize painful areas of the skin
   b. *soften the top layer of dead hardened skin for easy removal.
   c. both a and b above.
   d. None of the above.

28. True or False. Topical and oral antibiotics may be used for eczema-affected skin.
   b. False.
29. Most skin infections are caused by
a. gram-negative bacteria
b. *gram-positive bacteria
c. gram negative, S. aureus.
d. None of the above.

30. Alternatives to pharmaceutical preparations with anti-itching properties include
a. oatmeal bath additives.
b. pine tar preparations.
c. cyclosporine.
d. *Both a and b above.

Correct Answers:

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References Section

The reference section of in-text citations include published works intended as helpful material for further reading. Unpublished works and personal communications are not included in this section, although may appear within the study text.


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