

UNIT:

### III. PLASTIC SURGERY OF THE INTEGUMENT

#### A. Anatomy/Physiology/Embryology

UNIT OBJECTIVE:

At the end of the unit, the resident is thoroughly familiar with the histology, function and development of the skin.

LEARNER OBJECTIVES:

Upon completion of the unit, the resident:

1. Demonstrates knowledge of the structure and functions of the epidermis.
2. Demonstrates knowledge of the structure and functions of the dermis.
3. Demonstrates knowledge of the structure and functions of the skin appendages.
4. Demonstrates knowledge of the structure and function of subcutaneous tissues and fascial layers.
5. Knows the embryologic origin of the skin and at which gestational age the various components of the skin appear.
6. Understands the differentiation of the stratum germinativum into surface cells and appendages, and the differentiation of the dermis.
7. Demonstrates knowledge of the structure and function of the nails.

CONTENTS:

1. Normal anatomy, histology and function of the skin
  - a. epidermis (four layers, types of cells)
  - b. dermis (fibroblasts, collagen, elastin, ground substance)
  - c. appendages
    - 1) hairs
    - 2) eccrine glands (sweat glands)
    - 3) apocrine glands (axilla, anal-genital region, external ear, eyelid, breast)
    - 4) sebaceous glands
    - 5) neural and organs
2. Anatomy and function of the nail
3. The reaction of skin to
  - a. heat

- b. cold
  - c. mechanical trauma
  - d. microbial trauma
  - e. UV light trauma
  - f. pharmacologic agents
4. Embryologic origin of the skin
  5. Differentiation of stratum germinativum (surface cells, appendages) and of the dermis

**CLINICAL PRACTICE ACTIVITIES:**

During the course of the training program, the resident:

1. Reviews histologic slides of normal skin and pathologic processes.
2. Regularly reviews pathology slides of skin lesions from specific patients.
3. *Participates in the preparation and review of frozen sections in selected cases.*

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B. Benign and Malignant Skin Lesions

UNIT OBJECTIVE:

At the end of the unit, the resident has a thorough understanding of benign and malignant skin lesions, recognizes the morphologic and histologic features of the more common lesions, and effectively manages small and large skin tumors using a variety of treatment modalities.

LEARNER OBJECTIVES:

Upon completion of the unit, the resident:

**Lecture Series – Benign/Malignant Cutaneous Lesions**

- 1. Is familiar with the clinical presentation of benign and malignant cutaneous lesions and generalized skin disorders.**
- 2. Understands the natural history of both treated and untreated benign and malignant cutaneous lesions and generalized skin disorders.**
- 3. Fully comprehends histologic grading and clinical staging systems currently in use for the malignant and premalignant skin tumors.**
- 4. Is able to provisionally evaluate both simple and complex cutaneous lesions and proceed with diagnostic steps necessary to secure a definitive diagnosis.**
- 6. Is familiar with other treatment modalities including (but not limited to) x-ray therapy, Mohs micrographic surgery, cryotherapy, laser therapy and topical chemotherapy.**

**Rotational Evaluation**

- 5. Formulates a definitive treatment plan for the particular lesion in question choosing a surgical or nonsurgical treatment modality which best suits the lesion (based on size, anatomical location and physical condition of the patient).**
- 7. Is able to explain in a comprehensible but simplified manner to the patient the nature of the lesion, its extent, treatment options and long-term results.**
- 8. Can formulate a definitive treatment plan for regional or distant spread of malignant cutaneous tumors.**

9. Is familiar with the histologic characteristics of benign and malignant cutaneous lesions.

## CONTENTS:

1. Benign epithelial and adnexal tumors (nevi, papillomas, keratinous cysts, etc)
  - a. pathology, biologic behavior
  - b. treatment, surgical and nonsurgical
2. Benign mesodermal tumors (hemangioma, vascular malformations, cystic hygroma, etc)
  - a. pathology, biologic behavior
  - b. classification of vascular tumors
  - c. treatment, surgical and nonsurgical
3. Generalized skin disorders
  - a. pathology, biologic behavior
  - b. treatment, surgical and nonsurgical
4. Malignant cutaneous tumors, epithelial and mesodermal (basal cell carcinoma, squamous cell carcinoma, malignant melanoma, sarcomas)
  - a. pathology, biologic behavior
  - b. treatment, surgical and nonsurgical
5. Premalignant skin tumors
  - a. pathology, biologic behavior
  - b. treatment, surgical and nonsurgical
6. Miscellaneous
  - a. Mohs micrographic surgery and other special techniques for tumor therapy
  - b. complications of surgical and nonsurgical treatment and their management

## CLINICAL PRACTICE ACTIVITIES:

During the course of the training program, the resident:

### **PSOL**

1. **Evaluates a variety of cutaneous lesions, recommends an approach to therapy based on the lesion's size, clinical characteristics, location and condition of the patient.**
2. **Performs all invasive diagnostic studies including (but not limited to): direct incisional and excisional biopsy, needle biopsy, punch biopsy; recognizes under which circumstances each should be used.**
3. **Executes extirpative surgery of a variety of benign and malignant cutaneous lesions and associated locoregional disease, choosing the**

**optimal surgical incision or excision for the particular region to be treated.**

**1<sup>st</sup> Year**

**Required Study Case (Excision Lesion/Flap Reconstruction)**

- 4. Executes complex procedures for the reconstruction of surgically created wounds (including skin grafts, local or distant flaps, or free tissue transfer) resulting from skin tumor extirpation.**
5. Prescribes pharmacological agents for the care of cutaneous lesions not deemed appropriate for surgical extirpation.

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C. Burns and Trauma (see Unit I.A.)

NOTE: The material in this Unit frequently is covered during the **prerequisite** training period of many plastic surgery residents. The Unit should serve as a valuable review of important material in such cases. For residents who have **not** mastered this material previously, the Unit is essential.

UNIT OBJECTIVE:

At the end of the unit, the resident understands the physiology of burns and soft tissue injury, the principles of burn resuscitation, and the techniques of burn wound repair and reconstruction, and performs comprehensive, long-term management of burn and soft tissue injuries.

LEARNER OBJECTIVES:

Upon completion of the unit, the resident:

**Lecture Series – Thermal Injuries**

- 1. Understands normal skin anatomy, circulation and how it is impacted by injury.**
- 2. Understands the physiologic changes which occur with thermal injury including the:relationship between duration of exposure and temperature, specific changes which occur in the zone of coagulation, stasis, and hyperemia.**
- 3. Recognizes the Rule of Nines, the use of more detailed body surface charts, and the difference in relative body surface area comparing children to adults.**
- 4. Knows the parameters which define major, moderate and minor burns.**
- 5. Knows the various factors in addition to body surface area which affect prognosis of a patient with a thermal injury.**
- 6. Understands the pathophysiology and treatment of inhalation injuries and carbon monoxide poisoning.**
- 7. Understands the principles and techniques of fluid resuscitation, including isotonic and hypertonic techniques, and the principles of monitoring resuscitation.**

- 8. Understands the pathophysiologic changes unique to chemical burns including acid burns, alkali burns, chemotherapy extravasations, hydrofluoric acid burns, etc.**
- 9. Recognizes injuries and sequelae associated with electrical injuries including cardiac dysrhythmias, central nervous system damage, intra-abdominal injury, vascular injury, cataracts, etc.**
- 10. Knows the anatomy and physiology pertinent to the excisional treatment of burns and treatment by split thickness skin grafting.**
- 11. Understands principles pertinent to burn rehabilitation and reconstruction including aesthetic units of the face, tissue expansion, hair transplantation, hand splinting, etc.**
- 12. Understands the pharmacology and utilization of topical antibacterial agents, analgesics and antibiotics in the treatment of burns.**

13. Understands the basic theories pertaining to current flow, energy disposition, and location and extent of injury associated with conductive and arc injuries from electrical current.
14. Understands the pathophysiology of acute and chronic radiation damage.
15. Understands the pathophysiology of frostbite and its natural history and treatment.

**CONTENTS:**

1. Physiology of burn injuries including: thermal, electrical, chemical, etc.
2. Principles and techniques of burn resuscitation
3. Principles of nutritional management of the burn patient
4. Burn wound management
  - a. excisional techniques
  - b. grafting
5. Reconstruction of the burn patient
6. Rehabilitation of the burn patient
7. Radiation injury — acute and chronic
  - a. physiology
  - b. treatment

8. Cold injury — physiology and treatment
9. Extravasation injury

CLINICAL PRACTICE ACTIVITIES:

During the course of the training program, the resident:

**PSOL**

- 1. Evaluates patients with minor, moderate, and major burns of chemical, electrical, and thermal origin.**
  - 2. Manages outpatient burns operatively and non-operatively.**
  - 3. Performs surgical treatment of acute burns including escharotomies, fasciotomies, excision, grafting, etc.**
  - 4. Manages patients with burns of the hand including the operative treatment, postoperative therapy and late reconstructive surgery.**
5. Manages inpatients with major burns including resuscitation, nutrition, treatment of inhalation injury, and rehabilitation.
  6. Evaluates and treats patients with acute and chronic radiation injuries.
  7. Manages patients with chemical burns including intravenous infusion injuries.
  8. Performs reconstructive surgery on burn patients including functional and aesthetic procedures.
  9. Manages patients with frostbite injuries.

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D. Congenital, Aesthetic and Functional Problems

UNIT OBJECTIVE:

At the end of the unit, the resident is familiar with common congenital disorders and generalized disease processes of the skin and with the physiology of aging and successfully undertakes plastic surgical treatments of these processes and disorders.

LEARNER OBJECTIVES:

Upon completion of the unit, the resident:

**Lecture Series – Skin Disorders**

- 1. Knows the basic physiology of the aging process of the skin.**
  - 2. Understands the basic physiologic processes of sun exposure on the skin.**
  - 3. Understands the role of lasers in the management of various skin lesions and conditions.**
  - 4. Recognizes common inflammatory disorders of the skin such as impetigo, cellulitis, lymphangitis, hidradenitis suppurativa, necrotizing fasciitis; is familiar with medical management and surgical treatment of inflammatory disorders of the skin.**
  - 5. Demonstrates knowledge of common generalized dermatologic disorders such as: scleroderma, dermatomyositis, lupus erythematosus.**
  - 6. Is familiar with basic principles of medical treatment of generalized skin disorders.**
7. Demonstrates knowledge of the common congenital disorders of the skin including: xeroderma pigmentosa, Ehlers Danlos syndrome, basal cell nevus syndrome, albinism, etc.
  8. Understands the basic principles of medical management and surgical treatment of common congenital disorders of the skin.
  9. Is familiar with common nonsurgical methods and agents for treatment of the aging process of skin.

10. Knows the principles of prevention of sun exposure effects and is familiar with pharmacologic agents for prevention of sun exposure and the details of their prescription and use.
11. Has detailed knowledge of surgical aspects of treatment of patients with generalized skin disorders such as scleroderma and lupus erythematosus.
12. Understands the physiology of lipodystrophy and basic principles of fat metabolism.
13. Is familiar with medical management and surgical treatment of inflammatory disorders of the skin.
14. Recognizes processes of localized lipodystrophy, such as Romberg's disease, and is familiar with surgical and ancillary methods for treatment.

CONTENTS:

1. Congenital disorders of the skin (e.g., xeroderma pigmentosa, Ehlers Danlos syndrome, albinism)
  - a. classification
  - b. general principles of medical management
  - c. details of surgical management
2. The aging process
  - a. physiology
  - b. pharmacology
  - c. nonsurgical treatment methods
    - 1) Retin A and topical agents
    - 2) chemical peel (see unit I.E.)
3. Sun's effects on skin
  - a. physiology
  - b. pharmacologic agents for prevention
    - 1) mechanism of action
    - 2) patient management
4. Common generalized disorders of the skin (e.g., scleroderma, dermatomyositis, lupus)
  - a. basic physiology
  - b. surgical aspects
5. Lipodystrophy
  - a. physiology of deposition and metabolism
  - b. principles of liposuction treatment (see Unit I.E.)
  - c. localized lipodystrophy, such as Romberg's disease
    - 1) physiology
    - 2) surgical and ancillary techniques for treatment

6. Inflammatory processes of the skin
  - a. common bacterial skin disorders (impetigo, lymphangitis, necrotizing fasciitis, gas gangrene, gangrene)
    - 1) diagnosis
    - 2) surgical treatment
    - 3) medical treatment
  - b. hidradenitis suppurativa
    - 1) diagnosis
    - 2) surgical treatment
    - 3) medical management
  - c. common viral and fungal skin disorders
    - 1) diagnosis
    - 2) surgical treatment
    - 3) medical management
7. Lasers
  - a. laser physics
  - b. effects of laser light on the skin
  - c. use for vascular and pigmented lesions
  - d. use for resurfacing of skin

#### CLINICAL PRACTICE ACTIVITIES:

During the course of the training program, the resident:

1. Performs surgery on patients with congenital skin disorders.
2. Utilizes pharmacologic agents for treatment of aging skin.
3. Performs laser treatment for a variety of skin disorders.
4. Recommends pharmacologic agents for prevention of sun exposure; instructs patients in use of the agents and in general principles of skin protection from the sun.
5. Evaluates and treats patients with bacterial, viral and fungal infections of the skin such as cellulitis, lymphangitis, necrotizing fasciitis, gas gangrene.
6. Performs surgical extirpation and reconstruction for hidradenitis suppurativa of axilla and other parts of the body.
7. Performs reconstructive procedures for patients with localized lipodystrophy such as Romberg's disease.
8. *Performs surgical procedures on patients with generalized dermatologic disorders such as scleroderma and lupus erythematosus.*

