

## Interventions for Clients with Immune Function Excess: Hypersensitivity (Allergy) and Autoimmunity

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Eliza Rivera-Mitu, RN, MSN

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## Hypersensitivities/Allergies

- Increased or excessive response to the presence of an antigen to which the client has been exposed
- Degree of reaction ranging from uncomfortable to life threatening
- Terms *hypersensitivity* and *allergy* used in text interchangeably

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## Type I: Rapid Hypersensitivity Reactions

- Also called atopic allergy, this is the most common type of hypersensitivity.
- Some reactions occur just in the areas exposed to the antigen.

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## Type I: Rapid Hypersensitivity Reactions *(Continued)*

- Allergens can be contacted in the following ways:
  - Inhaled (plant pollens, fungal spores, animal dander, house dust, grass, ragweed)
  - Ingested (foods, food additives, drugs)
  - Injected (bee venom, drugs, biologic substances)

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## Type I: Rapid Hypersensitivity Reactions *(Continued)*

- Contacted (pollens, foods, environmental proteins)
- Other reactions may involve all blood vessels and bronchiolar smooth muscle, causing widespread blood vessel dilation, decreased cardiac output, and bronchoconstriction, which is known as *anaphylaxis*.

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## Collaborative Management

- History
- Physical assessment/clinical manifestations
- Laboratory assessment
- Allergy testing including skin testing, scratch testing, intradermal testing, oral food challenge
- Avoidance therapy, symptomatic therapy, drug therapy

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## Drug Therapy

- Decongestant
- Antihistamines
- Corticosteroids
- Mast cell stabilizers
- Leukotriene antagonists
- Complementary and alternative therapy
- Desensitization therapy

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## Anaphylaxis

- First feelings of uneasiness, apprehension, weakness, and impending doom
- Pruritus and urticaria
- Erythema and sometimes angioedema of the eyes, lips, or tongue

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## Anaphylaxis *(Continued)*

- Histamine causes capillary leak bronchoconstriction, mucosal edema, and excess mucus secretion.
- Congestion, rhinorrhea, dyspnea, and increasing respiratory distress with audible wheezing result.
- Anaphylaxis can be fatal.

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## Interventions

- First assess respiratory function; an airway must be established.
- CPR may be needed.
- Epinephrine is given as soon as symptoms appear.
- Antihistamines treat angioedema and urticaria.
- Oxygen reduces hypoxemia.

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## Type II: Cytotoxic Reactions

- The body makes special autoantibodies directed against self cells that have some form of foreign protein attached to them.
- Clinical examples include hemolytic anemias, thrombocytopenic purpura, hemolytic transfusion reactions, Goodpasture's syndrome, and drug-induced hemolytic anemia.

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## Type III: Immune Complex Reactions

- Excess antigens cause immune complexes to form in the blood; these circulating complexes usually lodge in small blood vessels.
- Usual sites include the kidneys, skin, joints, and small blood vessels.

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### Type III: Immune Complex Reactions

*(Continued)*

- Deposited complexes trigger inflammation, resulting in tissue or vessel damage.
- Rheumatoid arthritis, systemic lupus erythematosus, and serum sickness occur.

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### Type IV: Delayed Hypersensitivity Reactions

- In a type IV reaction, the reactive cell is the T-lymphocyte (T-cell).
- Antibodies and complement are not involved.
- Local collection of lymphocytes and macrophages causes edema, induration, ischemia, and tissue damage at the site.

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### Type IV: Delayed Hypersensitivity Reactions

*(Continued)*

- Other examples include positive purified protein derivative, contact dermatitis, poison ivy skin rashes, insect stings, tissue transplant rejection, and sarcoidosis.

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### Collaborative Management

- Intervention
- Identification of allergen
- Client preparation
- Procedure
- Follow-up care

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### Type V: Stimulatory Reactions

- Inappropriate stimulation of a normal cell surface receptor by an autoantibody, resulting in a continuous “turned-on” state for the cell
- Example: Graves' disease, a form of hyperthyroidism

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### Autoimmunity

- Autoimmunity is the process whereby a person develops an inappropriate immune response.
- Antibodies and/or lymphocytes are directed against healthy normal cells and tissues.
- For unknown reasons, the immune system fails to recognize certain body cells or tissues as self and triggers immune reactions.

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## Sjögren's Syndrome

- Group of problems that often appear with other autoimmune disorders
- Dry eyes, dry mucous membranes of the nose and mouth (xerostomia), and vaginal dryness
- Insufficient tears causing inflammation and ulceration of the cornea
- Immunomodulation and symptomatic therapy

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## Goodpasture's Syndrome

- Autoimmune disorder in which autoantibodies are made against the glomerular basement membrane and neutrophils
- Lungs and kidneys
- Shortness of breath, hemoptysis, decreased urine output, weight gain, edema, hypertension, and tachycardia
- Treatment: high-dose corticosteroids

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# Chapter 70

## Interventions for Clients with Skin Problems

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## Anatomy and Physiology Review

- Structure of the skin
- Subcutaneous fat
- Dermis
- Epidermis
- Hair
- Nails
- Glands

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## Functions of the Skin

- Protection
- Homeostasis
- Temperature regulation
- Sensory organ
- Vitamin synthesis
- Psychological

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## Skin Assessment

- Color
- Lesions, primary and secondary
- Assess each lesion for:
  - A: asymmetry of shape
  - B: border irregularity
  - C: color variation within one lesion
  - D: diameter > 5 mm

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## Inspect Skin

- Look for signs of:
  - Edema
  - Moisture
  - Petechiae
  - Ecchymosis

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## Integrity of Skin

- Skin tears result from flattening of the dermal-epidermal junction and are a common finding with aging.
- Look for skin tears where constrictive clothing rubs the skin, on the upper extremities where the skin is grasped when assisting a client to move, and in the areas where adhesive tapes or dressings have been used.

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## Palpation

- Palpation confirms the size of the lesions and determines whether they are flat or slightly raised.
- Macular: flat rash
- Papular: raised rash
- Skin temperature: assessed with the back of the hand
- Turgor: the amount of skin elasticity

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## Hair Assessment

- Inspect and palpate the hair for cleanliness, distribution, quantity, and quality.
- Dandruff is an accumulation of patchy or diffuse white or gray scales that appear on the surface of the scalp.
- Hirsutism is excessive growth of body hair, which is one manifestation of hormonal imbalance.

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## Nail Assessment

- Dystrophic nails may occur with a serious systemic illness or local skin disease involving the epidermal keratinocytes.
- Evaluate fingernails and toenails for color, shape, thickness, texture, and presence of lesions.

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## Nail Assessment *(Continued)*

- Minor associations with the aging process include gradual thickening of the nail plate, presence of longitudinal ridges, and yellowish-gray discoloration.

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## Skin Assessment Techniques for Clients with Darker Skin

- Assess for:
  - Pallor
  - Cyanosis
  - Inflammation
  - Jaundice
  - Skin bleeding

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## Diagnostic Assessment

- Cultures for fungal infections
- Cultures for bacterial infections
- Cultures for viral infections
- Skin biopsies:
  - Punch biopsy
  - Shave biopsy
  - Excisional biopsy

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## Diagnostic Assessment

- Wood's light examination: exposes some skin infections; produces a specific color such as blue-green or red in a darkened room; produces no discomfort occurs during the examination
- Diascopy
- Skin testing

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## Xerosis (Dryness)

- A common problem among older clients.
- Fine flaking of the stratum corneum
- Generalized pruritus
- Scratching a result of secondary skin lesions, excoriations, lichenification, and infection

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## Collaborative Management

- Nursing interventions aim to rehydrate the skin and relieve itching.
- Bathing with moisturizing soaps, oils, and lotions may reduce dryness.
- Water softens the outer skin layers; creams and lotions seal in the moisture provided by water.

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## Pruritus

- Pruritus is caused by stimulation of itch-specific nerve fibers at the dermal-epidermal junction.
- Itching is a subjective symptom similar to pain.
- Cool sleeping environment is helpful.
- Fingernails should be trimmed short.

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## Pruritus (Continued)

- Balneotherapy is a therapeutic bath using colloidal oatmeal.
- Therapy:
  - Antihistamines
  - Topical steroids

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## Sunburn

- First-degree, superficial burn
- Cool baths
- Soothing lotions
- Antibiotic ointments for blistering and infected skin
- Topical corticosteroids for pain

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## Urticaria

- Urticaria: presence of white or red edematous papules or plaques of varying sizes
- Removal of triggering substances
- Antihistamines helpful
- Avoidance of overexertion, alcohol consumption, and warm environments, which can worsen symptoms

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## Trauma

- Phases of wound healing
  - Inflammatory phase
  - Fibroblastic, or connected tissue repair phase
  - Maturation or remodeling phase

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## Process of Wound Healing

- First intention resulting in a thin scar
- Second intention (granulation) and contraction—a deeper tissue injury or wound
- Third intention (delayed closure)—high risk for infection with a resultant scar

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## Partial-Thickness Wounds

- Involve damage to the epidermis and upper layers of the dermis
- Heal by re-epithelialization within 5 to 7 days
- Skin injury immediately followed by local inflammation

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## Full-Thickness Wounds

- Damage extends into the lower layers of the dermis and underlying subcutaneous tissue.
- Removal of the damaged tissue results in a defect that must be filled with granulation tissue in order to heal.
- Contraction develops in healing process.

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## Pressure Ulcer

- Tissue damage caused when the skin and underlying soft tissue are compressed between a bony prominence and an external surface for an extended period.
- Mechanical forces that create ulcers:
  - Pressure
  - Friction
  - Shear

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## Identification of High-Risk Clients

- Mental status/decreased sensory perception—client at risk for pressure ulcers
- Activity/mobility
- Nutritional status
- Incontinence

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## Pressure-Relieving Techniques

- Adequate pressure relief key to prevention of pressure ulcers
- Capillary closing pressure
- Pressure relief products and devices
- Positioning away from mattresses and pillows

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## Wound Assessment

- Pressure ulcers and their features are classified and assessed in 4 stages:
  - Stage I
  - Stage II
  - Stage III
  - Stage IV

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## Impaired Skin Integrity

- Interventions include:
  - Individual client needs
  - Nonsurgical management: dressings, physical therapy, drug therapy, diet therapy, new technologies, electrical stimulation, vacuum-assisted wound closure, and hyperbaric oxygen therapy

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## Surgical Management

- Preoperative care
- Operative procedures
- Postoperative care
  - Do not disturb dressing.
  - Ensure complete rest of grafted area.
  - Ensure care of pedicle flap.
  - Provide postoperative care of donor sites.
  - Ensure correct client positioning.

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## Risk for Infection and Wound Extension

- Interventions:
  - Monitor the ulcer's progress.
  - Provide timely treatment with topical and systemic antibiotics.
  - Take steps to reduce introduction of pathogenic organisms to the ulcer through direct contact.

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## Prevention of Infection and Wound Extension

- Interventions:
  - Report the following to the primary health care provider:
    - Sudden deterioration of the ulcer, increase in size or depth of the lesion
    - Changes in color or texture of the granulation tissue

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## Prevention of Infection and Wound Extension *(Continued)*

- Changes in the quantity, color, or odor of the exudate
- Classic signs of wound infection

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## Bacterial Infections

- Folliculitis: superficial infection involving only the upper portion of the follicle
- Furuncles: much deeper infection in the follicle
- Cellulitis: generalized infection with either *Staphylococcus* or *Streptococcus* involving deeper connective tissue

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## Herpes Simplex Virus

- Type 1 herpes simplex virus: classic recurring cold sore
- Type 2 herpes simplex virus: genital herpes
- After first infection, virus dormant in a nerve ganglia; no symptoms
- Autoinoculation or transfer from one part of the body to another

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## Herpes Simplex Virus (Continued)

- *Herpetic whitlow*—a form of herpes simplex infection occurring on the fingertips of medical personnel who have come in contact with viral secretions

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## Herpes Zoster/Shingles

- Caused by reactivation of the dormant varicella-zoster virus in clients who have previously had chickenpox.
- Multiple lesions occur in a segmental distribution on the skin area innervated by the infected nerve.
- Eruption lasts several weeks.
- Postherpetic neuralgia occurs after lesions have resolved.

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## Fungal Infections

- Dermatophyte infections can differ in lesion appearance, anatomic location, and species of the infecting organism.
- The term *tinea* describes dermatophytoses.
  - Tinea capitis
  - Tinea corporis

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## Assessment

- Because most skin infections are contagious, take precautions to prevent the spread of infection.
- Culture purulent material; obtain blood cultures.
- Obtain Tzanck's smear and viral culture.
- Test for fungal infections with potassium hydroxide (KOH).

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## Skin Care

- Bathe daily with an antibacterial soap.
- Remove any pustules or crusts gently.
- Apply warm compress twice a day to furuncles or areas of cellulitis.
- Apply Burow's solution to viral lesions.
- Avoid excessive moisture.
- Ensure optimal client positioning.

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## Drug Therapy for Skin Disorders

- Antibacterial drugs
- Antifungal drugs
- Anti-inflammatory drugs

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## Cutaneous Anthrax

- Infection caused by the spores of the bacterium *Bacillus anthracis*
- Diagnosis based on appearance of the lesions and culture, or anthrax antibodies in the blood
- Oral antibiotics for 60 days: Cipro, Doryx, or Vibramycin

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## Pediculosis

- Pediculosis—infestation by human lice
  - Head lice: *Pediculosis capitis*
  - Body lice: *Pediculosis corporis*
  - Pubic or crab lice: *Pediculosis pubis*
- Pruritus most common symptom
- Drugs such as Bio-Well, Kwell, Kwellada, Ovide, or Prioderm
- Laundering of clothing and bed linen

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## Scabies

- Scabies is a contagious skin disease caused by mite infestations.
- Scabies is transmitted by close and prolonged contact or infested bedding.
- Examine skin between fingers and on the palms.
- Infestation is confirmed by an examination of a scraping of a lesion under a microscope.

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## Scabies *(Continued)*

- Scabicides include Kwell, Kwellada, or topical sulfur preparations.
- Launder clothes and personal items.

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## Common Inflammations

- Contact dermatitis, atopic dermatitis
- Interventions include:
  - Steroids
  - Avoidance of oil-based products
  - Antihistamines
  - Compresses and baths

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## Psoriasis

- Lifelong disorder with exacerbations and remissions
- Scaling disorder with underlying dermal inflammation; possibly an autoimmune reaction
- Psoriasis vulgaris most often seen
- Exfoliative psoriasis—an explosively eruptive and inflammatory form of the disease

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## Treatment of Psoriasis

- Topical steroids
- Tar preparations
- Ultraviolet light therapy, vitamin D, sunlight
- Systemic therapy
  - Cytotoxic agents
  - Immunosuppressants
  - Biologic agents
- Emotional support

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## Benign Tumors

- Cysts
- Seborrhic keratoses
- Keloids
- Nevi
- Warts
- Hemangiomas:
  - Nevus flammeus
  - Cherry hemangiomas

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## Skin Cancer

- Actinic keratoses
- Squamous cell carcinomas
- Basal cell carcinomas
- Melanomas—highly metastatic; survival depends on early diagnosis and treatment

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## Treatment of Skin Cancer

- Drugs: topical chemotherapy 5-fluorouracil, systemic chemotherapeutic agents, interferon
- Radiation therapy
- Immunotherapy
- Surgical management
  - Cryosurgery
  - Curettage and electrodesiccation
  - Excision

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## Surgical Management

- Preoperative care
- Operative procedures
- Postoperative care
  - Monitoring for complications and wound infection
  - Pressure dressings
  - Comfort measures
  - Edema and discoloration at the operative site

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## Acne

- Red pustular eruption affecting the sebaceous glands of the skin
- Progressive disorder that manifests as noninflammatory comedones, inflammatory papules, pustules, and cysts
- Topical agents
- Systemic antibiotics and possibly isotretinoin (Accutane) possibly helpful

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## Other Skin Disorders

- Lichen planus with itchy papules
- Pemphigus vulgaris with chronic blistering
- Toxic epidermal necrolysis—a rare, acute drug reaction
- Stevens-Johnson syndrome
- Frostbite
- Leprosy

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## Nail Disorders

- Ingrown toenails can cause pain and infection.
- Treatment should be given twice daily with soaking.
- Surgical removal is a possible option, but it is not always successful and recurrence is possible.

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## Interventions for Clients with Burns

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## Pathophysiology of Burn Injury

- Skin changes resulting from burn injury
- Anatomic changes
- Functional changes
- Temperature
- Depth of burn injury varies:
  - Superficial-thickness wound
  - Partial-thickness wound

*(Continued)*

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## Pathophysiology of Burn Injury *(Continued)*

- Superficial partial-thickness wounds
- Deep partial-thickness wounds
- Full-thickness wounds
- Deep full-thickness wounds

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## Vascular Changes Resulting from Burn Injuries

- Fluid shift: third spacing or capillary leak syndrome, usually occurs in the first 12 hr and can continue 24 to 36 hr
- Profound imbalance of fluid, electrolyte, and acid base, hyperkalemia and hyponatremia levels, and hemoconcentration
- Fluid remobilization after 24 hr, diuretic stage begins 48 to 72 hr after injury

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## Changes Resulting from Burn Injury

- Changes include:
  - Cardiac
  - Pulmonary
  - Gastrointestinal (Curling's ulcer)
  - Metabolic
  - Immunologic

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## Compensatory Responses to Burn Injury

- Inflammatory compensation can trigger healing.
- Sympathetic nervous system compensation occurs when any physical or psychological stressors are present.

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## Etiology of Burn Injury

- Dry heat
- Moist heat
- Contact burns
- Chemical injury
- Electrical injury
- Radiation injury

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## Emergent Phase of Burn Injury

- First phase, or emergent phase, continues for about 48 hr.
- Goals of management include:
  - Secure airway
  - Fluid replacement
  - Prevent infection
  - Maintain body temperature
  - Provide emotional support

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## Injuries to the Respiratory System

- Direct airway injury
- Carbon monoxide poisoning
- Thermal injury
- Smoke poisoning
- Pulmonary fluid overload
- External factors

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## Cardiovascular Assessment

- Shock is a common cause of death in the emergent phase in clients with serious injuries.
- Monitor vital signs.
- Monitor cardiac status especially in cases of electrical burn injuries.

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## Renal/Urinary Assessment

- Changes are related to cellular debris and decreased renal blood flow.
- Myoglobin is released from damaged muscle and circulates to the kidney.
- Assess renal function, blood urine, nitrogen, serum creatinine, and serum sodium levels.
- Examine urine for color, odor, and presence of particles or foam.

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## Skin Assessment

- Determine size and depth of injury.
- Determine percentage of total body surface area affected.
- Use "rule of nines," using multiples of 9% of total body surface area.

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## Skin Assessment *(Continued)*

- Lund-Browder and Berkow methods are more accurate for evaluating size of injury.
- Criteria for depth of injury are based on appearance and associated characteristics.

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## Gastrointestinal Assessment

- Changes in gastrointestinal function are expected.
- Decreased blood flow and sympathetic stimulation during the emergent phase causes reduced gastrointestinal motility and paralytic ileus.
- Assess for gastrointestinal bleeding.

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## Laboratory Assessment

- Blood studies
- Radiographic assessment
- Ophthalmic evaluation
- Intravenous renograms
- Computed tomography
- Ultrasound
- Bronchoscopy
- Magnetic resonance imaging

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## Decreased Cardiac Output Interventions

- Increasing blood fluid volume
- Supporting compensatory mechanisms
- Preventing complications
  - Intravenous fluid therapy
  - Plasma exchange therapy
  - Monitoring
  - Drug therapy
  - Surgical management: escharotomy

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## Ineffective Breathing Pattern Interventions

- Supporting normal pulmonary function and preventing pulmonary complications
- Maintaining airway
- Promoting ventilation
- Monitoring gas exchange
- Providing oxygen therapy

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## Ineffective Breathing Pattern Interventions

(Continued)

- Giving drug therapy
- Positioning and deep breathing
- Providing surgical management

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## Acute Pain; Chronic Pain Interventions

- Drug therapy
- Complementary and alternative therapy
- Environmental changes for client comfort and sleep
- Early surgical excision under anesthesia to reduce pain from daily debridement at the bedside or during hydrotherapy

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## Potential for Pulmonary Edema Interventions

- Pulmonary edema can arise from lung injury or from fluid resuscitation and myocardial overload.
- Drugs such as digoxin treat pulmonary edema.
- Diuretics may or may not be used in the emergent phase.

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## Potential for Acute Respiratory Distress Syndrome

- Increase lung compliance.
- Improve partial pressure of arterial oxygen levels.
- Give positive end-expiratory pressure.
- Use intermittent mandatory volume.

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## Potential for Acute Respiratory Distress Syndrome

(Continued)

- Document and report any signs of respiratory distress.
- Monitor arterial blood gas levels.
- Use neuromuscular blocking agents.

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## Acute Phase of Burn Injury

- Begins about 36 to 48 hr after injury and lasts until wound closure is completed
- Care directed toward continued assessment and maintenance of all systems and healing processes

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## Assessment

- Assessments include those of:
  - Cardiopulmonary
  - Neuroendocrine
  - Immune
  - Musculoskeletal

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## Impaired Skin Integrity: Wound Care Management

- Interventions include:
  - Debridement
  - Mechanical debridement twice each day by hydrotherapy through tub or shower water treatment
  - Enzymatic debridement by autolysis or the application of enzyme agents, such as collagenase

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## Dressing the Burn Wound

- Standard wound dressings with multiple layers of gauze
- Biologic dressings
- Homograft
- Heterograft
- Amniotic membrane
- Cultured skin

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## Dressing the Burn Wound *(Continued)*

- Artificial skin
- Biosynthetic wound dressings
- Synthetic wound dressings

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## Surgical Management

- Surgical excision is done within 5 days after injury to excise very thin layers of the necrotic burn surface; a bed of healthy dermis or subcutaneous fat is then reached.
- For wound covering by autograft, skin from a remote unburned area of the body is transplanted to cover the burn wound.

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## Risk for Infection Interventions

- Autocontamination of burn wound from client's own normal flora
- Cross-contamination of burn wound from the external environment

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## Risk for Infection Interventions (Continued)

- Drug therapy for infection prevention includes:
  - Tetanus toxoid, immunoglobulin
  - Topical antibiotics (Silvadene, flamazine, Sulfamylon)
  - Systemic antibiotics

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## Risk for Infection Interventions (Continued)

- Isolation therapy
- Secondary prevention/early detection
- Surgical management

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## Imbalanced Nutrition: Less Than Body Requirements

- Interventions include:
  - Diet therapy
  - Oral diet therapy
  - Enteral tube feedings for clients who cannot swallow
  - Parenteral nutrition given intravenously

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## Impaired Physical Mobility

- Positioning
- Range of motion exercises
- Ambulation
- Pressure dressings
- Surgical management

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## Disturbed Body Image

- Interventions:
  - Nonsurgical management is achieved through adaptation to a positive self-perception and assistance with education of family members.
  - Surgical management can be achieved through reconstructive and cosmetic surgery.

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## Rehabilitative Phase of Burn Injury

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- Rehabilitation begins with wound closure and ends when the client returns to the highest possible level of functioning.
- Emphasis during this phase is on psychosocial adjustment, prevention of scars and contractures, and resumption of preburn activity.

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## Rehabilitative Phase of Burn Injury *(Continued)*

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- This phase may last years or even a lifetime if client needs to adjust to permanent limitations.