



2023 Entry-Level Physical Therapist Curriculum Recommendations for Integumentary/Wound Management

Academy of Clinical Electrophysiology & Wound Management: Wound
Management Special Interest Group

A component of the American Physical Therapy Association

Ever advancing knowledge and technology drives change in healthcare education and practice. Subsequently, integumentary/wound management-related knowledge and skill expectations for entry-level physical therapists continue to grow and expand.

The Academy of Clinical Electrophysiology and Wound Management's (ACEWM) Wound Management Special Interest Group (WMSIG) present the following recommendations to support academic and clinical faculty in developing, updating, and implementing a robust entry-level integumentary/wound management curricular plan. These consensus-based recommendations were developed through a Delphi process in 2022-2023 and represent the opinions of academic and clinical faculty from across the country.

Recognizing that education programs dedicate varying amounts of time to integumentary/wound management content, topics are divided into "Need to Include" and, where applicable, "Nice to Include" categories to assist faculty in prioritizing content based on available contact hours.

It is important to recognize that some general "Need to Include" recommended content items are applicable across practice settings (e.g., systems screening, patient history) and likely are, or could be, included in other areas of the curriculum. In this case, previously covered content can be efficiently reviewed/applied/integrated during integumentary-specific instruction. Faculty communication and collaboration across entry-level courses is highly encouraged.

The 2023 curriculum recommendations continue a long history of the ACEWM WMSIG working to promote contemporary education for entry-level physical therapists. Early foundational recommendations were created and published 25+ years ago, with revisions in 2008 and 2014, and served as a strong foundation for the 2023 update. The ACEWM appreciates the continued partnership between members, educators, and clinicians working to keep this document applicable to contemporary practice. Thank you to all that have contributed!

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NORMAL TISSUE HEALING

Anatomy of the Skin

| Need to Include |
|---|
| Function of skin |
| Layers of skin, including primary cells & vascular supply |

Example lab activity:

- Review burn injury depths (superficial, superficial & deep partial thickness, full thickness, subdermal) based on skin layer involvement & scar risk.

Example learning objectives:

- Identify structural components of the skin.
- Define terms associated with wound depth, including superficial, partial thickness, and full thickness.

Physiology of Healing

| Need to Include |
|---|
| Activation of platelets & the process of hemostasis |
| Growth factors |
| Normal physiology of tissue healing, including phases of healing & general timeframes |
| Primary cells |
| Types of wound closure |

Example lab activity:

- Identification of healing phases using wound photographs.

Example learning objective:

- Describe the function of primary cells active in tissue healing to include: platelets, mast cells, neutrophils, macrophages, endothelial cells, fibroblasts, myofibroblasts, & epithelial cells.

Factors That Can Negatively Impact Tissue Healing

| Need to Include |
|-----------------------|
| Local factors |
| Nutrition & hydration |
| Systemic factors |

Example lab activity:

- Large & small group discussion to identify complicating factors presented in a case study & how to mitigate.

Example learning objective:

- Provide patient education regarding how factors that may impede tissue healing can be altered.

PSYCHOLOGICAL ISSUES

Possible Concerns

| Need to Include | Nice to Include |
|---|-----------------------|
| Barriers to care (e.g., language, resource availability, funding, social support) | Cosmesis & self-image |
| Effects of chronic illness | Palliative care |
| Effects of isolation | Sleep |
| Healthcare expenses & lost wages | |
| Mental health | |
| Occupational & lifestyle changes | |
| Quality of life | |
| Social habits | |
| Stress (patient, family, caregiver) | |

Example lab activity:

- Identify potential local sources of support for patients, family, or caregiver(s) dealing with psychological issues.

Example learning objective:

- Discuss possible effects of chronic illness including stress, anger, depression, financial stress, isolation, & dependence on a patient's ability to deal with open wounds.

EXAMINATION

Patient History

| Need to Include |
|---|
| Allergies & sensitivities, including latex, sulfa, adhesives, etc. |
| Current condition(s)/chief complaint(s), including patient needs, concerns, & current/prior wound interventions |
| Employment/work |
| Family history |
| General demographics including age, height, & weight |
| General health status & function, including self-care/ADLs & domestic responsibilities; education; work; & community, social, civic life |
| Growth & development |
| Imaging |
| Injury/disease including onset, mechanism, course of events, symptoms, patient/family/caregiver expectations, and goals |
| Lab values |
| Living environment & destination at conclusion of care |
| Medications (e.g., steroids, antibiotics, anticoagulants, chemotherapy, radiation, insulin, nonsteroidal anti-inflammatory drugs (NSAIDS), analgesics, herbals, home remedies) |
| Past medical/surgical history (e.g., cardiovascular, endocrine/metabolic, gastrointestinal, genitourinary, previous wounds/dermatologic conditions, musculoskeletal, neuromuscular, & prior hospitalizations) |
| Social habits & behavioral health risks, including tobacco, alcohol, drug abuse, & fitness |
| Social history including culture, resources, activities, & support systems |

Example lab activity:

- Create a patient evaluation template, complete a full examination including history using wound models and/or simulation activities.

Example learning objective:

- Explain issues surrounding a patient's level of function & mobility & how these factors influence wound healing potential.

Gross Screening of Systems

| Need to Include |
|------------------|
| Cardiovascular |
| Cognitive |
| Gastrointestinal |
| Genitourinary |
| Integumentary |
| Lymphatic |
| Musculoskeletal |
| Neuromuscular |
| Pulmonary |

Example lab activity:

- Perform basic systems review screening (e.g., vital signs, range of motion, strength, gross motor function, breath sounds, girth, gross postural & skin assessment).

Example learning objective:

- Summarize how wound healing can be negatively impacted by deficits in one or more body systems.

Wound Characteristics

| Need to Include | Nice to Include |
|---|-------------------------------|
| Classification based on: <ul style="list-style-type: none"> • Depth of tissue destruction • Etiology & wound type, including Wagner Scale & pressure injury staging • Tissue color | Surface area – Lund & Browder |
| Drainage/exudate, including type, amount, consistency, & odor | |
| Photo documentation | |
| Wound bed/margins, including tissue type, color, quality, presence of anatomical structures, & phase(s) of healing | |
| Wound dimensions: <ul style="list-style-type: none"> • Depth • Surface area (length x width), including Rule of Nines • Tunneling, sinus tract • Undermining | |

Example lab activity:

- Wound measurements: create wounds in fruit with various shapes, depth, tunnels, & undermining

Example learning objective:

- Perform accurate wound measurement using wound models.

Periwound & Surrounding Skin

| Need to Include | Nice to Include |
|-------------------------|------------------------|
| Ecchymosis | Denuded Skin |
| Edema, pitting edema | Fissures |
| Epibole | Pruritis |
| Erythema | Scar assessment scales |
| Excoriation | Turgor |
| Fungal infection | Xerosis |
| Girth | |
| Hemosiderin staining | |
| Hyperkeratosis, callus | |
| Induration | |
| Lymphedema | |
| Maceration | |
| Periwound coloration | |
| Scarring | |
| Tenderness to palpation | |

Example lab activity:

- Using wound photos, match periwound descriptors & link to possible interventions.

Example learning objective:

- Discuss options for identifying erythema in darkly pigmented skin.

Pain Specific to Open Wounds

| Need to Include | Nice to Include |
|--|---------------------------|
| Baker Wong Faces Scale | McGill Pain Questionnaire |
| Impact of pain on function | |
| Quality of sleep | |
| Types of pain: <ul style="list-style-type: none"> • Background • Incident • Neuropathic • Nociceptive/acute • Operative • Procedural | |
| Visual Analog Scale (1-10) | |

Example lab activity:

- Practice screening for & determining the type of pain during mock patient cases.

Example learning objective:

- Compare & contrast the different types of pain & give examples of how these might be mitigated.

General

| Need to Include |
|---|
| Balance |
| Community, social, civic life |
| Education & work/life activities |
| Footwear |
| Joint integrity |
| Mobility |
| Muscle performance |
| Range of motion |
| Reexamination, including repeat of selected tests/measures |
| Self-care, ability to perform basic ADLs |
| Use of assistive technologies, including offloading devices |

Example lab activity:

- Build a template for wound examination including general screens/assessments.

Example learning objective:

- Incorporate general patient screening into wound examination.

Vascular Testing

| Need to Include | Nice to Include |
|----------------------------|--|
| Ankle-brachial index (ABI) | Buerger's test |
| Assess distal pulses | Knowledge only: <ul style="list-style-type: none"> Digital photoplethysmography Lower extremity angiography Toe brachial index Transcutaneous pulse oximetry |
| Blanch testing | Venous filling time |
| Capillary refill | WiFi (wound, ischemia, foot inspection) |
| Rubor of dependency | |
| Visual inspection | |

Example lab activity:

- Perform a full lower extremity noninvasive vascular screen including skin assessment, pulses (femoral, popliteal, dorsalis pedis, posterior tibialis), temperature, capillary refill, Rubor of dependency, & ABI (depending on Doppler availability).

Example learning objective:

- Utilize ABI results when developing an intervention plan for a patient with vascular insufficiency.

Pressure Risk Assessment

| Need to Include | Nice to Include |
|--|---|
| Braden Scale - For Predicting Pressure Sore Risk | Braden Q |
| Knowledge only: <ul style="list-style-type: none"> Pressure mapping | Gosnell Scale - For Predicting Risk of Pressure Ulcer |
| | Norton Pressure Ulcer Risk Scale |
| | PUSH |

Example lab activity:

- Revisit wheelchair assessment (with focus on pressure risk) given various patient mobility scenarios.

Example learning objective:

- Select and perform appropriate risk assessment(s) based on mock patient cases.

Sensory Integrity

| Need to Include | Nice to Include |
|---------------------------------------|---|
| Deep pressure | MNSI (Michigan Neuropathy Screening Instrument) |
| Kinesthesia | |
| Light touch | |
| Position sense | |
| Semmes-Weinstein monofilament testing | |
| Sharp/dull | |
| Temperature | |
| Vibration | |

Example lab activity:

- Assess protective sensation using vibration & monofilament testing.

Example learning objective:

- Perform protective sensation screening of the foot.

Infection

| Need to Include | Nice to Include |
|---|---|
| Infection-related laboratory markers/values | Impact of pharmaceuticals on infection |
| Signs & symptoms of: <ul style="list-style-type: none"> • Biofilm • Cellulitis • Local & spreading infection • Lymphangitis • Osteomyelitis • Systemic infection & sepsis | Knowledge only: <ul style="list-style-type: none"> • Fluorescence imaging • Tissue biopsy |
| Swab cultures | |
| Tests & measures to identify infection | |

Example lab activity:

- Sterile field set up.

Example learning objective:

- Perform a sterile field set up.

Various Wound Diagnoses

| Need to Include | Nice to Include |
|--|--|
| Abscess | Calciphylaxis |
| Allergic reactions | HIV/AIDS |
| Burns | Hydradenitis suppurativa |
| Charcot Foot | MARSI (medical adhesive related skin injury) |
| Contact dermatitis | Medical device-related pressure injuries |
| Malignancy, cancer | Mucosal pressure injuries |
| Neuropathic ulcers | Necrotizing fasciitis |
| Skin Tears | Peritonitis |
| Stasis dermatitis | Psoriasis |
| Surgical | Pyoderma gangrenosum |
| Traumatic | Rheumatoid |
| Vascular: <ul style="list-style-type: none"> • Arterial insufficiency • Venous insufficiency | Scleroderma |
| | Shingles/Chicken Pox |
| | Sickle cell disease |
| | Systemic Lupus Erythematosus |
| | Vasculitic |

Example lab activity:

- Utilize various wound photos & patient histories for differential diagnosis practice.

Example learning objective:

- Differentiate between various types of wounds and correlate wound characteristics with possible etiologies.

INTEGUMENTARY/WOUND MANAGEMENT INTERVENTIONS

Pain Management

| Need to Include | Nice to Include |
|--|--|
| Deep breathing | Home remedies |
| Distraction | Monochromatic infrared energy |
| Electrical stimulation | Music |
| Impact of dressing selection & removal, including moisture retentive | Non-contact ultrasound |
| Pharmacological: <ul style="list-style-type: none"> • Over the counter • Topical | Pharmacological: Prescription (IV, intramuscular, oral) |
| Rapport, empathy | Pain neuroscience education (PNE) |
| Rest breaks | |

Example lab activity:

- Integrate selection & application of pain minimization techniques into case study activities.

Example learning objective:

- Summarize various techniques for minimizing pain during wound interventions.

Infection Control Measures

| Need to Include |
|---|
| Aerosolization risks with irrigation & low frequency ultrasound |
| Cleaning & disinfection of equipment |
| Hand hygiene, soap & water versus sanitizer |
| Isolation, including organism-specific (e.g., contact, droplet, airborne) |
| Sterile versus clean technique |
| Standard precautions |
| Use of personal protective equipment (PPE) |

Example lab activity:

- Practice donning/doffing gowns, exam gloves, and sterile gloves.

Example learning objective:

- Compare & contrast PPE requirements based on patient history & diagnosis, wound type, & intervention.

Wound Cleansing

| Need to Include | Nice to Include |
|---|-----------------|
| Wound cleansers | Scrubbing |
| Wound cleansing/irrigation, including type, method, amount, & temperature | |

Example lab activities:

- Utilize monojects & catheters to irrigate wound models.
- Practice pulsed lavage with suction (if portable suction is available).

Example learning objective:

- Compare & contrast various methods of wound cleansing, irrigation, & hydration & when each would be appropriate based on wound status.

Debridement

| Need to Include | Nice to Include |
|---|--|
| Methods of debridement: <ul style="list-style-type: none"> • Autolytic • Enzymatic • Mechanical • Sharp (knowledge only) • Surgical (knowledge only) | Methods of debridement: <ul style="list-style-type: none"> • Biosurgical (maggot - knowledge only) • Chemical • Ultrasound (knowledge only) |
| Special considerations (e.g., lab values, pain) | |

Example lab activity:

- Practice debridement methods using fruit (e.g., oranges, avocados), pig's feet, and/or cadavers.

Example learning objective:

- Compare & contrast various forms of debridement & select when each would be appropriate based on case scenarios.

Non-Antimicrobial Dressings

| Need to Include | Nice to Include |
|-----------------------------|------------------|
| Absorbent pads | Burn pads |
| Calcium alginate | Composite |
| Collagen | Growth factors |
| Foam | Skin substitutes |
| Gauze | |
| Hydrocolloid | |
| Hydrofiber | |
| Hydrogel | |
| Non-adherent contact layer | |
| Primary/secondary dressings | |
| Transparent film | |

Example lab activity:

- Demonstration/practice of dressing application on wound models.

Example learning objective:

- Compare & contrast dressing characteristics.

Infection Management

| Need to Include | Nice to Include |
|--|------------------|
| Antimicrobial dressings, including silver | Cadexomer iodine |
| Biofilm management | Honey |
| Debridement to decrease potential/current infection | |
| Inappropriate use of occlusive dressings in presence of infection | |
| Topical solutions, including acetic acid, Dakin's solution, hydrogen peroxide, & povidone-iodine | |

Example lab activity:

- Practice parameter selection & application techniques of available modalities appropriate for management of infection (e.g., pulsed lavage with suction, wound cleansing/irrigation, electrical stimulation, noncontact ultrasound).

Example learning objective:

- Select appropriate irrigation solutions & dressing(s) for infected wounds based on patient history & wound characteristics.

Biophysical Agents

| Need to Include | Nice to Include |
|---|--------------------------|
| Electrical stimulation | Hyperbaric oxygen |
| Negative pressure wound therapy | Low frequency ultrasound |
| Pulsatile lavage (with/without suction) | Pneumatic compression |
| | Shockwave therapy |
| | Traditional ultrasound |
| | Ultraviolet light |

Example lab activity:

- Practice parameter selection & application of high volt pulsed current electrical stimulation based on various patient scenarios.

Example learning objective:

- Apply negative pressure wound therapy & explain rationale for parameter & dressing decision.

Pressure Redistribution

| Need to Include | Nice to Include |
|----------------------------|--------------------------|
| Footwear needs & options | Seating/pressure mapping |
| Management of incontinence | |
| Mobility training | |
| Offloading | |
| Orthotic devices | |
| Support surfaces | |
| Therapeutic positioning | |

Example lab activity:

- Place colored dots over bony landmarks at highest risk for pressure injury in various positions (e.g., supine, prone) & have students apply offloading principles to mitigate risk.

Example learning objective:

- Identify pressure injury risk factors & describe pressure redistribution techniques & devices appropriate to address these risks.

Other

| Need to Include | Nice to Include |
|---|-------------------------------|
| Bandaging techniques | Bandaging – Montgomery straps |
| Compression: <ul style="list-style-type: none"> • Ace wrap • Compression garments • Long stretch • Multi-layer • Short stretch | Removal of sutures & staples |
| Control of bleeding | |
| Exercise prescription | |
| Knowledge only: <ul style="list-style-type: none"> • Manual lymph drainage • Total contact casting (TCC) | |
| Management of incontinence | |
| Periwound management | |
| Possible adverse reactions | |
| Scar management | |
| Skin care | |
| Skin sealant/protectant | |

Example lab activity:

- Practice figure of eight & spiral wrapping techniques & apply multi-layer compression.

Example learning objective:

- Prescribe an exercise plan based on loss of muscle tissue associated with traumatic injury.

DOCUMENTATION

| Need to Include |
|--------------------------|
| Daily treatment notes |
| Diagnosis |
| Discharge summary |
| Evaluation |
| Goals |
| History |
| Patient education topics |
| Plan of care |
| Prognosis |
| Re-evaluation |
| Referrals |
| Systems review |
| Tests/measures |

Example lab activity:

- Add documentation to existing case studies/patient scenarios.

Example learning objective:

- Utilize correct wound-related terminology in completing accurate, timely wound documentation.

HEALTHCARE PROVIDER RISK

| Need to Include |
|---|
| Post exposure procedures |
| Provider immunizations |
| Reduction/prevention of infection transmission |
| Sharps |
| Standard & isolation precautions, including contact, droplet, airborne (knowledge only) |
| Tuberculosis & blood borne pathogen standards/training |
| Use of personal protective equipment (PPE) |
| Work practice controls/hazard communication |

Example lab activity:

- Practice don/doff of PPE.

Example learning objective:

- Describe basic PPE/OSHA standard precautions required in various patient scenarios.

INTERDISCIPLINARY TEAM

Possible Members of a Wound Management Team

| Need to Include | Nice to Include |
|---|-----------------------------------|
| Advanced practice providers (Physician Assistant, Nurse Practitioner) | Diabetic Educator |
| Case manager | Infection prevention professional |
| Dietician | Pharmacist |
| Durable Medical Equipment (DME) Providers | Podiatrist |
| Nurse | Smoking cessation specialist |
| Orthotist/prosthetist | |
| Physical therapist/physical therapist assistant | |
| Physician/surgeon, from all relevant specialty areas | |
| Social worker | |

Example lab activity:

- Based on patient scenarios, discuss other healthcare professional team members necessary to optimize patient care.

Example learning objective:

- Determine when patient needs extend beyond the scope of physical therapist practice & recommend referral to collaborative healthcare professionals.

WOUND MANAGEMENT BUSINESS & ADMINISTRATION

Exposure to Reimbursement Issues

| Nice to Include |
|--|
| Coding: overview of Healthcare Common Procedural Coding System (HCPCS) |
| Local Coverage Articles (LCAs) |
| Local Coverage Determinations (LCDs) |
| Medicare Administrative Contractors (MACs) |
| National Correct coding Initiative (NCCI) |
| National Coverage Determinations (NCDs) |
| Overview of Medicare - Minimum Data Set (MDS) |
| Patient-Driven Groupings Model (PDGM) |
| Patient-Driven Payment Model (PDPM) |

Example lab activity:

- Utilize LCD information to answer questions about a patient's plan of care.

Example learning objective:

- Summarize various issues related to wound management reimbursement.