The Basic Components of Wound Care and Prevention

– Utilizing a Competency Based Education Approach –

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Identifying; Classifying; Understanding; Directing; Treating

This lesson plan is intended to be completed over a 2 to 3-day class period. Some activities are intended to be done by students at home at the conclusion of the day and brought back to class the next day. If the class is done virtually, the activities can be uploaded as Word documents or PDF files to allow for sharing of the gathered information.

LEARNING OBJECTIVES

1. Differentiate wound states: *chronic vs. acute*
2. Identify types of *chronic wounds*
3. Identify and differentiate the wound stages within each wound type
4. Discuss the etiology/pathophysiology and contributing factors of different wound types
5. Identify and understand the conditions that hinder healing
6. Identify the team members in healing wounds and the roles they play
7. Discuss the different types of dressings and their purposes
8. Discuss advanced modalities of treatment and when to pursue them
9. Identify when standard care is no longer effective, and alternate plans need to be made

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Course Outline

Identifying

1) Wound states:
    a) *Chronic* Vs. *acute* – Which one is it?

i) **Teaching Strategies:** Have the students call out examples of chronic and acute wounds to organize in columns.

b) How do we know what state it is?

i) Provide the definition of *chronic* and *acute*.

ii) What stage is the wound?

(1) First know the stages of healing a wound progresses through and determine what stage it is at.

(2) Hemostasis

(a) The first stage involves stopping the bleeding by constricting blood vessels and forming a clot.

(3) Inflammation

(a) The second stage activates the body's immune response to remove debris, pathogens, and damaged cells. This stage is characterized by redness, swelling, heat, and pain.

(4) Proliferative

(a) In the fourth stage, granulation tissue, collagen, and new blood vessels are generated, and the wound begins to contract and epithelialize.

(5) Remodeling

(a) In the final stage, the newly formed tissue begins strengthening and remodeling, including collagen maturation and scar formation.

iii) **Teaching Strategies:** Have the students ponder the examples called out initially and see if they change their mind on any, or if they can contribute new wound types.

2) Types of chronic wounds:

a) Broken down into the 7 most common:

i) **Teaching Strategies:** List the 7 types along with an example image of each one. See if there are physical identifying characteristics and include that as well; if there are no specific characteristics, state that.

(1) Diabetic

(2) Venous

(3) Arterial

(4) Pressure

(5) Trauma

(6) Infection

(7) Autoimmune

3) Staging of wounds – Full vs. partial, diabetic Wagner, and pressure ulcer:

a) Review the staging processes

i) Full vs. partial

ii) Review the Wagner scale for diabetic wounds.

iii) Review the pressure ulcer staging criteria.

(1) **Teaching Strategies:** Provide the students with a stack of wounds images to choose from. Ask the students to choose 2 images of various chronic wound types. Using their phones or computers, they are to then briefly research how the wound is staged and then present the staging decision based upon what they have just learned and what they see in the picture.

Classifying

4) What type is it? Understanding underlying causes/pathophysiologic processes:

a) Diabetic ulcers

i) Contributing factors of diabetes that lead to chronic wounds:

(1) Chronic hyperglycemia (A1C >6) (significant slowing of healing)

(2) Neuropathy (injuries go unnoticed)

(3) Micro/macrovascular disease (insufficient provision of oxygen and nutrients)

b) Venous stasis ulcers

i) Contributing factors that lead to venous stasis ulcers:

(1) Peripheral vascular disease (can be genetic or caused by lifestyle)

(2) Obesity (puts increased pressure on the venous return leading to pooling of blood)

(3) Lymphedema (can be caused by injury, genetics, or poor blood flow)

(4) Sedentary lifestyle or occupation (significant standing/sitting with little walking)

c) Arterial insufficiency ulcers

i) Contributing factors that lead to arterial insufficiency ulcerations:

(1) Smoking (hardening of the arteries)

(2) Diabetes (clogging of the arteries)

(3) Can sometimes be genetics, as well, though not as common

d) Interrupted perfusion ulcerations

i) Potential causes of pressure ulcers:
   (1) Bed confinement
      (a) Patients may not be able to reposition independently or may choose to remain in one position due to comfort or effort to avoid pain.
      (b) Nutrition and comorbidities may increase the risk
   (2) Chair confinement
      (a) This can occur even with someone who is able to walk and move about, but continues to spend >2 hours in one position without positional changes causing blood-flow restriction to the area
      (b) Nutrition and comorbidities may increase the risk

ii) After-effects of restricted blood flow:
   (1) This can be caused by using vasopressors
   (2) Dialysis access can result in a condition called “Steal Syndrome” where the distal portions of the extremities may not get enough blood flow to sustain life.

e) Infection
   i) Bacterial
      (1) Surface/superficial levels
      (2) Cellulitis
      (3) Abscess
   ii) Fungal

f) Nutritional deficiencies/overload
   i) Hypoproteinemia
      (1) Poor appetite
      (2) Alterations to the digestive system
      (3) Comorbidities such as ESRD
   ii) Excess sodium intake
      (1) Contributes to lower extremity swelling and the tissue ruptures

g) Immune complications
   i) Pyoderma gangrenosum
   ii) Lupus
   iii) Rheumatoid arthritis
   iv) Bullous pemphigoid

v) Hidradenitis suppurative

h) Kidney disease

i) Calciphylaxis

ii) Gouty tophi

(1) **Teaching Strategies:** Wound types are labeled with a coordinating letter and presented on a whiteboard or overhead screen projection. A bank of associated causes is presented as an additional handout. Students are to mark the matching letter next to the coordinating cause. Conversely, a digital game system, such as Blooket or Kahoot, can be used to complete the assignment in a game format.

Understanding

5) Understand the basic roadblocks to healing

a) Nutrition:

i) How does our nutritional status affect healing?

(1) Poor glucose levels

(2) Poor dietary intake

(a) **Teaching Strategies:** Have the students write out a one-day healthy meal plan for themselves. Have them then write out what they ate for the entire day before and have them examine the differences and see how their nutritional intake compares.

b) Vascular:

i) If blood pools (venous), the pressure causes stretching and tearing of the tissues and skin

(1) Allows lymphatic fluid to leak, and bacteria to enter

(2) Inhibits the inflow of oxygenated blood

ii) If blood is unable to reach (arterial) the extremities, insufficient oxygen and nutrients reaches the wound inhibiting healing, and eventually tissue death occurs

c) Infection:

i) Cultures should be done if any reasonable suspicion of infection is present, but consider the following:

(1) What are symptoms of local infection and what are alternate considerations?

(a) Increased redness – can occur as a singular sign of inflammation as opposed to infection

(b) Increased drainage – patient could have chronic issues with lymphedema

(c) Increased pain – patient could have increased nerve pain because of exposed nerve endings

(d) Purulent drainage – some dressing types can cause a pseudo-purulent drainage

(2) Infection distracts the body from healing and drains necessary resources to heal

ii) Having one or two symptoms does not necessarily mean infection! This is important to consider, otherwise you will be culturing everyone, constantly!

d) Lifestyle contributing factors:

i) Smoking

(1) vasoconstriction causes diminished blood flow to the extremities for at least 2 hours after each cigarette

(2) Nicotine contributes to hardening of the arteries which in turn slows the flow of blood to our extremities by stifling the pulse from our cardiac push.

ii) Poor nutrition

(1) High sodium, carbohydrate, or fried food intake. Low fiber intake

iii) Excess caffeine

(1) Contributes to vasoconstriction as well, and impacts blood flow, but to a lesser degree than smoking.

(2) Often consumed along with excess amounts of sugar

e) Compliance:

i) It is important to understand **why** the patient is non-compliant.

(1) Finances?

(2) Education?

(3) Comprehension?

(4) Willingness to engage?

(5) Ability to engage?

(6) Necessary resources?

(7) Embarrassment?

(8) Social blockages?

ii) Without compliance, no intervention will be successful!

(1) **Teaching Strategies:** Have the students define 2 roadblocks of their choosing in more detail. Have them give suggestions on how they would address the issue. This can be done via a discussion board post.

Directing

6) Who plays a part in wound care?

a) It is a multi-disciplinary effort to heal wounds, with many important players. Here are some examples along with what they might contribute:

i) *Nurses* provide the assessment, dressing changes, and education to the patient.

(1) This can be in the home, outpatient clinic, or inpatient hospital settings.

ii) *Specialists* address the various contributing factors:

(1) *Vascular* corrects or improves blood flow issues both arterial and venous.

(2) *Infectious Disease* manages antibiotics if they are needed for particularly persistent or deep infections such as XDRO or osteomyelitis.

(3) *Wound Care* directs the patient to the various accessory specialists and directs the plan-of-care to heal the wound.

(4) *Endocrinology* manages the patient's blood glucose and diabetes.

(5) *Dermatologists* may help manage more superficial ulcerations or rheumatological issues such as hidradenitis suppurativa.

(6) *General Surgeons* may take the patient into the OR to surgically debride the wound or perform a graft or flap.

(7) *Podiatrists* may reshape a foot or amputate a portion of the foot or leg if the wound is unable to be closed.

iii) **Teaching Strategies:** Give the students an opportunity to suggest other people who might contribute to the care of the patient. Allow them the opportunity to explain how they would contribute. (Some examples include social work, orthopedists, prosthetists, and insurance case managers.)

Treating

7) Understand the basic care of wounds:

a) Long-held ideas about wound care often exacerbate and keep wounds *chronic.*

i) Education among patients and other care providers is essential to speed wound healing and prevent complications.

ii) Education of the patient should be done gently and with understanding to prevent shame and encourage compliance.

(1) The methods a patient has used to the point of intervention could have been taught by family members such as grandparents, etc. and to refute these methods can cause conflict within the patient.

iii) Addressing some of the most common misconceptions in wound care:

(1) Always keep open ulcerations *covered.*

(a) Exposure to the environment invites microbes and contamination from the outer environment.

(b) Wounds cool and cells become *senescent* faster.

(2) Dry wounds heal slower because epithelialization cannot occur across a dry surface.

(3) Clean wounds with non-cytotoxic cleaners such as normal saline, or soap and water.

(a) Avoid use of cleaners such as iodine, peroxide, and alcohol which are *cytotoxic* and *desiccating.*

8) Understanding different dressing types:

a) Wounds may have different needs at different stages of healing.

b) What works on one person, may not work on another.

c) There are many types of standard dressings, some examples:

i) *Medicated* – such as xeroform (petroleum jelly and the mineral bismuth on a gauze fabric)

ii) *Absorbent* – Calcium alginate (derived from seaweed, it helps to soak up excess drainage)

iii) *Supplemental* – Collagen (it helps to provide additional collagen at wound site to assist with building tissue)

d) If a wound fails to respond to standard dressings, there are advanced modalities available:

i) *Offloading* dressings such as *total contact casts* (TCC)

(1) They alleviate pressure from wounds on the bottom of the foot while providing compression to the lower leg to alleviate swelling in the leg.

ii) *Negative pressure wound therapy* (NPWT)

(1) This is a suction device that provides consistent suction upon the wound which helps stimulate cell proliferation.

iii) *Hyperbaric oxygen therapy* (HBOT)

(1) A treatment that puts the patient under increased barometric pressure in a 100% oxygen environment to stimulate angiogenesis and to help force oxygen deep into damaged tissues.

e) *Skin grafting/substitutes*

i) These can be autografts, allografts or xenografts
   (1) *Autografts* come directly from the patient and are harvested from a different part of their body.
   (2) *Allografts* are tissue harvested from cadavers for the purpose of donation.
   (3) *Xenografts* are grafts harvested from another species, such as cows (bovine) or pigs (porcine).

9) When to determine conventional wound care is no longer effective:
   a) Unfortunately, this does happen, and it must be understood that you *will* encounter this at some point.
      i) This is when it is important to be empathetic, because this is often a period of deep distress for a patient.
      ii) It is important to reassure the patient and *LISTEN*.
      iii) Some of the most common reasons are:
         (1) Inability to remedy the underlying contributing factors
         (2) Deep-seated infection where treatment would be more dangerous than amputation, or time is not an option
         (3) The patient is experiencing *treatment fatigue*
         (4) The patient's comorbidities preclude further treatment
            (a) They are entering hospice
         (5) Patient non-compliance or refusal of further treatment

LEARNING ACTIVITIES

The instructor may choose either option #1 or #2 for the students to complete, along with completing exercise #3, as assignments to be done outside of the classroom and turned in later. Alternatively, the assignment can be done online if the course is an online course.

Competency Establishing Exercises:

1. Have the students select a particular wound from a pre-gathered database of images. Have the students then decide what type of wound they see, describe the most common causes of this wound type, and what detailed teaching they would provide the patient on preventing further

complications and changes the patient needs to make to optimize their healing potential. This can be done as a written post.

2. Alternately, ask the students to pair up with a partner. They are to choose a wound type and will develop a simple profile of a patient that might have that type of wound based upon what we have discussed and present it to their partner. For example:

> *"I'm a 42-year-old African American female. I'm a diabetic, 1-pack a day smoker since age 17, who drinks 3 cups of coffee a day. I work in a busy warehouse packing orders for 10-hour shifts, 4 days a week. I hate wearing compression stockings because they're hot! Now I have this venous statis ulcer. What should I do?"*

The partner will then develop a 1 to 2-page handout with information to educate the patient on what factors contribute to their wound, how their lifestyle choices might be affecting their wounds, and how to adapt or change their current lifestyle choices while encouraging compliance.

3. Provide the students with a list of the most common standard dressing types. Have the students look up the ingredients, uses, and contraindications of three of them. Have the students present this as an informational handout that other students can download and read. This helps utilize a teach-back method of instruction.

Discussion

How does this exemplify *Competency Based Education* (CBE)?

Englander et al. defines evidence of CBE as, "an observable ability of a health professional, integrating multiple components such as knowledge, skills and attitudes." (p. 1089, 2013). By having students search out and learn to identify characteristics and pathophysiological processes of various wound types, as well as having them identify sociological, physical, and psychological reasons behind the patient's past, present and future behaviors that contribute to the development and presence of

the wound, the care provider will help to maximize the ability to care for and heal the patient. It is not enough to be able to just identify and dress a wound. To truly be competent, the caregiver must be able to identify the underlying issues and address them as necessary. Competency shows a demonstrated performance that covers the integration of knowledge, skills, values, and beliefs (Giddens, 2020).

How Am I integrating CBE into my lesson plan?

By having the students work together to teach each other from student-created scenarios, there is an introduced aspect of unpredictability. Just as they would encounter in the clinical setting. This allows them to flex their cognitive skills by looking at all the contributing factors that went in to developing the wound along with how to address it moving forward. While students will not know every possible wound situation and available treatment at the time of graduation, they will be knowledgeable beyond wet-to-dry dressings, making them a more proficient care-provider at the time of graduation (Zerwic, 2023).

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