



## Complete Summary

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### GUIDELINE TITLE

Treatment of pressure ulcers.

### BIBLIOGRAPHIC SOURCE(S)

Folkedahl BA, Frantz R. Treatment of pressure ulcers. Iowa City (IA): University of Iowa Gerontological Nursing Interventions Research Center, Research Dissemination Core; 2002 Aug. 30 p. [58 references]

## COMPLETE SUMMARY CONTENT

SCOPE  
METHODOLOGY - including Rating Scheme and Cost Analysis  
RECOMMENDATIONS  
EVIDENCE SUPPORTING THE RECOMMENDATIONS  
BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS  
QUALIFYING STATEMENTS  
IMPLEMENTATION OF THE GUIDELINE  
INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT  
CATEGORIES  
IDENTIFYING INFORMATION AND AVAILABILITY

## SCOPE

### DISEASE/CONDITION(S)

Pressure ulcers; also called decubitus ulcers, bed sores, or pressure sores

### GUIDELINE CATEGORY

Evaluation  
Management  
Treatment

### CLINICAL SPECIALTY

Dermatology  
Family Practice  
Geriatrics  
Internal Medicine  
Nursing  
Nutrition  
Physical Medicine and Rehabilitation  
Plastic Surgery

## INTENDED USERS

Advanced Practice Nurses  
Dietitians  
Health Care Providers  
Hospitals  
Nurses  
Physical Therapists  
Physician Assistants  
Physicians

## GUIDELINE OBJECTIVE(S)

- To treat pressure ulcers among elderly patients
- To enhance the healing of pressure ulcers

## TARGET POPULATION

Adult patients who have been identified with pressure ulcers or who are 'at risk' for pressure ulcers

## INTERVENTIONS AND PRACTICES CONSIDERED

1. Identification of at-risk patients (use of Braden Scale)
2. Initial assessment and staging
3. Management foci:
  - Tissue loads (pressure, friction, shearing)
  - Nutritional support
  - Ulcer care
  - Infection
4. Reassessment
5. Dietary intake
6. Debridement (sharp, mechanical, autolytic, or enzymatic) and cleansing (normal saline or commercial wound cleanser, wound irrigation)
7. Moist dressings (e.g., hydrogels, hydrocolloids, saline moistened gauze, transparent film dressings)
8. Adjuvant wound therapies (e.g., hyperbaric oxygenation, negative pressure wound therapy, and electrical stimulation)
9. Topical antibiotics for non-healing ulcers (e.g., Iodosorb, silver sulfadiazine, triple antibiotic, silver impregnated dressings)
10. Protective/injury-prevention measures

Note: Antiseptics are considered but specifically recommended against using.

## MAJOR OUTCOMES CONSIDERED

- Accuracy of research-based tools (e.g., Braden scale) for predicting pressure ulcer risk
- Accuracy of staging instruments for assessing pressure ulcer severity
- Pressure ulcer healing
- Pressure ulcer formation

- Size and condition of ulcers

## METHODOLOGY

### METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)  
Hand-searches of Published Literature (Secondary Sources)  
Searches of Electronic Databases

### DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The guideline was adapted from the Agency for Health Care Policy and Research (AHCPR, now known as the Agency for Healthcare Research and Quality [AHRQ]) Clinical Guidelines "Pressure Ulcers in Adults: Prediction and Prevention" (May 1992) and "Treatment of Pressure Ulcers" (December 1994).

Additional MEDLINE and CINAHL searches were conducted.

The Web was also used to access professional organizations that are involved in pressure ulcer care (e.g., National Pressure Ulcer Advisory Panel; Wound, Ostomy, Contenance Nursing Society).

### NUMBER OF SOURCE DOCUMENTS

22,000

### METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

### RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Evidence Grades

- A. Evidence from well-designed meta-analysis.
- B. Evidence from well-designed controlled trials, both randomized and nonrandomized, with results that consistently support a specific action (e.g., assessment, intervention or treatment).
- C. Evidence from observational studies (e.g., correlational descriptive studies) or controlled trials with inconsistent results.
- D. Evidence from expert opinion or multiple case reports.

### METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review

### DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

#### METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

#### RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

#### COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

#### METHOD OF GUIDELINE VALIDATION

Clinical Validation-Trial Implementation Period  
Peer Review

#### DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Reviewed by series editor Marita G. Titler, PhD, RN, FAAN and nationally known expert

## RECOMMENDATIONS

#### MAJOR RECOMMENDATIONS

The evidence grades supporting the recommendations (A, B, C, D) are repeated at the end of the "Major Recommendations" field.

#### Definition of Pressure Ulcers

A pressure ulcer is any injury usually caused by unrelieved pressure that damages the skin and underlying tissue. Pressure ulcers are also called "decubitus ulcers," "bed sores," or "pressure sores," and their severity ranges from reddening of the skin to severe, deep craters that have formed down to muscle and bone.

#### Classification of Pressure Ulcers

Research indicates that there are several stages to the severity and condition of pressure ulcers. Treatment of these ulcers must acknowledge these differing stages. The following stages are adapted from the Agency for Health Care Policy and Research (1994) (AHCPR, now known as Agency for Healthcare Research and Quality [AHRQ]) guidelines:

- Stage 1: Non-blanchable erythema of intact skin, the heralding lesion of skin ulceration. In individuals with darker skin, discoloration of skin, warmth, edema, induration, or hardness may also be indicators. The definition

according to the National Pressure Ulcer Advisory Panel (NPUAP) states "A stage I pressure ulcer is an observable pressure related alteration of intact skin whose indicators as compared to the adjacent or opposite area on the body may include changes in one or more of the following: skin temperature (warmth or coolness), tissue consistency (firm or boggy feel) and/or sensation (pain, itching). The ulcer appears as a defined area of persistent redness in lightly pigmented skin, whereas in darker skin tones, the ulcer may appear with persistent red, blue or purple hues."

Please note: Assessment of Stage 1 pressure ulcers is difficult in patients with darkly pigmented skin. In lighter-skinned people, a Stage 1 pressure ulcer may change skin color to a dark purple or red area that does not become pale under fingertip pressure. In dark-skinned people, this area may become darker than normal. The affected area may feel warmer than surrounding tissue. When an eschar is present, accurate staging is not possible.

- Stage 2: Partial thickness skin loss involving epidermis, dermis or both (e.g., abrasion, blister, or shallow crater).
- Stage 3: Full thickness skin loss involving damage to or necrosis of subcutaneous tissue that may extend down to, but not through, underlying fascia (deep crater with or without undermining). The ulcer presents clinically as a deep crater with or without undermining adjacent tissue.
- Stage 4: Full thickness skin loss with extensive destruction, tissue necrosis, or damage to muscle, bone, or supporting structures (e.g., tendon or joint capsule).

#### Individuals at Risk for Pressure Ulcers

Based upon research reviews, the following two factors have been identified as those which place patients at increased risk for the development of pressure ulcers:

- Patients who are chairfast or bedfast

After identifying patients who are chairfast or bedfast, the following characteristics further increase the risk for pressure ulcer development:

- Advanced age increases even more the likelihood of pressure ulcers among patients who are chair or bedfast.
- Patients with impaired ability to reposition themselves in chair or bed.
- Patients with friction and shearing (i.e. unable to pull self up in bed, patient who has involuntary muscle movements that cause rubbing against sheets).
- Patients who have decreased sensory perception (i.e. loss of feeling in certain part of body, patient who is comatose).
- Patients with decreased nutritional intake (i.e. not taking in minimal daily requirements).
- Patients with excessive exposure to moisture (i.e. incontinence, excessive perspiration, wound drainage).

The Braden Scale for Predicting Pressure Sore Risk (refer to Appendix A in the original guideline document for details) is a research-based tool that can estimate level of risk for pressure ulcers and to predict which patients are likeliest

to develop pressure ulcers. Previous research indicated that patients whose score on the Braden Scale is equal to 16 or lower in acute care settings; 18 or lower in long term, were considered at risk (Evidence Grade = B). Current research indicates that a patient in any setting with a score of 18 or lower is at risk. The risk assessment should be completed on admission and 48 hours later. Clinicians should then establish an ongoing frequency to both continue to assess the patient and determine the appropriate interventions based on the assessment. This can prevent the overuse of costly treatments (Evidence Grade = B).

As with most screening tools, the Braden Scale's accuracy varies across types of settings. Therefore, it cannot stand alone in predicting pressure ulcers in individual patients. Regular skin assessments for early signs of pressure injury are an essential adjunct to risk assessment.

### Description of Intervention

1. Treatment of pressure ulcers should center on the following intervention activities:
  - Management of tissue loads (i.e. pressure, friction, and shearing)
  - Nutritional assessment and support
  - Ulcer care
  - Management of bacterial colonization and infection
2. Assessment of pressure ulcers should focus upon the following factors:
  - Location and stage of ulcer (Stage 1 to 4)
  - Size of ulcers (i.e. length, width and depth)
  - Presence of tracts or undermining
  - Ulcer bed appearance
    - Granulation tissue
    - Yellow slough
    - Eschar
    - Drainage
    - Presence of rolled wound edges
  - Odor
  - Peri-wound skin condition
3. Color photos taken on initial assessment and reevaluation are very helpful in monitoring changes in the wound tissue. However, care must be taken to ensure that the photo accurately depicts the appearance of the wound.
4. Reassess pressure ulcers weekly. If the condition of the patient or the wound deteriorates, reevaluate as soon as noted. Refer to Appendix B in the original guideline document for a Pressure Ulcers Assessment Guide to track the healing progress of the ulcer.
5. Ensure adequate dietary intake to enhance healing. Request a consult from a dietitian and develop a nutrition plan. The stage of the wound is correlated with the severity of nutritional deficits, especially low protein intake or a below-normal serum albumin (Allman et al., 1996; Bergstrom & Braden, 1992; Berlowitz & Wilking, 1989; Breslow, Hallfrish, & Goldberg, 1991; Ek, Unosson, & Bjurulf, 1989; Hanan & Scheele, 1991; Holmes et al., 1987; Pinchcofsky-Devin & Kaminski, 1986) (Evidence Grade = B). Also check to make sure that teeth are in good condition or dentures fit properly (Evidence Grade = B).
6. Remove necrotic tissue with sharp, mechanical, autolytic, or enzymatic debridement. Autolytic and enzymatic debridement methods generally are

- specific to necrotic tissue and do not harm healthy tissue. However, they may be slow to debride the necrotic tissue. Sharp debridement is the most expedient at removing devitalized tissue, but does require specially trained personnel to perform (Bale & Harding, 1990; Barrett & Klibanski, 1973; Bryant, 2000; Longe, 1986; Michocki & Lamy, 1976) (Evidence Grade = C).
7. Cleanse with normal saline or commercially prepared wound cleanser at each dressing change. For the majority of wounds, isotonic saline is adequate to cleanse the wound surface. In those instances when the wound surface is more heavily laden with surface debris, a commercial wound cleanser may be used. Healing cannot occur until all inflammatory foreign material is removed (Bryant, 2000; Bryant et al., 1984; Foresman et al., 1993; U.S. Department of Health and Human Services, 1994) (Evidence Grade = C).
  8. Use enough irrigation pressure to cleanse wound without causing trauma. Safe and effective ulcer irrigation pressures range from 4 to 15 pounds per square inch (psi). (Refer to Appendix C in the original guideline document for details on delineation of irrigation pressures for various devices) (Brown et al., 1978; Green et al., 1971; Gross, Cutright, & Bhaskar, 1972; Hamer et al., 1975; Stevenson et al., 1976; Longmire, Broom, & Burch, 1987; Rodeheaver et al., 1975; Bhaskar, Cutright, & Gross, 1969; Wheeler et al., 1976) (Evidence Grade = B).
  9. Avoid use of antiseptics (e.g., povidone iodine, iodophor, Dakin's solution, hydrogen peroxide, acetic acid) (Custer et al., 1971; Johnson, White, & McAnalley, 1989; Rodeheaver et al., 1980; Rydberg & Zederfeldt, 1968) (Evidence Grade = B).
  10. Apply dressings that maintain a moist wound environment. Examples of moist dressings include, but are not limited to, hydrogels, hydrocolloids, saline moistened gauze, transparent film dressings. The ulcer bed should be kept continuously moist (Kurzuk-Howard, Simpson, & Palmieri, 1985; Fowler & Goupil, 1984; Gorse & Messner, 1987; Sebern, 1986; Alm et al., 1989; Colwell, Foreman, & Trotter, 1992; Neill et al., 1989; Oleske et al., 1986; Xakellis & Chrischilles, 1992) (Evidence Grade = B).
  11. Keep the surrounding (periwound) intact skin dry while keeping the ulcer bed moist.
  12. If the ulcer does not progress toward healing, the patient should be evaluated to determine if osteomyelitis is present. If diagnosed, the infection must be treated if the ulcer is to heal.
  13. Adjuvant wound therapies such as hyperbaric oxygenation, negative pressure wound therapy, and electrical stimulation may be considered on an individual basis for those wounds that do not respond to more traditional therapies and osteomyelitis has been ruled out (Bryant, 2000) (Evidence Grade = C).
  14. DO NOT USE SWAB CULTURES TO DIAGNOSE WOUND INFECTION because all pressure ulcers are colonized with bacteria (Bryant, 2000; Garner et al., 1988; Krizek & Robson, 1975; Rousseau, 1989; U.S. Department of Health and Human Services, 1994) (Evidence Grade = C).
  15. Consider a 2 week course of topical antibiotics for clean pressure ulcers that do not heal or continue to produce purulent exudate after 2 to 4 weeks of care as outlined in this protocol. The antibiotic should be effective against gram-negative, gram-positive, and anaerobic organisms (e.g., Iodosorb [Healthpoint], silver sulfadiazine, triple antibiotic, or silver impregnated dressings) (Bendy et al., 1964; Kucan et al., 1981) (Evidence Grade = B).
  16. After initial treatment of pressure ulcers begins, the size of the ulcer may increase, especially when the ulcer initially contains necrotic tissue. However, the ulcer should become clearer and cleaner despite the increase in size. The

treatment simply exposes more of the ulcer, thereby leading to the increased size. If the ulcer increases in size and does not become cleaner and clearer, then the treatment needs to be altered, as the ulcer is not healing appropriately.

17. Protect from further injury to the ulcer or additional ulcer formation by utilizing interventions outlined for patients at risk.

#### Definitions:

#### Evidence Grades

- A. Evidence from well-designed meta-analysis.
- B. Evidence from well-designed controlled trials, both randomized and nonrandomized, with results that consistently support a specific action (e.g., assessment, intervention or treatment).
- C. Evidence from observational studies (e.g., correlational descriptive studies) or controlled trials with inconsistent results.
- D. Evidence from expert opinion or multiple case reports.

#### CLINICAL ALGORITHM(S)

None provided

### EVIDENCE SUPPORTING THE RECOMMENDATIONS

#### REFERENCES SUPPORTING THE RECOMMENDATIONS

[References open in a new window](#)

#### TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The evidence in this protocol is based upon research studies that included older adult populations.

The type of supporting evidence is identified and graded for selected recommendations (see "Major Recommendations").

### BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

#### POTENTIAL BENEFITS

- Improved size and condition of pressure ulcer
- Prevention of ulcer progression
- Improved consistency of care along with decreased variability of practice

Subgroups Most Likely to Benefit:

Patients at increased risk who can benefit most from these recommendations include those who are:

- Chairfast or bedfast
- Elderly
- With impaired ability to reposition themselves in chair or bed
- At risk for friction or shearing (i.e., unable to pull self up in bed, patient who has involuntary muscle movements that cause rubbing against sheets)
- With decreased sensory perception (i.e., loss of feeling in certain part of body, patient who is comatose)
- With decreased nutritional intake (i.e., not taking in minimal daily requirements)
- With excessive exposure to moisture (i.e., incontinence, excessive perspiration, wound drainage)

## POTENTIAL HARMS

Isolated instances of patients being injured when placed on "high tech" low air loss beds

## QUALIFYING STATEMENTS

### QUALIFYING STATEMENTS

This research-based practice is a general guideline. Patient care continues to require individualization based on patient needs and requests.

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

#### Evaluation of Patient Outcomes and Process Factors

In order to evaluate the use of this protocol among patients at risk for pressure ulcers and the treatment of any that develop, both outcome and process factors should be evaluated.

#### Outcomes Factors

In order to document the success of the treatment of pressure ulcers program that is devised for each individual patient, and based upon this protocol, use or adapt the Pressure Ulcers Assessment Guide (refer to Appendix B in the original guideline document for details). Individual facilities should determine which tool best meets its needs. This chart will allow continued individual patient audits to determine the adequacy of pressure ulcer relief provided by the treatment program. Please note that there are other assessment tools available (refer to Appendix D in the original guideline document for details).

The Pressure Ulcers Management Monitor (refer to Appendix E in the original guideline document for details) is an outcome measure that is based upon patient interviews and examinations and which elicits specific information regarding pressure ulcer relief and its associated conditions. The Monitor should be used on, at least, a weekly basis. The outcomes of importance include: 1) no evidence of

new pressure ulcer development or formation, and 2) pressure ulcer is maintained or shows improvement as evidenced by improvement in overall size and condition of ulcer.

#### Process Factors

Process Indicators are those interpersonal and environmental factors that can facilitate the use of this evidence-based practice protocol.

One process factor that can be assessed with a sample of nurses and/or physicians is knowledge about the treatment of pressure ulcers. The Treatment of Pressure Ulcers Knowledge Assessment Test (refer to Appendix F in the original guideline document for details) should be assessed before and following the education of staff regarding use of this protocol.

The same sample of the nurses and/or physicians for whom the Knowledge Assessment test was given should also be given the Process Evaluation Monitor (refer to Appendix G in the original guideline document for details) approximately one month following his/her use of the protocol. The purpose of this monitor is to determine his/her understanding of the protocol and to assess the support for carrying out the protocol. Education staff should determine frequency of use of the Process Evaluation Monitor in order to check the on-going knowledge and understanding of the protocol used. It may be incorporated into yearly competency evaluations.

## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

Getting Better

### IOM DOMAIN

Effectiveness  
Safety

## IDENTIFYING INFORMATION AND AVAILABILITY

### BIBLIOGRAPHIC SOURCE(S)

Folkedahl BA, Frantz R. Treatment of pressure ulcers. Iowa City (IA): University of Iowa Gerontological Nursing Interventions Research Center, Research Dissemination Core; 2002 Aug. 30 p. [58 references]

### ADAPTATION

The guideline was adapted from the Agency for Health Care Policy and Research (AHCPR) Clinical Guidelines "Pressure Ulcers in Adults: Prediction and Prevention" (May 1992) and "Treatment of Pressure Ulcers" (December 1994).

DATE RELEASED

1997 (revised 2002 Aug)

GUIDELINE DEVELOPER(S)

University of Iowa Gerontological Nursing Interventions Research Center,  
Research Dissemination Core - Academic Institution

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GUIDELINE COMMITTEE

University of Iowa Gerontological Nursing Interventions Research Center  
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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline. It updates a previous version:  
Research Dissemination Core. Treatment of pressure ulcers. Iowa City (IA):  
University of Iowa Gerontological Nursing Interventions Research Center; 1997.  
22 p.

GUIDELINE AVAILABILITY

Electronic copies: Not available at this time.

Print copies: Available from the University of Iowa Gerontological Nursing  
Interventions Research Center, Research Dissemination Core, 4118 Westlawn,  
Iowa City, IA 52242. For more information, please see the [University of Iowa  
Gerontological Nursing Interventions Research Center Web site](#).

AVAILABILITY OF COMPANION DOCUMENTS

None available

## PATIENT RESOURCES

None available

## NGC STATUS

This summary was completed by ECRI on October 16, 1998. The information was verified by the guideline developer on February 18, 1999. This summary was updated by ECRI on December 19, 2002. The information was verified by the guideline developer on February 3, 2003.

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