

Nutrition Guideline

Pressure Injuries

Prevention and Management

For Professional Reference Only

Applicable to: Nurses, Physicians, and Other Health Professionals

Recommendations

- Patients with or at risk for pressure injuries should be screened for malnutrition using a validated nutrition screening tool, such as the Canadian Nutrition Screening Tool (CNST).
- Patients with or at risk of malnutrition should be referred to a Registered Dietitian for a comprehensive nutrition assessment.
- The presence of pressure injury can lead to hypermetabolic or catabolic state, in which energy requirements are increased. The goal should be to provide adequate energy for weight maintenance (or weight gain in underweight patients).
- Monitor intake, wound status, and weight carefully and adjust energy provision accordingly.
- Protein intake above the recommended daily allowance (RDA) is required for wound healing as protein requirements are increased in the presence of pressure injuries.
 - Patients should be encouraged to consume foods that are complete sources of protein including poultry, meat, fish, eggs, milk products, and soybeans.
- Fluid intake of at least 6 cups (1.5 L) per day is required for hydration, good skin turgor, and perfusion of oxygen and nutrients to wounded tissue for repair.
- Nutrition interventions should support optimal glycemic control.
- A well-balanced diet that meets the dietary reference intake (DRI) for vitamins and minerals is recommended. If overall intake is poor, a multivitamin supplement with minerals may be considered.
 - Known or suspected vitamin and mineral deficiencies should be corrected, especially vitamin A, vitamin C, and zinc.
 - Ensure nutrient intake from food and supplements do not exceed tolerable upper limits.
- There is insufficient evidence to support the use/supplementation of glutamine in patients with pressure injuries.
- Routine supplementation with arginine for wound healing is not recommended.
- There is insufficient evidence to support the use of omega-3 supplements for wound healing.

Health Benefits

Following the recommendations above can help individuals:

- Maintain skin integrity and support tissue repair processes.
- Meet nutritional needs and promote wound healing.

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Key Question(s)

What are pressure injuries?

A pressure injury is defined as a localized injury to the skin and/or underlying tissue, usually over a bony prominence, as a result of pressure, or pressure in combination with shear.¹¹ The injury can present as intact skin or as an open ulcer.

What causes pressure injuries?

- Pressure on the skin and tissues. This is the most common cause.
- Sliding down in a bed or chair, which can cause skin to fold over itself (shear force).
- Being pulled across bed sheets or other surfaces which can cause friction burns
- Excess moisture, such as from sweat, urine, or feces. Skin that is often wet is more likely to break down and form pressure sores.

What are the risk factors for the development of pressure injuries?^{1,2,1,2}

- Decreased mobility, for example, patients who are confined to a bed or chair, or patients with a decreased ability to change and control body position
- Poor nutrition status
- Increased skin moisture, for example, from sweat or incontinence
- Fragile skin
- Impaired blood flow to the extremities from vascular disease, diabetes or tobacco use
- Having an existing pressure injury

Additional factors that may increase risk for development of pressure injuries include increased body temperature, advanced age, impaired sensory perception, hematological measures, and general health status.

How are pressure injuries categorized?

Pressure injuries are categorized or staged based on the layers of tissue that are involved (stage 1-4), with an increasing stage representing increased severity.¹¹ Pressure injuries can also be classified as an *unstageable pressure injury* or a *deep tissue pressure injury*.

More information on how pressure injuries are categorized can be found at:

Wounds Canada: Best Practice Recommendations for the Prevention and Management of Pressure Injuries

<https://www.woundscanada.ca/docman/public/health-care-professional/172-bpr-prevention-and-management-of-pressure-injuries-2/file>

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Why is preventing pressure injuries important?

Pressure injuries may result in decreased quality of life from associated pain, increased risk of infection, and decreased mobility and ability to participate in activities of daily life.

Pressure injuries impact the health care system as they prolong hospitalization and recovery resulting in increased costs and resources.

What role does nutrition play in the prevention and management of pressure injuries?

Nutrition plays an integral role in the prevention and management of wounds.³³ Individuals who have poor nutritional status are more likely to have impaired wound healing, infectious complications, increased length of hospital stay, and higher mortality.^{3,43,4} The primary goal of nutrition care is to provide adequate nutrition to support an optimal healing environment.⁵⁵ Emphasis is on meeting nutritional requirements with a well-balanced diet and use of nutrition support as required.

Do all individuals with pressure injuries require nutrition screening?

All patients with pressure injuries or at risk of developing pressure injuries should be screened for risk of malnutrition at admission, with significant changes to the wound, and when progress towards healing is not observed.⁶⁶ A validated nutrition screening tool such as the Canadian Nutrition Screening Tool (CNST) should be used.⁷⁷ The Braden Scale for Predicting Pressure Sore Risk contains a nutrition subscale that may be used to identify patients at risk of malnutrition.⁸⁻¹¹⁸⁻¹¹ A nutrition score of 3 or less on the Braden tool indicates that nutritional status may not be optimal.⁹⁹

What should I do if a patient is screened at risk for malnutrition?

- Patients with pressure injuries at risk of malnutrition should be referred to a Registered Dietitian for a comprehensive nutrition assessment.
- If nutrition score on the Braden Scale is 3 or less, patient requires a high protein high calorie diet.⁹ This should **not** be ordered for patients with diabetes or renal insufficiency without consultation with a Registered Dietitian.
- If nutrition score on the Braden Scale is 2 or less, patient requires a Registered Dietitian referral.

What are the energy needs of patients with pressure injuries?

The presence of a pressure injury can lead to a hypermetabolic or catabolic state, in which energy requirements are increased.^{3,12-14} The goal is to provide adequate calories to promote weight maintenance (or weight gain in underweight individuals) and wound healing.¹¹ Intake, wound status, and weight should be monitored carefully and energy provision should be adjusted accordingly.

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How does weight loss affect pressure injuries?

People who experience weight loss have an increased risk of poor wound healing.¹⁵ Weight loss is associated with impaired immune function, decreased mobility, impaired muscle strength, lower functional status, and reduced anabolism. These are all factors which can impair wound healing.¹⁵ Nutrients for weight restoration may also be competing with wound healing needs.¹⁵ As weight loss is associated with reduced anabolism and increased risk for poor wound healing, individuals who are overweight or obese should be encouraged to maintain their weight and optimize nutritional intake during the wound healing process.¹⁵ A shift in focus to weight loss strategies is more appropriate when wounds are healed.

What are common barriers to adequate oral intake to watch for?

For individuals who are malnourished, it is important to identify the causes of poor intake that can be targeted through interventions. Frequent causes of malnutrition in the elderly include: decreased appetite, need for assistance to eat, impaired cognition, poor positioning, frequent acute illnesses, medications, decreased thirst response, dysphagia, psychosocial factors such as isolation and depression, and diet monotony.⁴

Barriers to adequate oral intake for individuals in the community may include food access and food insecurity, as well as a lack of understanding of the role of nutrition in wound healing. Education on the role of nutrition for wound healing and on community supports for food access, may help improve nutritional status and facilitate wound healing.

In the inpatient setting, taste fatigue with the hospital menu or oral nutrition supplements may present as a barrier to nutritional adequacy. This may be addressed with personalizing the menu or encouraging family members to bring food from home to improve nutritional intake.

Practical suggestions should be considered to encourage adequate intake including liberalizing diet restrictions where safe and appropriate, addressing impairments to dentition and swallowing, and providing favourite foods.⁴

How does protein status affect pressure injuries?

Protein requirements are increased in the presence of pressure injuries. Protein intake above the recommended dietary allowance (RDA), achieving positive nitrogen balance, is required for wound healing.^{6,11} Protein-energy malnutrition coupled with the metabolic needs of a wound can lead to a loss of lean body mass (or protein stores) and has been shown to impair wound healing. Therefore, a diet high in energy and protein is required to support tissue repair.³

Protein provision should be assessed on an individual basis. It should be noted that higher levels of protein intake may affect renal status, hepatic function, and may potentially lead to dehydration.

Patients should be encouraged to consume foods that are complete sources of protein including poultry, meat, fish, eggs, milk products, and soybeans.¹⁰ Protein supplements, if needed, should be derived from a complete protein and be high quality such as whey protein.

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How does hydration status affect pressure injuries?

Adequate hydration is required for the perfusion of oxygen and nutrients to wounded tissue for repair.^{10,11} Current guidelines recommend a minimum of 6 cups (1.5 L) per day, with adjustments to meet the patient's individual needs.^{6,11,14,16-18}

Should patients with pressure injuries take oral nutrition supplements?

Individuals with a poor appetite may have difficulty meeting nutritional goals and require calorie dense foods. High protein, high calorie oral nutrition supplements should be considered if the individual is unable to meet nutrient needs through food.⁵

Should patients with pressure injuries take vitamin/mineral supplements?

Vitamins and minerals play a role in several of the processes involved in wound healing, and deficiencies have been associated with poor wound healing.¹¹ Patients with pressure injuries should be encouraged to consume a well-balanced diet that meets the dietary reference intake (DRI) for vitamins and minerals.^{6,9,19} If overall intake is poor, it may be difficult to meet vitamin and mineral requirements through diet alone. In this case, a multivitamin supplement with minerals may be considered.^{11,13,20}

There is general consensus that known or suspected vitamin and mineral deficiencies should be corrected, especially for vitamin A, vitamin C, and zinc.^{6,9,11,14,17,19,20} When assessing for potential vitamin and mineral deficiencies, it is important to consider usual intake, current intake, biochemical data, and physical examination findings.⁶ Vitamin and mineral intake from all sources (including diet, fortified foods, vitamin and mineral supplements, oral nutrition supplements, nutrition support) should be evaluated. Total intake of micronutrients should not exceed tolerable upper intake levels (UL) in order to avoid risk of adverse effects. If vitamin and mineral repletion is required, the clinician should make a recommendation based on the individualized needs of the patient.

It should be noted that there are no clear evidence-based guidelines for the repletion of vitamin and mineral deficiencies in the context of impaired wound healing. There is considerable variance in recommendations for repletion, and often the suggested dose is above the established tolerable upper intake levels. Because of the potential for toxicity, vitamin and mineral supplementation for repletion requires careful consideration.

Are there supplements that have effects on pressure injury treatment outcomes?

Glutamine

Glutamine is a conditionally essential amino acid during periods of significant stress, as seen in the presence of a pressure injury.⁶ Glutamine plays a role in the immune response, is an important fuel source during the healing process, is a rate-limiting agent for protein synthesis, and acts as an anticatabolic agent.^{3,11}

There is insufficient evidence supporting the use of glutamine for wound healing in patients with pressure injuries.^{11,12,17,21}

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Considerations:

Excess glutamine provision can be harmful, as it may increase ammonia levels (especially in concomitant liver disease or kidney disease, and in the elderly).^{3,12} The *Canadian Clinical Practice Guidelines for Nutrition Support in Mechanically Ventilated, Critically Ill Adult Patients* indicates that glutamine supplementation (enteral, parenteral, or intravenous) is not recommended in critically ill patients with shock and multi-organ failure.²²

Arginine

Arginine is a conditionally essential amino acid during periods of significant stress, as seen in the presence of a pressure injury. Arginine stimulates insulin secretion, is involved in collagen deposition, and the formation of protein in cells.^{6,14}

Routine supplementation with arginine for wound healing is not recommended. However, there is some evidence supporting the use of nutrition supplements with arginine for patients with more severe pressure injuries (stages 3 or 4 and/or multiple pressure injuries) when nutrition needs cannot be met with diet and traditional high calorie, high protein supplements.^{6,9,14,19}

Considerations:

Arginine increases the production of nitric oxide, which may be detrimental to patients with critical illness and infection. Therefore, arginine supplementation is not recommended for patients with critical illness or sepsis.^{11,18,22} Arginine supplementation in dialysis patients can cause hyperkalemia at doses greater than 30 grams per day.²³ It is suggested that a safe dose of arginine for patients on dialysis is 20 grams per day from both diet and enhanced oral or enteral supplements (diet generally provides 5-6 grams per day).²³

Omega-3 EPA/DHA

It is hypothesized that omega-3 fatty acids may have a potential benefit in the wound healing process because of their anti-inflammatory effects and their role in supporting immune function; however, this has not been adequately studied.^{7,13}

There is insufficient evidence at this time to recommend the use of omega-3 supplements for wound healing.^{11,13}

Where can I get more information about diet for pressure injuries?

MyHealth.Alberta.ca – <https://myhealth.alberta.ca/health/pages/conditions.aspx?Hwid=abp5591>

Eating Well for Wound Healing: <https://www.albertahealthservices.ca/assets/info/nutrition/if-nfs-eating-well-for-wound-healing.pdf>

Refer to approved provincial Alberta Health Services nutrition education handouts to support patient education. For more information contact NutritionResources@albertahealthservices.ca

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