



# Nutrition and Wound-care Management/Prevention

BY Theresa A. Hurd

*"[Nursing] ought to signify the proper use of fresh air, light, warmth, cleanliness, quiet and the proper selection and administration of diet—all at the least expense of vital power to the patient." Florence Nightingale, 1859*

**T**oday's clinical setting involves a critical dependence on technology and the rapid advancement of health-care practice. Existing medical techniques are readily disposed of and replaced with more technological approaches in every area of medicine. Wound care is no exception. However, nutrition, a fundamental and by comparison almost rudimentary approach to medicine, continues to be essential in dealing with wound-care management.

Florence Nightingale defined the nursing role as "preparing the patient for the most favourable condition for healing." Nurses today remain in this crucial preparatory role in the healing process. Nutritional supplementation and additions to your patient's diet are crucial in preventing unnecessary wound complications and promoting or accelerating wound healing.

Malnutrition is a common occurrence in the chronically ill, hospitalized and aging populations, and one that is relatively easy to both diagnose and manage. Reports have stated that more than 85 per cent of long-term-care patients and 40 to 50 per cent of hospitalized patients are currently malnourished.<sup>1</sup> Although illness or injuries are major contributing factors to the development of malnutrition, other possible contribut-

ing factors must also be identified and integrated into the patient's holistic assessment.

Patients with wounds are often hospitalized, elderly and/or chronically ill. Health-care teams responsible for wound management are required to recognize malnutrition in these patients and be able to monitor and manage any malnutrition.

## Early Interventions

Oral supplements should be considered as an early intervention. There is a great benefit in encouraging and achieving oral feeding whenever possible. Eating and the ability to take food orally has been proven to provide comfort, pleasure and a sense of autonomy and dignity in the individual.

Malnutrition is defined as a deficiency of essential nutrients or the improper absorption and distribution of essential nutrients. The most serious type of malnutrition is protein-energy malnutrition (PEM). PEM is defined as the inadequacy or impaired absorption of both protein and energy. This condition will worsen when combined with malabsorption of fat, impaired carbohydrate utilization or increased stress and illness. PEM may develop quickly over a few months or gradually over a few years. Protein deficiency is extremely detrimental as each molecule of protein is indispensable and essential in all cell production and in maintaining homeostasis. PEM causes the body proteins to break down for gluconeogenesis, reducing the supply of amino acids needed for maintenance of body proteins and healing.<sup>1,2,3,4</sup>

There is a direct correlation between wounds that are non-healing and the indication of PEM. Wound pre-

## Nutritional Management Objectives

The nutritional management of the patient with a wound must

- provide adequate calories
- prevent protein-calorie malnutrition
- promote wound healing.

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More detailed information on the factors to consider when your patient is not eating is available on the CAWC Web site at [www.cawc.net](http://www.cawc.net).



vention and healing depend on the reversal of PEM along with good wound management.<sup>2,5</sup> Wound healing (the replacing of injured tissue and new tissue production) demands an increase in energy consumption. Wound healing also requires additional consumption of particular nutrients, specifically protein and calories. Wound healing is unachievable without having these nutritional needs met and is highly dependent on angiogenesis, which will, in turn, be suppressed if these needs are not met. In addition, the restoration of perfusion will be negatively affected. The fibroblast, the most important cell in the proliferative stage of wound healing, exudes products composed of only protein or peptides (collagen matrix, proteoglycans and glycosaminoglycans, cytokines and growth stimulants), which are essential to wound healing.<sup>6,7</sup>

The exudation of these vital nutrients in wound healing invariably causes a hypermetabolic/catabolic state that further increases nutritional demands. It is often the

wound itself that instigates serious, detrimental malnutrition in patients. The breakdown of protein from muscle is required for all essential wound-healing functions as well as an intact immune system. An infected pressure ulcer also increases tissue damage, causing further strain, a deeper ulcer and an increase in nutritional demands. Studies have shown that increasing protein in the diet of patients with chronic ulcers has generated faster healing times when compared with low protein diets.<sup>2,3,8</sup>

The early intervention and careful monitoring of your

### Watch for Patients who Need Nutritional Assessment

Indicators of the need for nutritional assessment include

- weight loss >5% or more
- meals eaten less than 50%/two meals a day/refusal to eat a meal/refusal to eat for more than three days
- poor appetite, consuming 1/2 or less at two or more meals/day for three days
- nausea or vomiting for more than three days
- loss of skin integrity
- laboratory values with nutritional implications outside of normal range (albumin, prealbumin, transferrin, hemoglobin, WBC and electrolytes)
- poor fluid intake of less than 1,500 ml fluid/24 hours over past seven days
- chronic infections (respiratory, urinary tract, etc.)

TABLE 1

## Principles of Nutrition and Wound Care

Principle	Sources	Increase	Supplement
<b>Calories</b> Kcals are important to sustain proper nutrition. Caloric needs increase with stress or injury	<ul style="list-style-type: none"> <li>• All food and beverages contain a varying number of Kcals, with the exception of water, coffee, tea and diet beverages with no nutritional value</li> </ul>	<ul style="list-style-type: none"> <li>• Portion size if appetite is good</li> <li>• Butter, gravy, cream and any other foods rich in calories as tolerated, as fats are essential for cell membrane and are calorically dense</li> </ul>	<ul style="list-style-type: none"> <li>• Nutritional shakes, smoothies, powder, oral supplements</li> </ul>
<b>Protein</b> Important to sustain proper nutrition; muscle mass, immune response and skin integrity	<ul style="list-style-type: none"> <li>• Meat, fish, poultry, eggs, dairy products, legumes, seeds, nuts, grains</li> </ul>	<ul style="list-style-type: none"> <li>• Encourage full portions of protein at every meal.</li> <li>• Double protein portions.</li> <li>• Offer high-protein snacks.</li> <li>• Offer high-quality meats rather than processed meats.</li> </ul>	<ul style="list-style-type: none"> <li>• Nutritional supplements, including shakes, smoothies, powders (such as milk powder, soy powder), oral supplementation and protein-dense supplements</li> </ul>
<b>Hydration</b>	<ul style="list-style-type: none"> <li>• Water, juice, milk, Jell-O, sherbet, ice-cream, yogourt, pudding, soup, popsicles, any other liquid except caffeinated beverages</li> </ul>	<ul style="list-style-type: none"> <li>• Use 250 ml glasses instead of 125 ml glasses at each meal.</li> <li>• Offer non-caffeinated beverage before caffeinated beverages.</li> </ul>	<ul style="list-style-type: none"> <li>• If unable to take fluids orally, consider IV fluids.</li> </ul>

Source: Breslow et al<sup>11</sup>

## The E's of Nutrition

Often, initial and repetitive encouragement at mealtime is needed to increase nutrition in the elderly. Some tips to increase nutrition are as follows:

- **E**ncourage full portion consumption of all protein foods.
- **E**ncourage food likes, and eliminate food dislikes.
- **E**ncourage a sitting or upright position for eating.
- **E**ncourage time for chewing, self-feeding (e.g., finger foods) and meal completion.
- **E**ncourage optimization of the environment.
- **E**ncourage frequent drinking of fluids.
- **E**nsure resident has dentures and/or mouth care as required for meals.

patient that preventative measures and wound management be implemented to ensure good health and quality of life. For various reasons, nutritional interventions are often difficult for this population, particularly in long-term-care facilities, where care of the very frail elderly often takes place. Large volumes of supplements are often difficult for the frail elderly, and administration is time-consuming for staff. These complications illustrate the importance of careful product-supplementation selection.

A holistic assessment and collaboration with the dietitian and multidisciplinary team to identify possible etiology and dietary requirements

patient is crucial in the acceleration of tissue repair.

The frail and aging population, in particular, is highly susceptible to both PEM and wounds of every degree and nature.<sup>9</sup> The importance of concentrated care of these wounds must not be diminished. It is vital to the

is a key component in providing nutritional care to the geriatric patient with a wound. Functional changes specific to the geriatric patient and certain disease processes, such as Parkinson's, require a multidisciplinary approach. The speech-language pathologist is an

TABLE 2

### Guidelines for Nutrition

Skin Integrity	Protein	Fluids	Calories
Intact Skin Preventative Wound Care	• 0.8–1.0 gm pro/kg	• 30 cc/kg per day of fluid	• 30 Kcal/kg per day
Partial Thickness Stage I and II Pressure Ulcers Skin Tears and Arterial Ulcers (one to two wounds)	• 1.2–1.5 gm pro/kg	• 35 ml/fluid/kg	• 35 Kcal/kg per day • Multivitamin + minerals
Full Thickness Stage III and IV Ulcers	• 1.5–2.0 gm pro/kg	• 35–40 ml/kg fluid per day	• 40 Kcal per day • Multivitamin + minerals
Severe Wounds IV Pressure Ulcers/Burns	• Up to 3.0* gm/pro/kg	• 40 ml/kg per day	• 40+ Kcal/kg per day • Multivitamin + minerals
Multiple/Non-Healing Hypoalbuminemia (27 g/L or less) Pre Albumin (0.10 g/L or less) Venous Ulcers and Multiple or Non-healing Stage II Ulcers	• 2.0–3.0* gm Pro/kg	• 40+ Kcal/kg per day	• 35–40 Kcals/kg • Multivitamin + minerals

Sources: Demling and Leslie<sup>2</sup>, Torun and Chev<sup>4</sup>, Zagoren<sup>5</sup>, Breslow, et al.<sup>11</sup>

\* While literature has shown improvement in healing with increased protein intake, it is wise to recommend that caution be taken when increasing intake to high levels of protein in the elderly. The elderly have a decreased ability to process high levels of protein in the absence of hydration. It is therefore imperative that each patient be assessed on an individual basis by the dietitian and the multi-disciplinary team to determine the amount of protein/hydration required.

essential team member and is required for proper feeding and swallowing assessment.

High-protein formulas are often intolerable because of the volume required to meet the needs of the geriatric patient with a wound, although many of the latest protein-dense formulas meet their requirements in smaller volumes. Studies show that when a geriatric patient loses weight, his or her ability to regain that weight is extremely difficult.<sup>2,10</sup> It is therefore vital that weight be monitored carefully with the geriatric patient and early intervention be implemented to avoid weight loss.

## Teamwork

*“The key elements in the art of working together are how to deal with change, how to deal with conflict and how to reach our potential ... the needs of the team are best met when we meet the needs of individuals persons.” — Max DePree*

It is vital to have effective communication with your co-workers, the dietitian and, most importantly, with the patients themselves or the patients’ families. All must work together as a wound-management and care team to deliver the best care possible. The nutritional plan, and ensuring that supplementation is implemented, involves participation by all team members.

## Albumin Levels

Albumin is the major circulating protein as well as the major contributor to oncotic pressure for both cellular and intravascular compartments.<sup>5</sup> Decreased levels of circulating albumin are indicative of PEM and will affect the healing process. The protein levels of patients are

most easily attained using an evaluation of albumin. While albumin levels have a half-life of 12–21 days and are not an entirely reliable indicator for early nutritional deficits, they should be monitored as part of the nutritional assessment.

Guidelines for concentrations of the three nutritional essentials—protein, hydration and calories—should be integrated into policy and procedures along with the three principles of wound-care management: treat the patient, treat the cause and treat the wound.

Ensuring proper nutrition remains a fundamental medical practice that is essential to all aspects of health, including the prevention and care of wounds. The role of nutrition in preventing unnecessary wound complications and promoting or accelerating wound healing is well established. Nursing practice must include careful and ongoing monitoring of nutritional health as well as interventions to ensure nutrition is maintained, particularly in patients who are elderly and/or chronically ill. ☺

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TABLE 3

## Vitamins and Minerals Important to Assist in Wound Healing

Zinc	Vitamin C	Protein	Vitamin A
Meat	Citrus fruits	Beef, pork, chicken,	Milk
Fish	Strawberries	Turkey, fish, lamb	Eggs
Seafood	Tomatoes	Eggs	Cheese
Liver	Potatoes	Liver	Fish
Eggs	Broccoli	Milk	Dark green
Beans	Cantaloupe	Cheese	vegetables
Whole-wheat products	Sweet peppers	Yogourt and milk products	Oranges
		Soy beans	Red fruits and vegetables

Source: Sizer and Whitney<sup>13</sup>