

The Power of Protein in Wound Healing

By Ellen Mackay, MSc RD CDE



Good nutrition provides the raw ingredients to help wounds heal and preserve skin integrity. Every step in the wound healing cascade requires good nutrition, especially protein. Many of our patients come to us malnourished due to illness, pain, poor appetites or inadequate intake over the years. Timely and adequate nutrition support not only helps in wound care but also improves overall nutrition status and may help lower health-care costs.¹

The Role of Protein

Protein is a macronutrient with many key roles in wound healing. It is vital in the synthesis of enzymes and the creation of collagen, connective tissue,

capillaries and epithelial cells. Amino acids provide the building blocks of antibodies, macrophages and a healthy immune system. A lack of protein may prolong the inflammatory stage of wound healing, impair adequate collagen synthesis leading to reduced tensile strength of a closed wound and increase the risk of a wound becoming chronic.²

How much is enough?

Protein requirements depend on several factors. Current nutrition status, size and number of wounds, other concurrent health conditions such as renal disease and cardiac status should be taken into account in assessing an individual's protein requirement. Unfortunately, assessing protein status can be a chal-

lenge, as there are few valid hematological markers that accurately define malnutrition. (See Wounds Canada's Best Practices Recommendations for The Prevention and Management of Pressure Injuries, 2018, for a list of screening tests that may help identify nutritional barriers to wound healing.³)

The average healthy Canadian needs approximately 0.8 grams of protein per kilogram of body weight.⁴ This translates into about 64 grams of protein for an 80-kilogram man or about 55 grams for a 68-kilogram woman. When wounds are present, protein requirements are significantly greater. The most well-reviewed guidelines for protein requirements in wound care come from the nutrition



support of those with pressure injuries. A white paper published by the National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance suggests patients at risk of a pressure injury or with existing pressure injuries need 1.2 to 1.5 grams of protein per kilogram body weight daily.⁵ This translates to 96 to 120 grams for an 80-kilogram man or 82 to 102 grams for a 68-kilogram woman. Some patients may need up to 2 grams per kilogram body weight, especially those with heavily exudating wounds. Other advisory panels suggest similar requirements.⁶ Eating enough protein may make the difference between a wound stalling or making efficient progress through the

wound-healing cascade.

Larger protein intakes may be contraindicated in individuals with impaired renal function. In addition, as protein intake increases, fluid requirements increase; be sure to provide additional fluids to those with higher needs. (See [Healing with Hydration](#) for suggestions to help keep your patients well hydrated.⁷) Consult a registered dietitian to provide a comprehensive nutrition assessment and help patients meet their protein and nutrition needs.

What About Arginine?

Recently there has been growing interest in the role of two specific amino acids, arginine and glutamine, in accelerating wound repair.⁹ Our bodies naturally produce arginine and

glutamine, but in times of stress, such as with a wound or sepsis, the body's demand for these amino acids outweighs supply, and these amino acids become conditionally essential and must be provided through the diet.

Arginine is receiving much attention as it plays an important role in wound repair, stimulating insulin secretion, promoting the transport of amino acids into tissue cells and supporting the synthesis of protein and collagen in the cells. Perhaps more important, arginine is a precursor to nitric oxide, a powerful neurotransmitter that helps blood vessels relax and dilate, improving blood flow to the wound bed. For these reasons, research is underway to determine if supplementation with arginine may indeed enhance

wound repair, or if increasing overall protein intake is sufficient to heal wounds.¹⁰

The Importance of Calories

Wound healing is an anabolic event. Calories from carbohydrates and fat are needed to “spare” the protein, to allow the protein to do its job in wound healing and preserving skin integrity. Without adequate calories, protein is broken down and used for energy. It has been suggested that patients would benefit from 30 to 35 kcal/kg body weight daily for adults with a wound or at risk for developing a wound, such as pressure injuries.⁶ To increase calorie intake, offer nutrient-dense foods, fortified



foods and/or high-calorie supplements with or between meals. It can be helpful to liberalize a patient’s diet restrictions to help improve overall calorie intake. Enlist a dietitian to assist with maximizing your patient’s intake.

Protein-Rich Foods

Foods rich in protein include animal proteins such as meat, poultry, eggs, fish and seafood. Other

good sources include milk products such as milk, kefir, cheese and yogurt. Animal proteins provide all the essential amino acids. Plant proteins such as legumes (beans, peas and lentils), tofu, nuts and seeds are also good sources of protein and provide valuable fibre. Our vegetarian or vegan patients can meet their protein requirements with plant

sources and by paying attention to variety in their intake. See Table 1 for the protein content of common foods. Encouraging patients to eat protein-rich foods at each meal and snack will assist them in meeting their higher dietary protein targets and result in healthy wound healing. See the sidebar below for ideas to increase protein intake.

Maximizing Protein Intake⁸


Milk Products	<ul style="list-style-type: none"> • Cook hot cereals in cow’s or soy milk. • Top fruit or cereals with Greek-style yogurt. • Grate cheese onto vegetables; add cheese to sandwiches; eat cheese with crackers at snacks. • Add skim milk powder to fluid milks. • Top fruit salad with cottage cheese. • Choose milk-based soups instead of broths. • Drink milk or soy milk at meals instead of water.
Meat and Alternatives	<ul style="list-style-type: none"> • Add tuna to salads or eat with crackers. • Mix ground meat into soups, stews or casseroles. • Eat hard-boiled eggs for snacks or in salads. • Top salads with chickpeas and black beans; mix legumes into soups; include tofu in stir fries. • Include hummus in sandwiches or as a dip. • Top toast with scrambled eggs; make French toast instead of plain bread. • Enjoy a bowl of baked beans as a snack. • Add seeds and nuts to baked goods, hot cereal, yogurt or rice dishes.

Getting patients to meet their protein needs through food may be a challenge. Occasionally those with wounds may experience poor appetite due to pain, depression or illness. Including protein through supplemental protein powders (e.g., whey, soy, hemp, rice or pea protein) and oral liquid nutrition supplements may help bridge the gap until patients are well enough to consume appropriate amounts.

For more information on protein-rich foods explore the Dietitians of Canada's website [Unlock Food](#) to learn more.

Conclusion

Good nutrition has the potential to support effective wound closure, create stronger skin integrity and reduce patient burden and health-care costs.

Clinicians should pay attention to a patient's nutrition needs and make nutrition support a priority to encourage wound healing. 

References

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Table 1: Protein Content of Common Foods¹¹

Food	Serving	Protein (g) (approximate)
Meat, fish, poultry	75 g (2.5 oz) or 125 mL (1/2 cup)	21
Cottage cheese	125 mL (1/2 cup)	13
Yogurt, Greek style	175 mL (3/4 cup)	14
Eggs	2 large	12
Tofu	150 g or 175 mL (3/4 cup)	12
Cheese	50 g (1.5 oz)	12
Dried beans, peas and lentils, cooked	175 mL (3/4 cup)	12
Cow's milk	250 mL (1 cup)	9
Yogurt	175 mL (3/4 cup)	7
Fortified soy beverage	250 mL (1 cup)	7–8
Peanut butter or other nut/seed spreads	30 mL (2 tbsp)	4
Nuts or seeds	60 mL (1/4 cup)	3–8