

Guidance on optimising nutrition for chronic wound healing

Good nutrition facilitates the wound healing process while malnutrition will delay, inhibit and complicate it. Many nutrients have a role to play in wound healing, working in isolation or in combination with others.

Fluids

Dehydrated skin is less elastic, more fragile and more susceptible to breakdown. Dehydration will also reduce efficiency of blood circulation, which will impair the supply of oxygen and nutrients to the wound. One of the main risk factors for dehydration is poor oral intake.

In long-term care, dehydration is one of the most common problems affecting good nutrition.

Proteins

Protein deficiency results in impairment of the proliferative and remodelling stage of wound healing. It has also been reported that protein deficiency can cause impaired collagen synthesis, reduced wound strength and an increase in risk of infection due to a compromised immune system.

Protein loss via wound exudates needs to be monitored.

Energy

The main sources of energy for the human body – and for wound healing – are carbohydrates and fats. The main demand for energy from a wound is for collagen synthesis. Caloric needs for healing increase with increasing size and complexity of the wound.

Carbohydrate availability is essential to prevent proteins from being converted into energy. In people with diabetes, monitoring (e.g. blood glucose levels, glycated haemoglobin) will be required.

Fats have a key role in the structure and function of cell membranes and are directly involved in cholesterol metabolism, the formation of inflammatory mediators, and clotting components. Adequate fats are also needed to prevent the body using protein for energy.

Vitamins

Many vitamins are involved in wound healing, the main one being vitamin C. Deficiency of vitamin A and Vitamin B complex will also have adverse effects on wound healing.

Vitamin C plays an important role in collagen synthesis and subsequent crosslinking, as well as the formation of new blood vessels. Adequate vitamin C levels help strengthen the healing wound. It also has important antioxidant properties that help the immune system, and it increases the absorption of iron.

Vitamin A increases the inflammatory response in wounds, stimulating collagen synthesis. Low vitamin A levels can result in delayed wound healing and susceptibility to infection. Supplementation with vitamin A requires caution, as there is a risk of toxicity.

It is possible that vitamin E can reduce injury to the wound by controlling excessive free radicals. Contrary to popular opinion, there is limited evidence for the benefits of vitamin E in decreasing scar formation. There is also some evidence that suggests oral supplementation of vitamin E over 400mg/day has an increased health risk.

Vitamin B complex is essential for carbohydrate metabolism and therefore energy production.

Minerals

Zinc, Copper and Iron are the main minerals in wound healing.

Zinc plays a key role in protein and collagen synthesis, and in tissue growth and healing. Zinc deficiency has been associated with delayed wound healing, reduced skin cell production and reduced wound strength. Zinc supplementation in people who are not zinc deficient generally has no benefit.

Insufficient dietary intake of zinc can be further exacerbated by zinc loss from excess wound drainage.

Assessing zinc deficiency can be difficult as serum/plasma levels may not be a true indication of zinc levels at the wound itself.

Iron is part of the system that provides oxygen to the site of the wound, therefore iron (haemoglobin) deficiency can impair healing. Iron deficiency can also result in impaired collagen production and strength of the wound. Iron absorption from non-meat sources can be enhanced with vitamin C consumed at the same meal.

Zinc and iron compete for absorption, therefore if someone is receiving supplements of both, they should be given with meals but not at the same time.

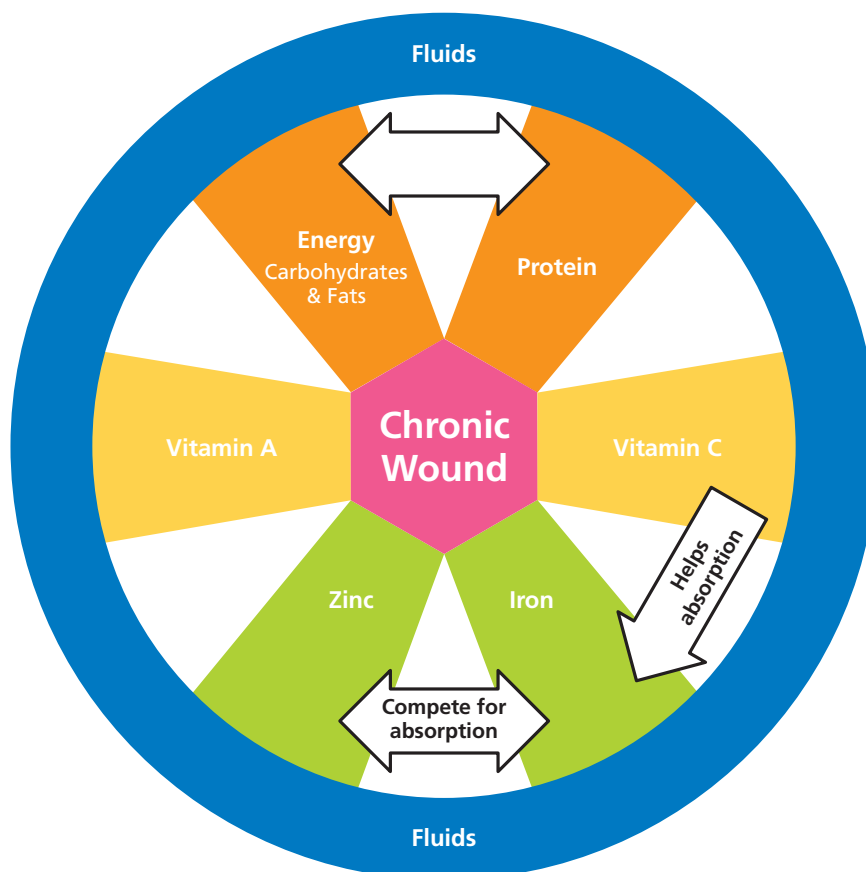
Other supplements of vitamins and minerals, however, should be avoided as this can be detrimental to the patient, affecting absorption and metabolic interactions and, ultimately, impair nutritional status.

Diabetes

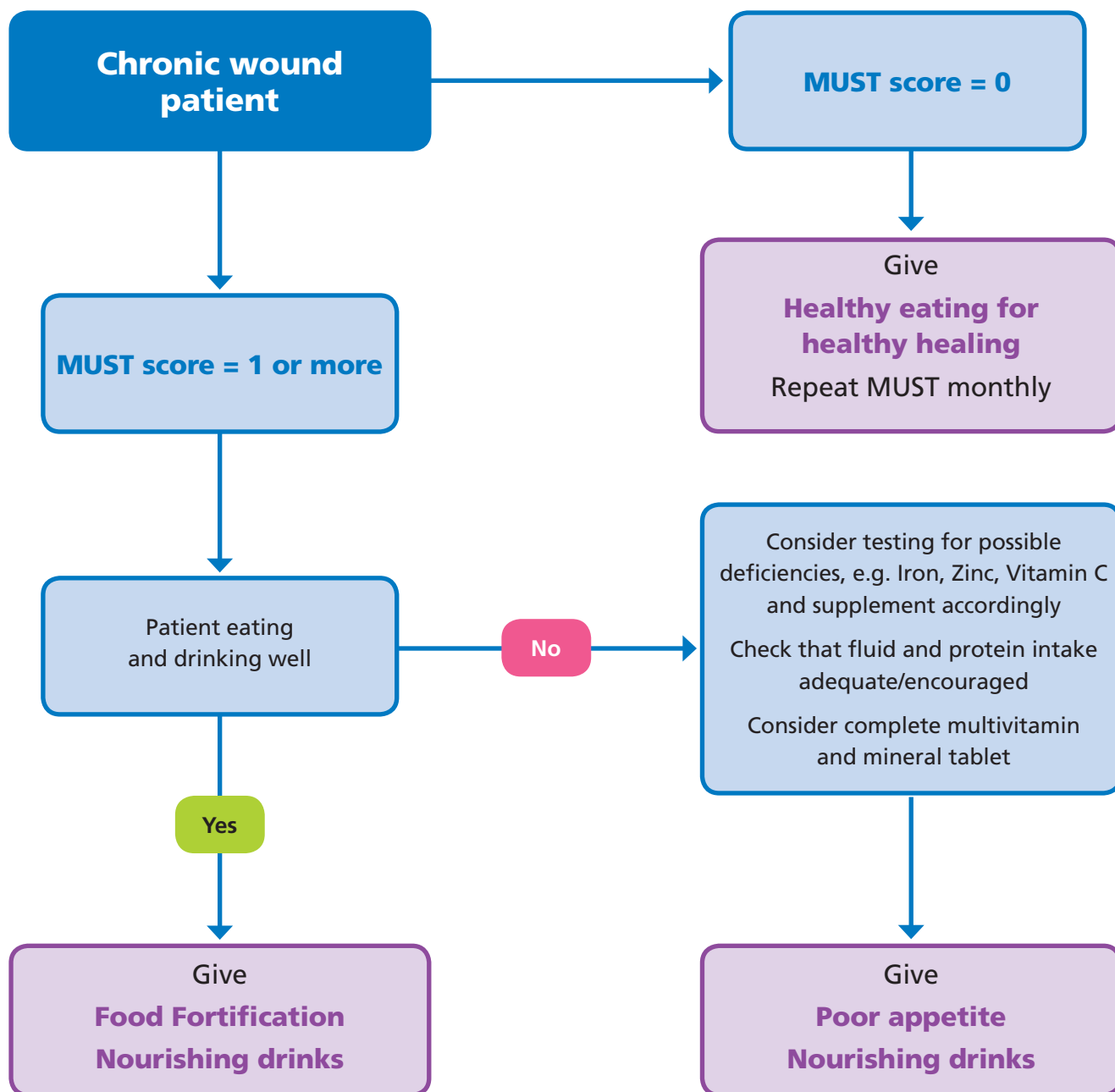
People with diabetes need adequate energy for wound healing, but tight glycaemic control is also important. For this reason regular blood glucose monitoring is needed, whether diet alone/oral hypoglycaemic agents or insulin is the current therapy. These may need adjusting while the wound is healing.

Obesity

It is not appropriate for people with wounds to follow diets that limit intake, such as diets to reduce cholesterol or weight and diets that avoid entire food groups such as carbohydrates. People with vegetarian or vegan diets, food allergies, or on dialysis need careful consideration and in these situations it is recommended that you seek the help of a dietitian.



Pathway for nutrition support information in the chronic wound patient



MUST: Malnutrition Universal Screening Tool.
Freely available at www.bapen.org.uk/musttoolkit.html

Example of wound management guidelines

Role of Nutrition in Wound Healing

Characteristic	Rationale
Ensure optimum nutrition (EPUAP Guidelines)	Aids wound healing, maintains immune function and decreases the risk of infection. Malnutrition and clinically proven deficiencies are associated with delayed wound healing and increased complications
Ensure varied and balanced nutritional intake	Provide all the essential nutrients needed for wound healing
Specific nutrients associated with wound healing include	Adequate calories; protein; vitamins: A, B, C, D, E; minerals: Iron, Zinc, Selenium

Nutrition Screening	
All patients at risk of pressure ulcers or with chronic wounds should be screened	To detect those at nutritional risk
Use Validated Screening Tool	For example: <ul style="list-style-type: none"> • MUST (BAPEN 2003) • Locally agreed screening tool e.g. Adapted Waterlow OR Braiden score • NHSSB Nutrition Risk Scoring Tool (Nursing & Residential Homes)
Consider Intrinsic factors	Check Haemoglobin (Hb) levels, check serum Albumin, ensure good glycaemic control (patients with Diabetes). Possible referral to diabetic nurse specialist.
Consider Extrinsic factors	Assess nutritional status

Nutrition Status	
Consider nutritional status in ALL patients at risk of pressure ulcers or with chronic wounds	
Assess nutritional status (EPUAP) Guidelines	Check Haemoglobin (Hb) and Albumin levels Ensure adequate calorie intake Ensure adequate protein intake i.e. 2 portions protein foods/ day Adequate minimum fluid, i.e. 8-10 cups/day (1.5litres) Daily dietary Vitamin C (Ascorbic acid)
Use of vitamin and mineral supplements (Food Standards Agency: Safe upper levels for vitamins and minerals, 2003)	Avoid vitamin and mineral supplements unless serum levels checked and/or recommended by GP/Dietitian Avoid supplements in excess of 1000mg/day Vitamin C (Ascorbic acid) and 50mg/day Zinc
High risk patients	<ul style="list-style-type: none"> • Weight loss, Protein Energy Malnutrition (PEM), poor oral intake • Post surgery, malabsorption (IBD) • High exudates wounds • Diabetic patients, IGT, IFG • Chronic leg ulcers, prolonged healing wounds • Home enteral feeding
Screen for undiagnosed Diabetes	In all patients with: <ul style="list-style-type: none"> • Venous and arterial leg ulcers • Chronic wounds and leg ulcers slow to heal Ensure referral to Dietitian on diagnosis of Diabetes
Referral to dietitian	For individual nutritional assessment refer to Dietitian via GP / Consultant