

# PATIENT GUIDE



## Support wound healing from the inside out

A helpful guide for patients about  
wound healing and nutrition

# Wound healing and nutrition

## A helpful guide for patients

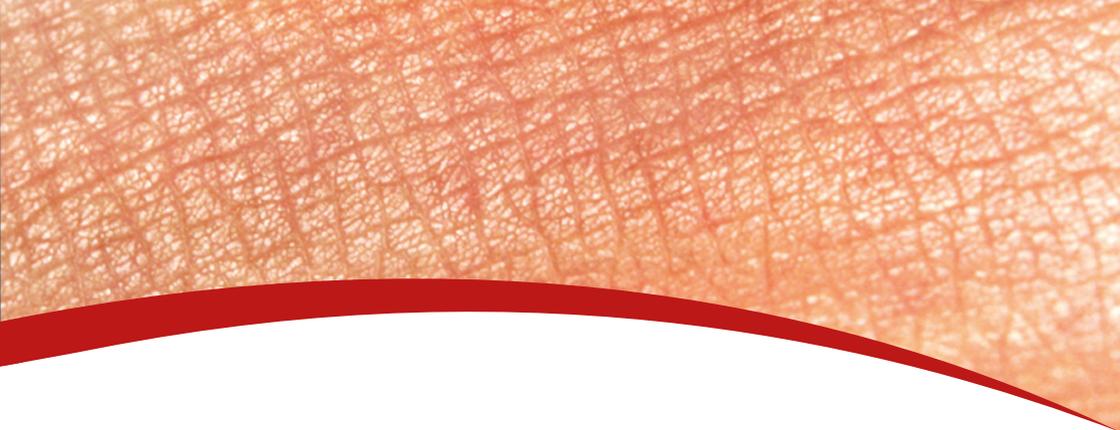
This booklet provides you with information on essential nutrients and foods that will assist with wound healing, as well as practical tips to improve your nutritional intake.

## What is a wound?

A wound is a type of injury where the skin is torn, cut or punctured. Wounds can become chronic and difficult to heal, and can occur as a result of surgery, illness, or sustained pressure on a bony area, known as pressure ulcers.

## What does skin do?

Skin is the body's largest organ, and is complex and "multi-tasking": it contains hair follicles, sweat glands, blood vessels and sensory (feeling) cells, and nerve fibres that can send messages to the brain. Skin can repair itself, and renews itself constantly. Skin also helps to control body temperature and hydration (the water content of the body). One of its major tasks is to maintain a physical barrier against the outside environment, acting like a wall that blocks the entry of harmful substances. Operating in reverse, it prevents too much fluid being lost from the body.



## Maintaining healthy skin

This involves cleansing the skin when necessary with product that will not strip the skin of its natural oils, but also having a healthy food intake of essential nutrients to help growth and repair.

## Wound healing and nutrition

There is a large body of scientific evidence demonstrating the essential role of nutrition in wound healing. Without adequate nutrition, healing of wounds may be delayed or they may not heal at all. Wound healing is a complex process but in simple terms, it is the process of replacing injured tissue with new tissue produced by the body.

The larger the wound, or the longer a wound exists, the greater the demand for more specific nutrients. When skin is damaged it requires not only the nutrients for normal functioning, but extra to aid faster and healthier healing.

It is important to be in the best health possible when you have a wound, so resting, gentle exercise, low stress, and quality food and fluids will help to optimise wound healing.



# Optimal nutrition for wound healing

Optimising your nutritional intake is important to ensure you are providing your body with what it needs to give wounds the best chance to heal.<sup>1</sup> If any of the following points apply to you, then it may not be possible to achieve adequate levels of essential nutrients through normal consumption of food and liquids:

- **You are losing weight**

- **You have poor appetite**

- **You feel weak and tired**

- **Your skin wounds easily**

- **You have wounds that are not healing**

- **You are entering into a residential aged care facility with a wound present**

- **You have frequent admissions or re-admissions to hospital for more than one week**

In these cases, nutritional supplementation may be beneficial, and have been shown to promote wound healing.<sup>1,2</sup> Keep an eye on your weight and consult your healthcare professional or dietitian if you have unintentional weight loss.

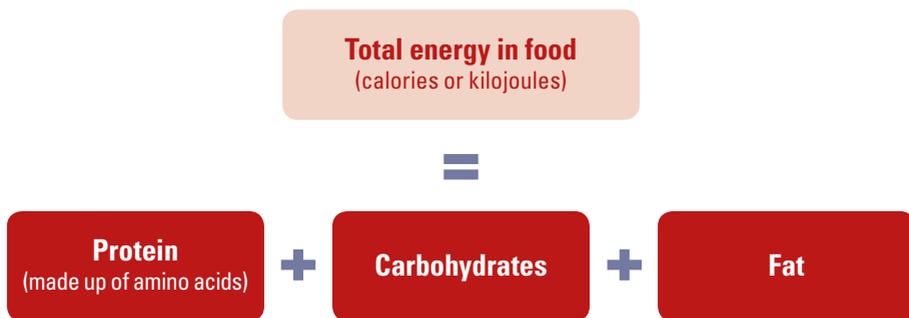


# Important nutrients for wound healing

Eating a well-balanced diet with a variety of nutrients is important for optimal health, however during times of wound healing, there are some specific nutrients that play key roles in this process. The role of each of these nutrients is explained below.

## Energy

We eat food to fuel our bodies for energy, growth and repair. Carbohydrates, protein and fat from the food we eat all provide energy, which is measured in kilojoules or calories. During wound healing, extra carbohydrates and fats are needed to provide energy to build new cells, and fat stores are also required for cushioning.<sup>3</sup> Protein also provides energy, however the main function of protein is to provide the building blocks for new cells. Energy requirements vary according to gender, age, activity levels and health or medical issues that may exist.



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## Protein

Protein is essential for tissue building and repair, therefore it is a vital ingredient in wound healing. Protein is required for the synthesis of new tissue;<sup>4</sup> therefore insufficient protein in the diet will slow down the healing process. Also, the body will have to break down muscle to use as a protein source, which can lead to malnutrition. Ensuring you are eating enough protein in your diet will help to achieve optimal wound healing rates.<sup>1,3,5</sup> A general recommendation for protein intake for people with slow to heal or chronic wounds is approximately 1.5g/kg/day<sup>2,3</sup> but it's best to be guided by your dietitian or healthcare professional.

### Arginine

Arginine is 1 of 20 amino acids, which are the building blocks of protein. Although all amino acids are important for healing and repair, arginine is essential in wound healing as it is needed for collagen synthesis, which helps to increase the strength of the wound;<sup>6-9</sup> it increases blood flow, allowing essential nutrients to be delivered;<sup>1,6,7</sup> as well as enhancing the immune system,<sup>7</sup> which can help to fight infection. Arginine is a conditionally essential amino acid, which means that the body can usually produce arginine as required, however when a wound is present, the body requires extra from the diet. It can often be difficult to consume enough from the diet, therefore supplements can be beneficial to help meet requirements. Arginine containing nutritional supplements have been shown to improve the rate of healing in patients with pressure ulcers.<sup>8,10,11</sup>

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## Carbohydrate

Carbohydrate is the body's preferred fuel source. When wounds exist, additional carbohydrate is required for optimal healing, as adequate calories are needed to provide energy to the wound, and to prevent the breakdown of muscle to be used as an energy source.<sup>4</sup> If you have diabetes, you may need to monitor your carbohydrate intake and blood glucose levels. If you are concerned about your carbohydrate intake or blood glucose levels, please speak to your healthcare professional.

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## Fat

Fat provides a concentrated source of calories which provides energy for wound healing. Adequate fats (as well as carbohydrates) are needed to prevent the body from using protein as an energy source.<sup>3</sup> This will allow protein to act as the building blocks in the repair of the wound. Fats are also a major contributor to the building of cell walls;<sup>4</sup> therefore are an important part of wound repair.

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## Vitamin C

Vitamin C plays an important role in collagen synthesis which helps strengthen the healing wound,<sup>1,3,9,12</sup> as well as the formation of new blood vessels.<sup>4</sup> Vitamin C deficiency can impair wound healing, and has also been associated with an increased risk of wound infection.<sup>1</sup> Research has shown Vitamin C supplementation helps promote pressure ulcer healing.<sup>9</sup>

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## Vitamin A

Vitamin A helps to stimulate collagen synthesis, which will strengthen the wound during healing. It is also an antioxidant, which helps improve immunity.<sup>4</sup> Low Vitamin A levels can result in delayed wound healing and a greater risk of infection.<sup>1,9</sup>

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## Vitamin E

Vitamin E is an antioxidant, therefore it can help protect the wound from free radical damage and enhance the wound healing process.<sup>1,3</sup>

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## Zinc

Zinc is a trace element and is required by almost every cell in the body to function properly. Zinc plays a key role in wound healing, by helping with collagen synthesis, which gives the wound strength.<sup>1,9</sup> Zinc deficiency has been associated with delayed wound healing and reduced wound strength.<sup>3</sup>

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## Iron

Iron helps to deliver oxygen to the site of the wound, which is imperative for wound healing to occur. Iron deficiency can impair collagen production and strength of the wound,<sup>1,3,13</sup> therefore delaying wound healing.

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## Fluids for hydration

Making sure you drink enough fluids (particularly water) is important in wound healing as dehydrated skin is less elastic, more fragile and more susceptible to breakdown. Dehydration will also reduce the efficiency of blood circulation, which will impair the supply of oxygen and nutrients to the wound.<sup>3</sup> As a general guideline, it is recommended to have a minimum of 1500mL or 6-8 cups of fluid/day.<sup>3</sup>

# Nutrients and intake

It can often be difficult to know which foods to choose to ensure that you receive all of the nutrients you need. The table below contains some examples of food and fluid combinations that will provide you with the recommended intake of nutrients for wound healing (based on a 65kg adult male).<sup>16</sup>

Nutrient	Recommended intake	Examples of food & fluid combinations
<b>Protein</b> (including Arginine*)	97.5g/day <sup>14</sup> (1.5g of protein per kg of body weight)	<ul style="list-style-type: none"><li>• Bowl of cereal with milk</li><li>• Tub of yoghurt</li><li>• Slice of grainy toast with baked beans</li><li>• 1 egg</li><li>• 1 slice of cheese</li><li>• Chicken fillet (small breast)</li></ul>
<b>Vitamin C</b>	45mg/day <sup>15</sup>	<ul style="list-style-type: none"><li>• 1 small glass of orange juice OR 2 tomatoes</li></ul>
<b>Vitamin A</b>	900mcg/day <sup>15</sup>	<ul style="list-style-type: none"><li>• 1 carrot</li><li>• 1 slice of cheese</li><li>• 1 egg</li></ul>
<b>Vitamin E</b>	10mg /day <sup>15</sup>	<ul style="list-style-type: none"><li>• 10 almonds</li><li>• 1 tablespoon olive oil</li><li>• 1 medium salmon fillet</li></ul>
<b>Zinc</b>	14mg/day <sup>15</sup>	<ul style="list-style-type: none"><li>• 2 wheat cereal biscuits with milk</li><li>• Chicken and cheese grainy sandwich</li><li>• 10 cashew nuts</li><li>• Steak (moderate size)</li></ul>
<b>Iron</b>	8mg/day <sup>15</sup>	<ul style="list-style-type: none"><li>• Steak (moderate size)</li><li>• ½ cup cooked spinach</li></ul>
<b>Fluids</b>	8-9 cups/day <sup>14</sup>	<ul style="list-style-type: none"><li>• Water, milk, juice, tea/coffee</li></ul>

\*An Arginine-containing supplement may be required to meet elevated requirements for wound healing.

# Meal Planning

To make it a bit more practical, here is an example of a balanced meal plan that will provide all of the essential nutrients required for optimal healing (as outlined in the previous table).<sup>16</sup>

<b>Breakfast</b>	<ul style="list-style-type: none"> <li>• 2 x wheat cereal biscuits with full cream milk</li> <li>• Banana</li> <li>• Cup of coffee with milk</li> </ul>	
<b>Morning Tea</b>	<ul style="list-style-type: none"> <li>• Small glass of orange juice</li> <li>• 10 almonds</li> </ul>	
<b>Lunch</b>	<ul style="list-style-type: none"> <li>• Grain bread sandwich with spread, chicken and salad</li> <li>• Glass of water</li> </ul>	
<b>Afternoon Tea</b>	<ul style="list-style-type: none"> <li>• 4 crackers plus 2 slices of cheese</li> <li>• Cup of tea with milk</li> </ul>	
<b>Dinner</b>	<ul style="list-style-type: none"> <li>• Beef casserole with carrot (cooked with olive oil) with spinach and mashed potato</li> <li>• Glass of water</li> </ul>	
<b>Supper</b>	<ul style="list-style-type: none"> <li>• Custard and fruit</li> </ul>	
Plus another 2-3 glasses of fluid throughout the day		

# Practical tips

Here are some practical tips to help you improve your nutritional intake to assist with wound healing. Remember that every mouthful counts, and is helping your body to heal and recover.

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- Allow enough time in your day for eating

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- Ask family members or friends or staff for assistance with eating if required

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- Have small frequent nutritious meals and snacks if your appetite is poor, such as cheese and crackers, yoghurt and nuts

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- Sip on nutritious drinks throughout the day, such as milk, juice or high-protein nutritional supplements

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- Have drinking water available at various places throughout your home to encourage you to drink

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- Try to be upright when eating for ease of digestion

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- Take time to chew your food properly and enjoy your meal

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- Try to eat in a relaxed environment without distractions

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- If you have dentures, make sure they are well fitted, and if not, speak to your healthcare professional about a dental review

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- Eat out with friends, as social situations can help keep you active and stimulate appetite.

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The content of this guide is provided for information purpose only and is not intended as a substitute for medical advice. Always seek the advice of your healthcare professional if you have any concerns regarding your health.

If you would like assistance from a dietitian, start by speaking with your local doctor. Community health centres often have dietitians which you may be able to access. Dietitians in private practice can be found on the Dietitians Association of Australia website under the section 'Find an APD' [www.daa.asn.au](http://www.daa.asn.au)

**Nestlé Health Science gratefully acknowledges the work of Jan Rice, Wound Nurse Consultant in compiling this resource.**

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# Wounds not healing?

**Arginaid® and Arginaid® Extra are nutritional supplements that have been specifically designed to assist with wound healing.**

Each serve contains 4.5g of arginine as well as other important nutrients to increase the rate of wound healing. Consuming 2 x Arginaid® or 2 x Arginaid® Extra per day has been shown to significantly improve the rate of wound healing<sup>8,11</sup>



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