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### Wound healing by dietary consideration in ayurveda.

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#### ABSTRACT

Now-a-days wound and its healing are the most important problem facing in surgical practice because of number of patients suffering due to impaired wound healing due to improper nutrition. A wound causes a number of changes in the body that can affect the healing process, including changes in energy, protein, carbohydrate, fat, vitamin and mineral metabolism. Shalya Tantra is one of the important branch of ayurveda, in which surgical and para-surgical techniques has described for management of various diseases. *Acharya Sushruta*—The father of surgery has scientifically classified wound healing in a systemic manner, whose wealth of clinical material and the principles of management are valid even today.. *Vrana* is the most important and widely described chapter of *Shalya Tantra*. *Vrana* (wound) is one of them, which have been managed by human being from starting of civilization. Under the circumstances, the first thing which the men came across was the injury from different sources which caused him the

*vrana*. *Vrana* is seen as debilitating and scaring disorder, usually seen affecting the human being at any age. Well balanced nutrition plays an essential role in the wound healing. *Acharya Sushruta* has mentioned that the diet plays an important role in the wound healing process, so *Sushruta* described the diet for the person suffering from the wound, and explained it. (xÉÑ.xÉÔ 19)

#### INTRODUCTION

In this modern era, there is a remarkable increase in the number of wound cases, where the treating modalities like antibiotics, and local management is not sufficient for wound healing. Along with this, a well balanced diet pattern is needful. Balanced diet plays an important role in wound healing process.

Delayed wound healing and wound infection place a substantial financial burden on health care systems. Nutritional support needs to be considered a fundamental part of wound management. Poor nutrition before or during the healing process may delay healing and impair

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wound strength[1,2]. *Acharya Sushruta* The Father of Surgery has mentioned that the diet plays an important role in the wound healing process, so *Sushruta* described the diet for the person suffering from the wound, and explained it. (xÉÑ.xÉÔ 19)[3]

### Patho-physiology of wound healing in Ayurveda

“The destruction/ break/ rupture/ discontinuity of body tissue/part of body, is called “*Vrana*”.(xÉÑ.ÍcÉ.1/6)[3,4]

### Factors influencing wound healing

Certain factors will influence the wound during the healing process, which is explained in *Sushruta samhita*. They are General factors include *vaya* (Age), *poshaka tatwa* (Nutrients), and the diseases like *madhumeha* (Diabetic), *paandu* (Anemia), etc.

Local factors include *twak sthaan* (Position of skin), *shalya vastu* (foreign bodies), *bhoota sanghaata* (Infection), etc.

### Diet and wound healing–An Ayurvedic aspect

*Ahara/Pathya* (Food/Diet) plays an important part for wound healing. The diet of a patient entertaining an open wound should preferably consists of *laghu ahara* (light diet) in small quantities. Food always should be taken freshly cooked with fatty articles (especially cow ghee). Above all digestive upsets should be avoided. Dietetic

constituents, as prescribed by *Acharya Sushruta*, should be advised for quicker healing and avoiding the complications. Hot liquefied food (like *manda/peya/vilepi* type of gruel) prepared from old rice, mixed with cow ghee (*Goghrita*) in small quantity with meat soup (*mamsa rasa*), a good diet for patient by which quick healing of wound occur.

### Nutrients involved in connective tissue synthesis & wound healing

When there is damage to connective tissue, it is important to address the nutritional requirements for the synthesis of both the collagen fibers and the proteoglycans. Collagen fiber and proteoglycan synthesis are dependent on the supply of nutrient building blocks, such as amino acids and amino sugars. Vitamins and minerals are also needed for the many enzymatic reactions involved in connective tissue rebuilding. Some of the nutrients that are involved in connective tissue repair and wound healing are as follows.

### Carbohydrates

Carbohydrate is a major source of calories for use by the body. Carbohydrate intake provides energy that is essential for optimal healing[1]. Carbohydrate sources include whole grain cereals, breads, rice and biscuits[6].

### Protein

Protein is essential for the maintenance and repair of body tissue. Adequate protein

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levels will help achieve optimal wound healing rates[1,7,8]. Sources of protein included and white meats, fish, eggs, liver, dairy products (milk, cheese, and go ghurt), soy beans, legumes, seeds, nuts and grains[9].

### **Amino acids**

The collagen fibers are made up of long chains of amino acids.

### **L-Arginine**

L-Arginine is an amino acid that has several properties that enhances a number of the pathways involved in wound healing, Dietary supplementation with arginine has been shown to enhance protein metabolism, helping to decrease muscle loss and collagen synthesis, which helps to increase the strength of the wound [2,10,11].

### **Fats**

Fats, including mono and polyunsaturated fats, provide fuel for wound healing[1]. Good sources of fats to promote wound healing include meat, full-fat dairy products, such as milk, cheese, butter, cream, Goghurt, ice-cream and oils and fats used in cooking or as spreads.

### **Vitamin A**

Vitamin A increases the inflammatory response in wounds, stimulating collagen synthesis[1]. Vitamin A is found in milk, cheese, eggs, fish, dark green vegetables, oranges, red fruits and vegetables[9].

### **Vitamin C**

Vitamin C, or ascorbic acid, has multiple functions as it related to connective tissue, vitamin C is required for collagen fiber synthesis, a process vital for tissue repair and healing[14]. A deficiency in vitamin C is associated with poor collagen formation and delayed wound healing . Vitamin C is considered a very important water-soluble antioxidant[14].

### **Vitamin E**

Vitamin E is a major antioxidant and functions to quench free radicals in most tissues.The main rationale for vitamin E supplementation is to reduce the damaging effects of free radicals[14]. Vitamin E supplementation may reduce free radical damage and benefit wound healing and connective tissue repair.

### **Role of minerals**

Zinc, Copper and Manganese for SOD induction: Superoxide dismutase (SOD) is an antioxidant enzyme. This enzyme contains in cells which plays an important role in wound healing. Dietary zinc sources include red meat, fish and shellfish, milk products, poultry and eggs.

### **Iron**

Iron is part of the system that provides oxygen to the site of the wound; therefore iron (Haemoglobin) deficiency can impair healing[1,6]. The best sources of iron in the diet are red meat, offal, fish, eggs, whole

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meal bread, dark green leafy vegetables, dried fruits, nuts and yeast extracts.

### 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[9].

### Other important factor-Fluid maintenance

Hydration is important in wound healing, as dehydrated skin is less elastic, more fragile and more susceptible to breakdown[9].

### Cow ghee (*Goghrita*)

Cow ghee gets absorbed easily and cross the cell membrane. It is also a concentrated source of energy having dietetic value, easier for digestion and absorption. Nutrients present in the ghee delivered to tissue easily. "Cow ghee is sweet in taste and cooling in energy, rejuvenating, good for the eyes and vision, kindles digestion, bestows lustre and beauty, enhances memory and stamina, increases intellect, promotes longevity, is an aphrodisiac and protects the body from various diseases"[12]. Cow ghee is used in most ayurvedic formulations. Cow ghee's regenerative properties are also useful for healing wounds and promoting the growth of healthy cells. This wound healing ability has also been clinically proven[13]. Cow ghee's cold, oily qualities help protect the body's mucous membranes and ensure its

usefulness in any condition with burning sensations. Finally, on a practical level, ghee is rich in antioxidants, and hence, does not go rancid for a long time.

### *Pathya ahara* as mentioned in ayurveda (Diet to be taken/ followed)

*Purana shastika Shaali* (old stored rice), *Jaangala mamsa* (less fatty chicken), *Jeevanthi shaaka* (leafy vegetable called *Leptadenia reticulata*), *Tanduleeyaka shaaka* (red variety of *Amaranthus* leafy vegetable), *Vaastuka* (green leafy vegetable, ie. *Chenopodium album*), *Baalamulaka* (tender radish), *Vaartaka* (Brinjal), *Patola* (bitter variety of snakegourd), *Karavellaka* (bittergourd/ *momordica charantia*), *Daadima* (pomegranate), *Grutha bhrusta amalaki* (gooseberries fried in cow ghee), *Saindhva lavana* (potassium chloride), *Purana sarpi* (old stored cow ghee), *Mung* (*Greengram/Phaseolus mungo*), *Vilepi* (thick rice gruel), *Srutha jala* (cold water/potable drinking water). These vegetables and fruits are to be taken more during the wound healing process as mentioned in ayurveda[3,4]

### *Apathya ahara* as mentioned in ayurveda (Diet not to be consumed)

*Nava dhanya* (newly harvested grain/cereals), *Masha* (blackgram), *Tila* (sesum oil), *Vishama bhojana* (intake of food at inappropriate time), *Ati-bhojana* (excessive eating), *Anista bhojana* (undesirable food), *Upavasa* (fasting),

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*Viruddha bhojana* (incompatible food), *Adhyashana* (eating when previous meal is not digested), *Kulattha* (horsegram), *Nishpava* (variety of pea), *Amla-lavana-katu rasa* (sour- salty & pungent foods), *Vallura mamsa* (dried meat), *Shushka shaaka* (dried vegetables), *Vasaa* (animal fat), *Sheetodaka* (cold water), *Madya* (variety of alcohols) *Asuri* (mustard seeds), *Mulaka* (radish, which is not tender one) are *pooyavardhaka* (suppurative) and *Doshajanaka* (increases tridosha/humour). So these are to be avoided during the wound healing time as mentioned in *ayurveda*[3,4].

### Discussion

Optimising nutrition is important to best practice care in wound management[1]. This can be achieved by providing the individual with adequate calories and nutrients, preventing protein- energy malnutrition and promoting wound healing[9]. Cow ghee's (*Goghrita*) widespread prevalence in ayurvedic medicines and treatments is due to its beneficial effects on the digestion, absorption and delivery of ayurvedic herbs, as well as its own healing properties. When the digestive capacity (*agni*) and life-essence (*ojas*) are weakened, the *doshas*(humours/*tridosha*) are disturbed, causing disease. Cow ghee's actions on both *agni* and *ojas* are, hence, at the heart of all *ayurvedic* treatment. Cow ghee also nourishes and regenerates the body and mind, improving the overall quality of treatment[12,13]. Diet is considered as one

of important factor for proper wound healing. Implementing the nutritional plan and providing appropriate nutritional support to the individual, helps to enhance the process of wound healing. *Acharya Sushruta* described the diet to help in wound healing in *Sushrut samhita* . Eating a diet rich in fresh fruits, vegetables, seeds, legumes and whole grains will also help to ensure an abundance of phyto-chemicals, natural plant based chemicals that may promote health and healing. By combining knowledge of the wound healing process together with best practice provision of nutrition, healthcare professionals can help decrease the morbidity and mortality associated with chronic wounds, as well as reducing their cost and impact.

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