NUTRITION AND WOUND HEALING

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WOUNDS IN RESIDENTIAL CARE AND HOSPITALS

- Frequent
  - Most common : skin tears
  - Pressure ulcer prevalence 5 – 26% [1.]
    - 17 to 35% on admission
  - Leg ulcers also common
    - 2% whole population at any time
- Expensive
- Impact quality of life
- Associated with increased mortality
- Impact accreditation

1. AWMA 2001

EFFECTIVE WOUND HEALING

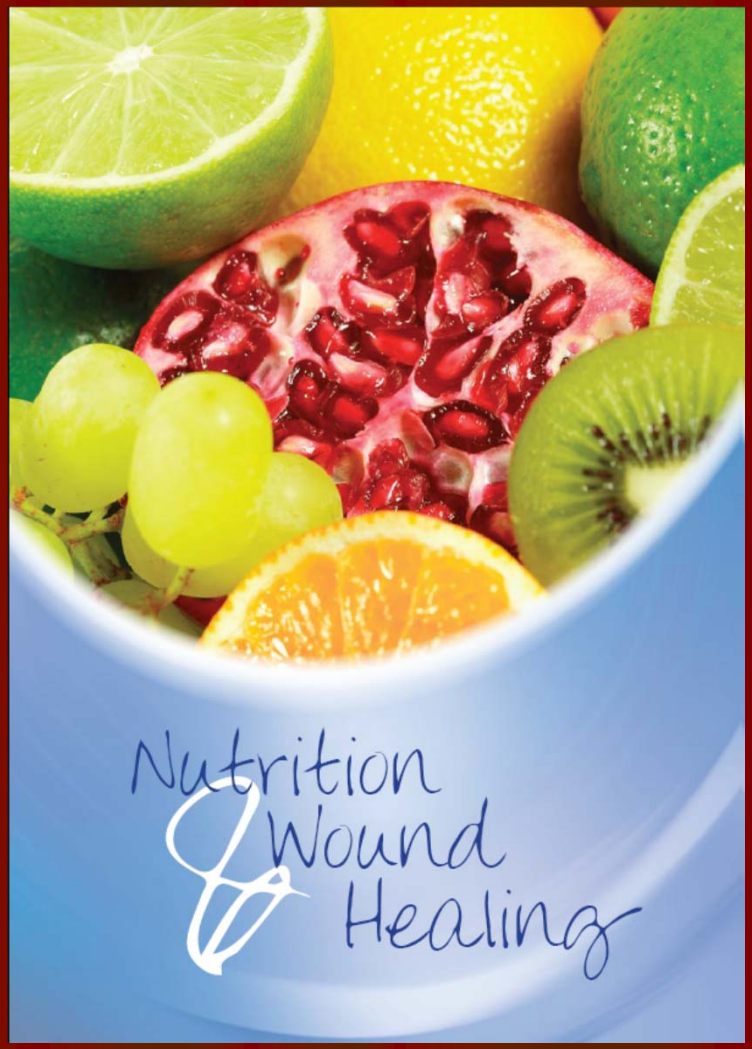
- Fully assess patient/resident
- Fully assess wound
- Treat systemic factors
- Treat wound
- Prevent recurrence

RISK FACTORS FOR DELAYED WOUND HEALING

- Arthritis
- Chronic liver disease
- Diabetes
- Impaired cognition
- Impaired self-care
- Inadequate nutrition
- Inflammatory disease
- Older age
- Polypharmacy
- Poor circulation/smoking/vascular disease
- Renal failure
- Weakened immune system

Nutrition & Wound Healing

- Poor nutrition before or during healing may **delay** healing & **impair** wound strength, making it prone to breakdown
- Nutritional support needs to be considered a **fundamental** part of wound management
- Attending to nutrition in wound care is **cost effective**


Nutrition
&
Wound
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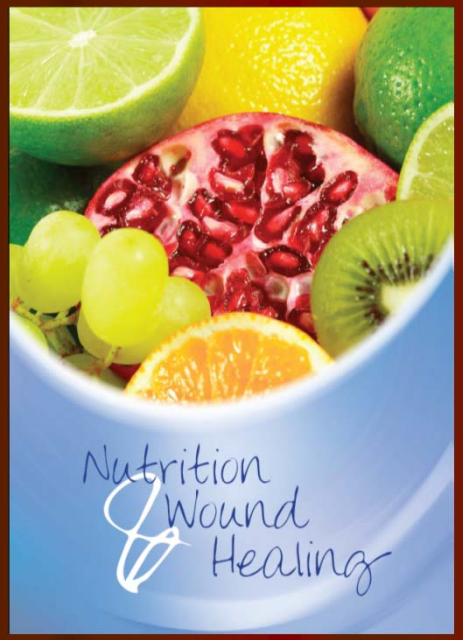

Developed by a group of Australian experts who specialise in the field of wound care and nutrition:

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Associate Professor Geoff Sussman OAM, Wound Consultant and Pharmacist, Auckland University, New Zealand and Monash University, Victoria

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PROTEIN ENERGY MALNUTRITION

- Inadequate nutrition supplied for needs
  - lack of both protein and energy
  - body breaks down own protein
- BMI below 19 or unintentional weight loss (> 5%)

BMI = weight (kg)/height $(m)^2$

BMI	INDICATION OF WEIGHT STATUS
< 20	Underweight
20 – 25	Normal
26 – 30	Overweight
> 30	Obese

MALNUTRITION PREVALENCE

RESIDENTIAL CARE : 40 – 85%

HOSPITALS : 60%

HOME CARE : 20 – 60%

FACTORS THAT MAY HINDER ADEQUATE NUTRIENT INTAKE

- Confusion and/or altered level of alertness
- Difficulty swallowing eg, due to Parkinson's disease or other neurological conditions
- Individual food preferences eg cultural food choices, vegetarian
- Lack of manual dexterity eg due to arthritis, peripheral vascular disease, neurological conditions

FACTORS THAT MAY HINDER ADEQUATE NUTRIENT INTAKE (continued)

- Isolation, low socio-economic status
- Taste changes, reduced appetite, early satiety
- Feeding routines in institutions eg tray collection times
- Poor eyesight

FACTORS THAT MAY HINDER ADEQUATE NUTRIENT INTAKE (continued)

- Anxiety
- Poor dentition
- Pain
- Eating environment
- Packaging of food

KEY MACRONUTRIENTS IN HEALING

Nutrient	Role	Requirement (per day)
Energy	maintains lean body mass & fat stores for cushioning	depends on individual & wound
Protein	tissue synthesis	1.5-3.0g/kg/day
Fat, Carbohydrate	protein sparing fatty acids for cell membrane synthesis	to meet energy requirement

ENERGY AND PROTEIN

% loss Lean Body Mass	Complications	% Associated Mortality
10	impaired immunity, increased infection	10
20	decreased healing, weakness, infection	20
30	too weak to sit, pressure ulcers develop, pneumonia, no healing	50
40	death, usually from pneumonia	100

Adapted from: De Santi L. Involuntary weight loss and the non healing wound. Adv Skin Wound Care 2000; 13 (Suppl 1):11-20

KEY MICRONUTRIENTS IN HEALING

Nutrient	Role	Requirement (per day)
Arginine	substrate for protein synthesis, precursor of nitrous oxide, enhanced collagen production	9g
Zinc	protein & collagen synthesis	15-50mg
Vitamin C	collagen synthesis	200mg
Vitamin E	anti-oxidant	7-10mg

DOES NUTRITIONAL SUPPORT IMPROVE WOUND HEALING

- Logically it should

  However, few well constructed trials have shown this

  - one excellent but small RCT showed arginine – containing supplement improved pressure ulcer healing in hospitalised patients [1]

1. Desnaves et al Clin Nutr 2005

Nutritional Support and Wound Healing

- Recent further RCT in pressure ulcers[1]
  - 28 institutionalised elderly
  - Recent onset PUs
    - Stages II-IV
  - All received 30kcal/kg daily support
    - Half standard nutrition
    - Half standard diet/supplements AND 400ml special supplement enriched with protein, arginine, Vit C and zinc.

1. Cereda et al. J Am Geriatr Soc 2009; 57: 1395-1402

Nutritional support in PU trial- results

- After 12 weeks both groups improved significantly
- Treatment group had higher healing rate
  - PUSH score at W12 -6.1 (+/_ 2.7) compared to -3.3 (+/_ 2.4), p< .05
- Conclusion- healing rate of new PUs increased by use of a supplement enriched with protein, arginine, Vit C and zinc

IMPLEMENTING NUTRITIONAL SUPPORT TO PROMOTE WOUND HEALING

- Goal – optimise nutritional state
- Method
  - Assess needs
  - Provide required calories and nutrients
    - Ideally through normal foods and liquids
  - May need supplements
- Assess, Intervene, Evaluate

ASSESSMENT

- Nutritional assessment with validated screening tool eg Malnutrition Screening Tool, Mini Nutritional Assessment (www.mna-elderly.com)
- Regular weighing
- Skin assessment
- Baseline healing score eg measured using the PUSH tool (Pressure Ulcer Scale for Healing)
- Energy expenditure eg activity level
- Co-morbidities eg diabetes
- Documentation of food and fluid intake

INTERVENTION

- Improve intake of food and fluids
- Improve nutritional quality of food
- Remove barriers to food consumption
- Supplementation where requirements cannot be met by diet alone

EVALUATION

- Regular assessment and evaluation of nutritional intake
- Measure success by improvements in measures (eg weight, skin condition, PUSH score) compared to initial assessment
- Success can also be indicated by subjective assessment of wound healing and lack of development of new wounds
- Biochemistry

TRIGGERS FOR NUTRITIONAL SCREENING

- Any unintentional weight loss, including
  - Unintentional weight loss of 5% or more in one month
  - Unintentional weight loss of 10% or more in six months
- Poor appetite – eg eating less than 50% of meals, or refusal to eat a meal, or refusal to eat for 3 days or more
- Nausea or vomiting for more than 3 days
- Loss of skin integrity

TRIGGERS FOR NUTRITIONAL SCREENING (continued)

- Development of a new pressure ulcer or ulcer on leg/foot
- Deterioration of an existing wound
- Levels of nutritionally relevant laboratory values suggestive of malnutrition or that have recently changed significantly
- Admission/readmission to hospital
- Entry into long term care

NORMAL LABORATORY VALUES OF NUTRIENTS

Nutrient	**Normal Value (reference range)**
Albumin (S/P)	36-48g/L
Prealbumin (S)	0.17-0.35g/L
C Reactive Protein (S/P)	0.33-1.47 nmol/L
Folate	>6.8 nmol/L
Haemoglobin	130-180g/L male
	115-165g/L female
Iron (S)	8.1-32.6 μmol/L male
	5.0-30.4 μmol/L female
Lymphocytes x 109/L	1.0-4.0
Potassium	3.5-5.3 nmol/L
Sodium	135-148 nmol/L
Vitamin D	>75 nmol/L

MALNUTRITION SCREENING TOOL

1. Has the resident lost weight recently without trying?

No	0
Unsure	2
Yes, how much (kg)?	
1.5	1
6.10	2
11-15	3
> 15	4
unsure	2

2. Has the resident been eating poorly (for example less than ¾ of usual intake) because of a decreased appetite

No	0
Yes	1

MALNUTRITION SCREENING TOOL (continued)

If the total score is 2 or more the individual is likely to be underweight and/or at risk of malnutrition and should be assessed by a dietitian.

NB: Nutritional screening is useful to determine if someone needs further nutritional assessment, intervention and support, not as a baseline to assess if an intervention made a positive change

NUTRITIONAL INTERVENTION

- HIGH PROTEIN/ENERGY FOODS & DRINKS
  - Meat
  - Butter, cheese, full cream milk
  - Breads, wholegrain cereals
  - Shakes, smoothies
  - Milk/soy powder added to drinks

  AIM TO EXCEDE MINIMUM ENERGY REQUIREMENTS OF 6,000 – 7,000 KILOJOULES (1,500 – 1,750 CAOLORIES) PER DAY

IDEAS TO IMPROVE NUTRITIONAL STATUS INCLUDE

- Offer food and fluids in a variety of textures and consistencies
- Offer assistance and allow sufficient time for meals and enlist family members or volunteers to help
- Provide encouragement, without pressuring
- Offer a variety of nutrient dense, high calorie and high protein meals
- Encourage grazing – small frequent meals/snacks
- Encourage frequent drinking of fluids

IDEAS TO IMPROVE NUTRITIONAL STATUS INCLUDE (continued)

- Provide hydration stations for patients to access drinks at any time
- Provide foods that patients like
- Position upright when eating
- Allow time for individuals to eat in a relaxed manner, with time to chew, feed themselves and finish their meal
- Provide a pleasant mealtime environment
- If the individual has dentures ensure that these are well fitted.
- Explain that eating well, and eating the rights foods, will aid recovery
- Provide assistance with the opening of containers, lids

WHEN TO USE SUPPLEMENTS

- Not achieving adequate oral intake from food/drink alone:
  - Poor intake
  - Vegetarian/other special diet and added nutritional needs (eg wound)
  - Already malnourished and need rapid “catch up”.
  - Special situations
- Require a nutrient that is difficult to supply from diet alone
  - eg arginine

SPECIAL SITUATIONS USUALLY REQUIRING NUTRITIONAL SUPPLEMENTS

- Pressure ulcers
  - In our hospital, all patients with PUs receive Arginaid
- Diabetics with chronic wounds
- Large wounds
  - especially if much exudate

Arginaid Extra

Product	Arginaid Extra
Presentation	237ml tetra
Flavours	orange wildberry
Energy	250kcal 1050kJ
Nutritional Composition Protein Arginine CHO Fat Zinc Vitamin C Vitamin E	 10.5g 4.5g 52g 0g 15mg 250mg 90mg

Arginaid Powder

Product	Arginaid Powder
Presentation	9.2g sachet
Flavours	orange lemon
Energy	35kcal 146kJ
Nutritional Composition	
Protein	4.5g
Arginine	4.5g
CHO	4g
Fat	0g
Zinc	0g
Vitamin C	155mg
Vitamin E	60mg

Summary

Product	Arginaid Extra	Arginaid Powder
Presentation	237ml tetra	9.2g sachet
Flavours	orange wildberry	orange lemon
Energy	250kcal 1050kJ	35kcal 146kJ
Nutritional Composition		
Protein	10.5	4.5g
Arginine	4.5	4.5g
CHO	52	4g
Fat	0	0g
Zinc	15	0g
Vitamin C	250	155mg
Vitamin E	90	60mg

OTHER SUPPLEMENTS

- Sustagen
- Novasource
- Ensure
- Others

CONCLUSIONS

- Wounds are common
- Residents/clients with wounds need full evaluation.
- Nutrition impacts on wound risk and wound healing.
- Nutritional assessment, intervention and evaluation vital to good wound management.
- Some individuals require nutritional supplements to assist wounds to heal.

PRACTICAL POINTS

- Nutritional assessment and intervention can both prevent and heal wounds
- The booklet “Nutrition & Wound Healing” can be a valuable resource
- Less wounds (and better nutrition) improves quality and life and assists in achieving accreditation in Residential Care