

Development of a Nutrition Therapy Protocol for Wound Prevention and Treatment

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OBJECTIVES

1. Describe the role macro- and micronutrients play in maintaining skin integrity and treating wounds.
2. List key components that should be included in a nutrition therapy protocol, including guidelines for initiating a referral to a registered dietitian.
3. Develop a nutrition therapy protocol for their own practice setting.

No disclosures to report

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Wounds

TYPES OF WOUNDS	TYPES OF HEALING
Surgical	Primary Intention
Traumatic	Secondary Intention
Lower Extremity Ulcers	Tertiary Intention
Venous Ulcers	
Diabetic or Neuropathic Ulcers	
Pressure Injuries	
Burns	

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Nutrition Principles for Wounds

Proper nutrition promotes skin integrity

Malnutrition increases risk of pressure injury development and delayed healing of all wounds

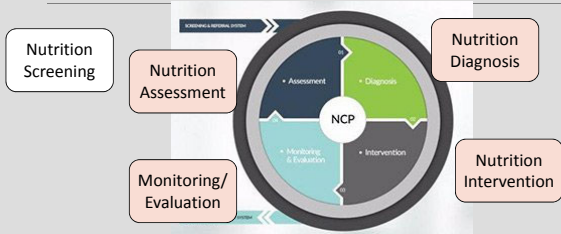
Nutrition interventions are important for all types of healing

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Nutrition Care Process

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Nutrition Care Process (NCP)



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Nutrition Screening and Referral

Nutrition screening tool validated for population and care setting

Patient request

Example facility specific criteria

- Intake < 50% of usual
- Significant weight loss

Time Frame	% of Weight Lost
1 week	1-2%
1 month	5%
3 months	7.5%
6 months	10%
1 year	20%

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NCP: Assessment

Diet History

- Adequate calorie, protein, and fluid intake?
- Adequate intake of micronutrients?

Anthropometrics

- Body mass index (BMI)
- Weight changes
- Fluid status

Medical and Surgical History

- Ability to maintain Activities of Daily Living (ADL) related to nutrition?

Medication Review

- Impact on nutrient metabolism
- Promote organ functions that support nutrient status

Laboratory Results

- Influence on nutrition management

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NCP: Nutrition Diagnosis and Intervention

Identify and document malnutrition **diagnosis** when present

- All healthcare professionals involved in the care of the patient

Nutrition Diagnostic Statement → Problem – Etiology – Signs/Symptoms (PES Statement)

- Nutrition diagnoses related to wound care

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Nutrition Interventions

Nutrition **intervention** targeted towards the etiology, signs/symptoms to resolve the nutrition **diagnosis**

Standardized nutrition interventions vs individualized care

Order writing privileges for RDNs

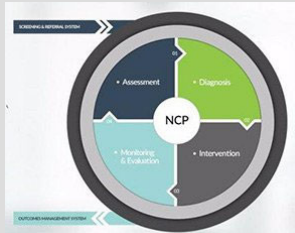
- Nutrition interventions focus on wound prevention and treatment

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Nutrition Monitoring/Evaluation (M/E)

Monitor progress towards goals

Wound healing progress is part of Nutrition M/E




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Evaluating Nutrition Research

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Nutrition Research and Wounds



TREATMENT LENGTH	TREATMENT POPULATION
Achievable in your care setting?	Healthy vs sick
Patient compliance	Age of treatment group
Expense vs cost-effectiveness	Sedentary vs active

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Nutrition Research and Wounds

<p>Control Group</p> <ul style="list-style-type: none"> Standard or "house" diet or enteral feeding? 	<p>Control Group - "house" diet</p> <p>Intervention Group – Supplement with 500 calories, 34 gm protein, 6 gm arginine, 18 mg zinc, 500 mg Vitamin C</p> <p>Results - Ulcer size improved by week 8, PUSH score improved by week 12</p>
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Intervention Group

- All things remained equal except for studied component?

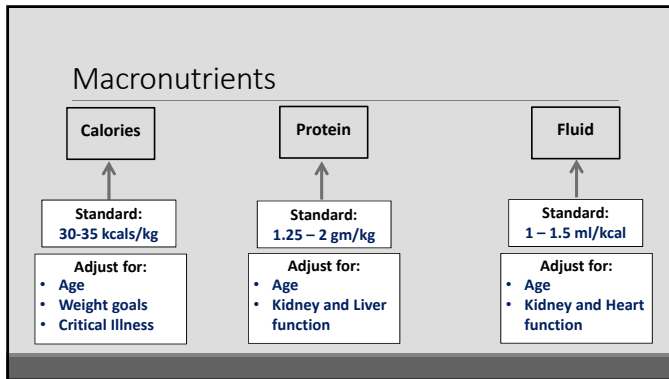
Which component made the difference?
Were patients well nourished?
Were patients representative of the population you serve?

Cereda et al. 2009

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**Recommended
Macronutrient Intakes**

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Consideration for Micronutrient Supplementation



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Vitamin C

ROLE IN WOUND HEALING	
RDA: 90 mg/d for men, 75 mg/d for women; Upper Limit: 2000 mg/d	Leukocyte production and wound bacterial control
Water-soluble (quickly depleted)	Co-factor for collagen
No reliable test in clinical setting	Antioxidant

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Vitamin C


1974 NON-RANDOMIZED CONTROL TRIAL (TAYLOR, ET AL)

N=8 males, 12 females. Mean age 74.5 years
 Routine PI treatment and regular diets
 Treatment group: 500 mg ascorbic acid BID; Control group: Placebo
 Treatment time: 4 weeks

Results: Mean reduction in PI area for treatment group

Limitations:

- Some patients deficient at onset, others were not
- Small sample size, no details of PI treatment
- No standardization of PI monitoring and measurements



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Vitamin C

1995 RANDOMIZED CONTROL TRIAL (TER RIET ET AL)


12 weeks treatment, also receiving routine PI care

Treatment	Control
N=43	N=45
500 mg ascorbic acid	10 mg ascorbic acid

Results: No increase in wound healing

Limitations:

- Control group had larger baseline wounds than treatment group
- Simultaneous evaluation of two different treatments (groups got different dosages of ascorbic acid)



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Zinc

RDA: 11 mg/d for men, 8 mg/d for women; Upper Limit: 40 mg/d

- 220 mg ZnSO₄ = 25 mg Zinc

Plasma levels more reliable than serum levels

- Affected by stress, wounds, etc. and zinc is bound to albumin

ROLE IN WOUND HEALING

Synthesize granulation and epithelial cells

Anti-inflammatory

Required for synthesis of many enzymes

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Beta-hydroxyl-beta-methylbutyrate (HMB)

Safety studies evaluated 3 gm/day; Max dosage shown to be safe = 6 g/day

May need to avoid if taking medications that affect the immune system

- Antivirals
- Blood pressure and cholesterol-lowering medications
- Weight loss agents

ROLE IN WOUND HEALING

Preserve or repair lean body mass

Most studies done in athletes and other healthy persons; one study in critically ill trauma patients in 2002

NPUAP and International Guidelines do not address HMB

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HMB Research

Pereira S, Hays NP, Oliver J, et al. Clin Nutr. 2013

Inclusion criteria: Older adults, BMI 20-35; No mobility limitations; compliance with prescribed activity level.

Exclusion criteria: recent major surgery, had active malignancy, history of DVT or other hypercoagulation disorders; refractory anemia; history of diabetes or fasting blood glucose value > 126 mg/dL; presence of partial or full artificial limb; kidney disease or serum creatinine > 1.4 mg/dL; cardiovascular disease; untreated hypothyroidism; liver disease; chronic or acute gastrointestinal (GI) disease; uncontrolled severe diarrhea, nausea or vomiting; actively pursuing weight loss; could not refrain from smoking over the bed rest study period or could not discontinue anticoagulant therapy over bed rest period, taking any medications known to affect protein metabolism.

Intervention: 1.5 gm HMB BID vs Placebo **Sample Size** Control = 7; Treatment = 8

Tx Length Initiated 5 days prior to bed rest, continued until the end of the rehabilitation period.

Authors' Conclusion: "provision of HMB starting before bed rest and during the bed rest period attenuates muscle mass losses in older adults." No difference in muscle function.

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Arginine

Conditionally essential amino acid during times of stress

Stimulates insulin secretion

Doses studied: between 1.5 to 6 gm/day

Not safe to use in patients with sepsis

ROLE IN WOUND HEALING

Promotes the transport of amino acids into tissue cells

Requires adequate total protein intake




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Nutrition and Wound Care Protocol Development

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Nutrition and Wound Care Protocol Components




- Evaluate research for the population served at the facility
- Indicate types of wounds covered by protocols
- Nutrition screening and RDN referral criteria
- Incorporate every step of the nutrition care process



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Nutrition and Wound Care Protocol Components

- Timelines for assessment and reassessment
- Address glycemic control and fluid management
- Consider transition of care –
 - Achieve the recommended treatment length?
 - Build in discharge planning



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SAMPLE Nutrition Protocol

NUTRITION AND WOUND CARE PROTOCOL

POLICY STATEMENT:
All patients with wounds, malnutrition, and/or are at risk for skin breakdown or malnutrition will receive evidence based treatment to support healing and prevent further skin breakdown.

PROCEDURES: Nutrition Screening

Nutrition Screening: Nursing
The goal of a nutritional screen is to identify patients with nutrition-related problems so that those at most risk can benefit from assessment and development of an individualized nutrition plan of care by a registered dietitian nutritionist (RD/N) during their stay in the hospital. All patients are screened for nutrition risk within 24 hours of admission by a registered nurse (RN). Refer to the Admission Assessment Database for the validated nutrition screening tool that is used at this facility. The electronic health record (EHR) will automatically send a consult to the RD/N when a patient triggers positively on the nutrition screen.

Note: Patients at risk for skin breakdown as determined by the Braden Scale score will benefit from a nutrition assessment and care plan if they are also at risk for malnutrition. The nutrition screening tool will identify those patients with or at risk for malnutrition, so a separate nutrition screening using the Braden Scale is not required.

Interdisciplinary Wound Care Nutrition Referral: Nursing, Physical Therapy, Occupational Therapy
When patients meet the following criteria, enter a referral for a nutrition assessment by an RD/N.

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SAMPLE Nutrition Protocol

Nutrition Assessment, Diagnosis, and Intervention

Nutrition Assessment: RD/N
RD/Ns perform nutritional assessments within the designated timeframe of receipt of consult as seen below.

By the next day Physician Referral TPN/New Order for Tube Feeding NPO/CCL for 5 days Intake < 50% of meals for >5 days	By second day after referral Nutrition Screening Referral Interdisciplinary Wound Care Nutrition Referral Patient Request
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Nutrition assessment by a RD/N will include, but not be limited to:

- Food / Nutrition history
- Medical and Surgical History
- Biochemical data, Medical tests, and procedures
 - Note: albumin and pre-albumin levels are likely to be low in patients with wounds due to the inflammatory response. These measures do not reflect nutrition status, and will not change in response to nutrition interventions.
- Medication list
- Anthropometric measurements

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SAMPLE Nutrition Protocol

Table 1. Guidelines for nutrient needs for wound healing. PI = Pressure Injury; EN = Enteral nutrition (tube feeding); EN = Parenteral nutrition (IV feeding)

Nutrient	Stage I or II PI: Patients at risk for skin breakdown	Stage III or higher PI, Chronic/Recalcitrant wounds, open wounds with drainage	Additional Considerations
Calories	30+ kcal/kg Critical illness: utilize indirect calorimetry if possible	35+ kcal/kg Critical illness: utilize indirect calorimetry if possible	Adjust for age, weight goals, critical illness
Protein	1.2 – 1.5 gm/kg	1.5-2.0 gm/kg	Adjust for age, kidney and liver function Provide protein evenly throughout 24 meals/day
Fluid	1 mL/kcal or 30+ mL/kg	1 mL/kcal or 35 mL/kg	Adjust for age, kidney, heart, and liver function
Vitamin C	Assess diet for usual intake of vitamin C; ensure DRIs are met	Assess diet for usual intake of vitamin C; ensure DRIs are met	Providing an MVI with minerals can usually meet Vitamin C requirements EN and PN at goal usually provide adequate Vitamin C Set reminder to discontinue
Zinc	Assess diet for usual intake	Assess diet for usual intake of	

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SAMPLE Nutrition Protocol

Nutrition Diagnosis: RDN
Based on the Nutrition Assessment findings, the dietitian identifies one or more Nutrition Diagnosis(es) and documents using the appropriate terminology and format according to the Academy of Nutrition and Dietetics' Nutrition Care Process Terminology.

Nutrition Intervention: RDN and LIP
The RDN gains patient and caregiver agreement on nutrition care goals and the appropriate Nutrition Intervention(s). Primary focus of medical nutrition therapy for wounds:

- Ensure adequate calories and protein intake to promote wound healing and decrease risk of malnutrition. Refer to the facility-approved oral and enteral nutrition formula as needed; utilize least restrictive diet order as possible.
- Optimize glycemic control to promote wound healing and reduce the risk of infections
- Ensure adequate fluid intake to prevent dehydration
- Ensure DRIs for vitamins and minerals are met, either through a supplement, oral diet, EN, or PN

When recommendations are made which require an LIP order, the RDN will communicate with the LIP to discuss the care plan and request orders to be placed. The RDN will follow-up within 3 days to verify a response to the recommendation. If the physician does not respond to the recommendation by ordering the requested intervention or by another entry in the medical record, the RDN will determine if the intervention is still recommended and then contact the physician to discuss the recommendation(s) made.

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SAMPLE Nutrition Protocol

Nutrition Monitoring and Evaluation (M/E)

Nutrition M/E: RDN
The RDN monitors and evaluates the patient's response to care according to the patient's care goals; at minimum, a reassessment will be completed weekly. Nutrition monitoring and evaluation may include any or all of the following: nutrition reassessment, meal rounds, medical rounds and/or care plan rounds or meetings. Wound healing progress will be reviewed to determine appropriateness and effectiveness of the nutrition care plan. Monitoring and evaluation may or may not result in new nutrition recommendations.

The RDN will document progress towards nutrition care goals. When nutrition goals are met or are no longer applicable and no further nutrition diagnosis is found, a dietitian may document "no nutrition diagnosis at this time." Patients with no nutrition diagnosis will be re-screened weekly thereafter with a brief note, unless the patient's status and priority level changes.

Hand-Off Communication
When the care of a patient transfers from one RDN to another or from the hospital to another care setting, there is a "hand-off" of information about the patient. While the information may be written or verbal, there must always be the opportunity to ask and respond to questions, in a timely fashion. Information communicated during the "hand-off" includes the patient's current condition, nutrition interventions implemented and the patient's response to the interventions.

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Hospital Acquired Conditions Penalties

Patient care must be "individualized and patient centered"

- Wound care
- Nutrition care
- Patient goals that are specific and measurable

Unavoidable

- Establish nutrition care plan and optimize nutrition interventions
- Document, document, document



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