

Nutritional Management & Wounds

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Certification Review Course

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Objectives

The participant will:

- Identify nutritional assessment basics
- Recognize the nutritional burden wounds place on the body
- Describe the necessary nutritional management required for the patient with a wound

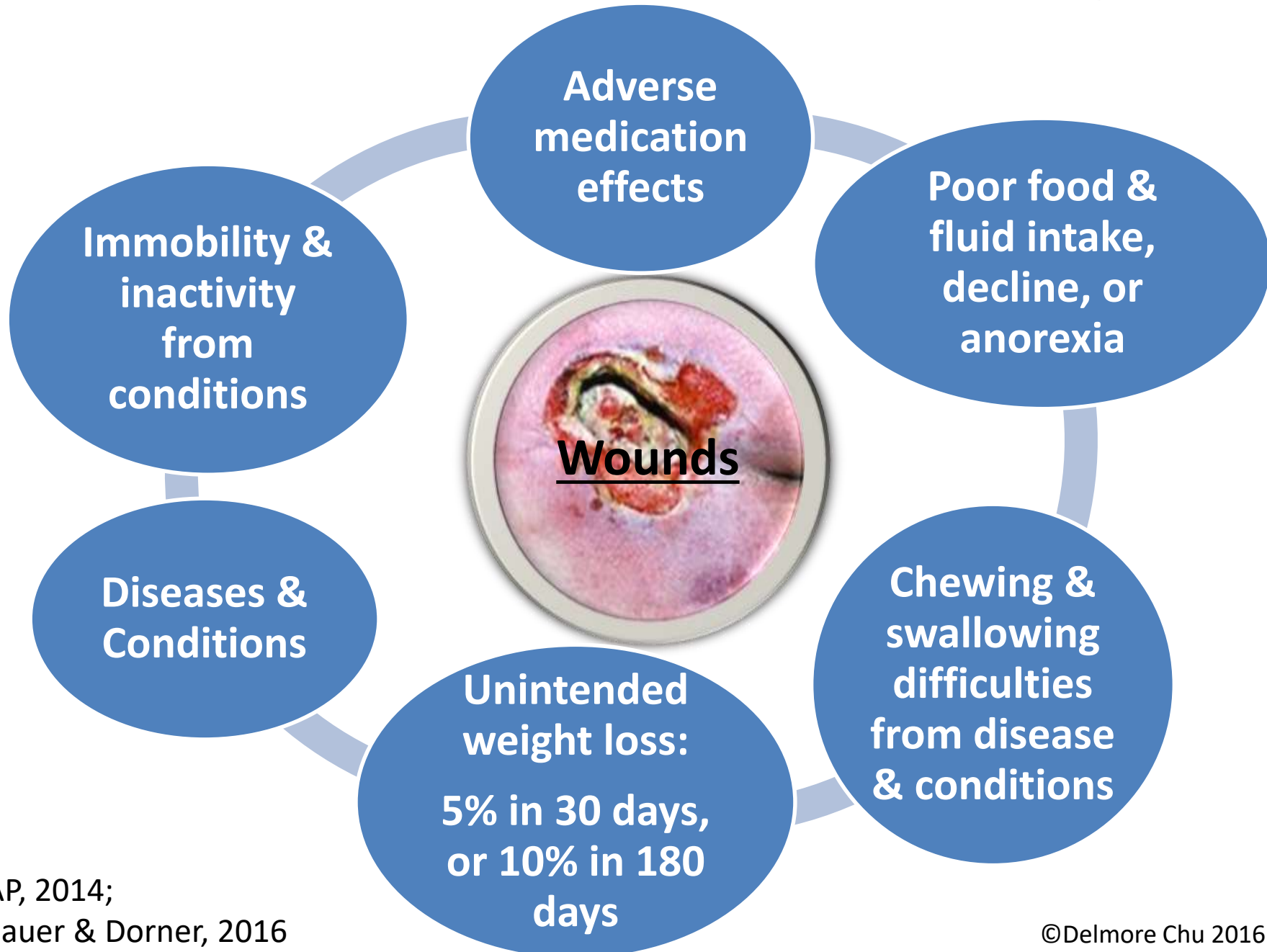
POP QUIZ



The patient has a large, draining Stage 4 pressure injury. His daily caloric requirements are estimated at 2,500 kcalories. He cannot consume this amount over 3 meals. What would you offer?

1. A high-calorie supplement with all his meals
2. Double portions of protein at each meal
3. High-protein, high-calorie snack between meals
4. A high-calorie supplement at breakfast

Factors that Prompt Nutritional Screening



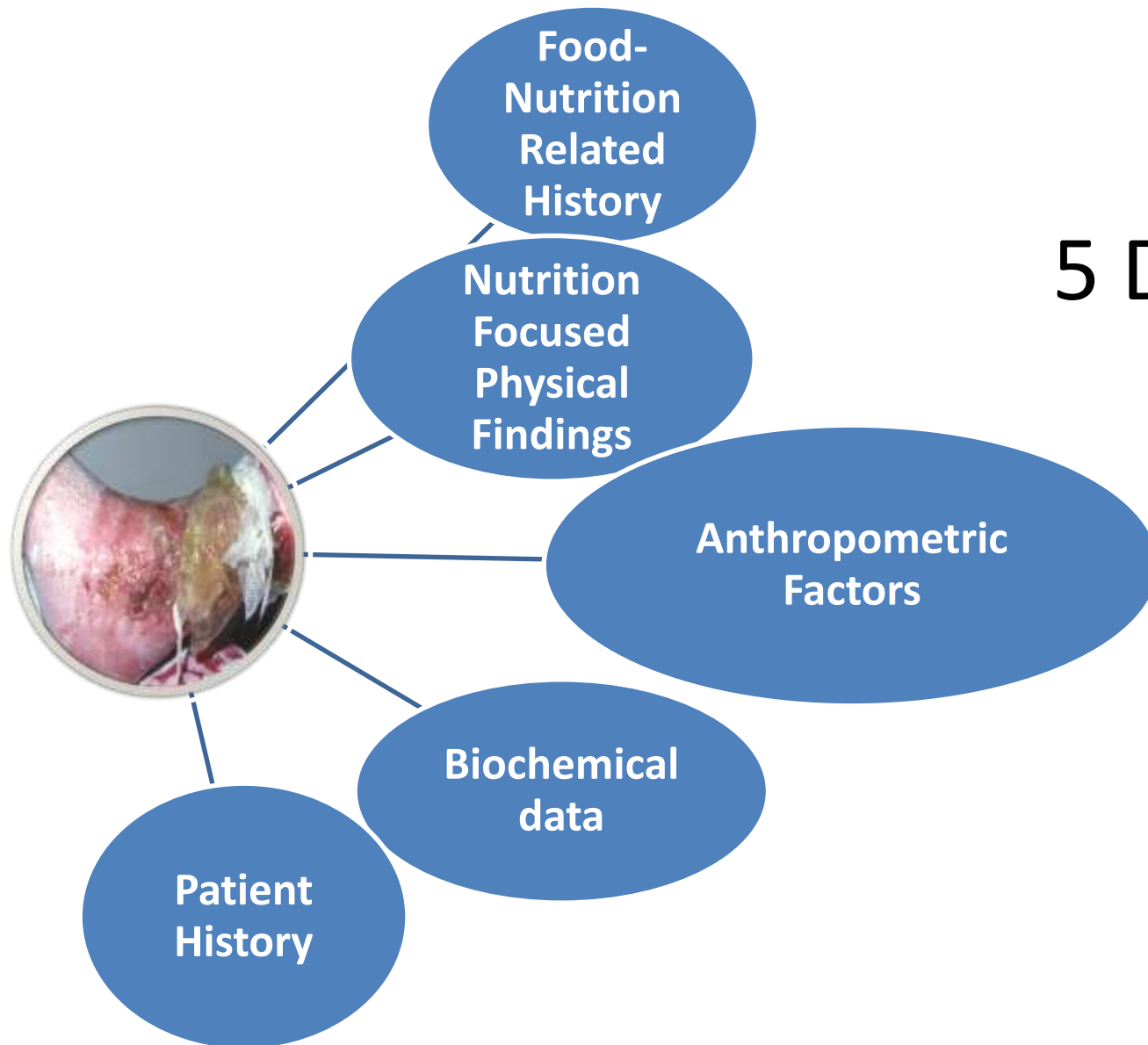
Why so Important to Assess?

- Certain conditions create stress:
 - Injuries, surgery, burns, fractures,
wounds=deplete nutrient stores required for healing
- Patients with wounds need:
 - Additional calories to compensate for the increased metabolic stress due to hypermetabolism

Elements of a Nutritional Assessment

- Intended to determine nutritional risk or detect malnutrition
 - Guide interventions
- Can be done by qualified staff
 - Registered dietitian, registered dietetic technician, nurse, physician

Elements of a Nutritional Assessment



5 Domains

Elements of a Nutritional Screening

- Tools
 - Mini Nutritional Assessment (MNA)
 - Malnutrition Universal Screening Tool (MUST)
 - Malnutrition Screening Tool (MST)
 - Subjective Global Assessment (SGA)
 - Short Nutritional Assessment Questionnaire (SNAQ)
 - JCAHO guidelines
 - “Home-grown”



Pop Quiz



Left outer malleolus

- 78 year-old female
- Admitted from nursing home with long-standing venous ulcer
- PMH: Heart failure, DM type 2
- Needs feeding assistance



Pop Quiz

Based on this case presentation, what is your initial action?

1. Order vitamin C & zinc
2. Perform a nutritional screening
3. Call the registered dietitian
4. Ask the patient her dietary history



Pop Quiz

What are the recommended protein needs for wound healing?

1. 0.6-0.8 g/kg
2. 0.8-1.0 g/kg
3. 1.0-1.2 g/kg
4. 1.25-1.5 g/kg

Major Classes of Nutrients

1. Carbohydrates
2. Proteins
3. Fats
4. Vitamins
5. Minerals
6. Water

Major Classes of Nutrients

Carbohydrates – provide energy and prevents gluconeogenesis (body forced to convert protein to energy)

- Normal: 50-60% total caloric intake should be from CHO (20-25% protein; remaining fat)
- **Role in wound healing: glucose main fuel of collagen synthesis**

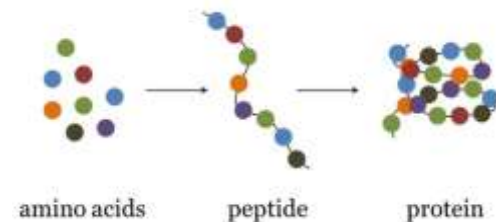
Major Classes of Nutrients

Proteins – accounts for 17% patient's body weight;
builds muscle & transports lipids

- Normal – 0.8 g/kg
- **Wounds - 1.25-1.5 g/kg/day**

Role in wound healing:

- Generates collagen
- Builds skin cells
- Transports oxygen & vitamins/minerals



Posthauer & Dorner, 2016; Stotts, 2012

Major Classes of Nutrients

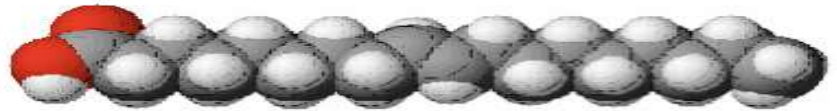
Fats-most concentrated and reserve source of energy

Normal: 20-25% of total caloric intake

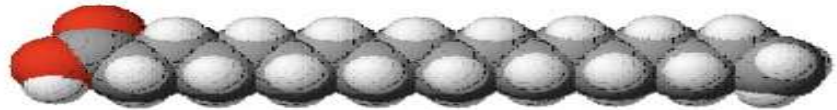
- Role in wound healing:
 - Development & stability of cell membranes
 - Part of the inflammatory response to injury

Posthauer & Dorner, 2016;
Stotts, 2012

The trans fat molecule



The saturated fat molecule



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Major Classes of Nutrients

Vitamins-

- Fat soluble: A, D, E
- Water soluble: C



http://sites.psu.edu/siowfa15/wp-content/uploads/sites/29639/2015/10/shutterstock_163244129_1.jpg

• Role in wound healing:

- A-epithelium maintenance
- D & E - fat metabolism and collagen synthesis
- C-collagen synthesis (collagen and fibroblasts needed for new wound bed structure)

Major Classes of Nutrients

Minerals

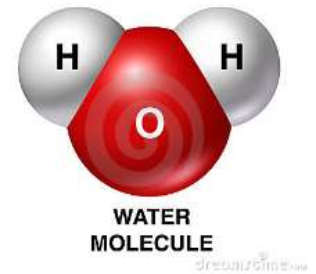
- Zinc
- Copper
- Iron



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- Role in wound healing:
 - Zinc-co-factor for collagen formation & metabolizes proteins
 - Copper-preserves strength of skin, blood vessels, epithelial and connective tissue
 - Iron-needed for hemoglobin, collagen formation & oxygen transport
- Note: Good diet & multivitamin best; deficiency confirmed before extra supplementation

Major Classes of Nutrients



Water

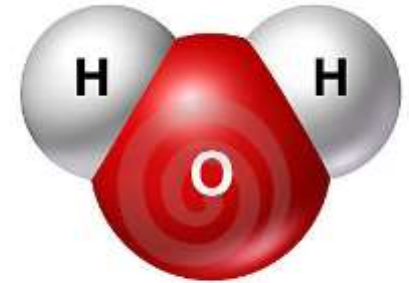
- Constitutes 60% of adult body weight-intracellular, interstitial, and intravascular
- Conditions that promote H₂O loss: draining wounds, emesis, diarrhea, ↑ temperature or ↑ perspiration
 - Provide additional fluid for individuals with dehydration, elevated temperature, vomiting, profuse sweating, diarrhea, or **heavily exuding wounds**

Major Classes of Nutrients

Water

- Role in wound healing:

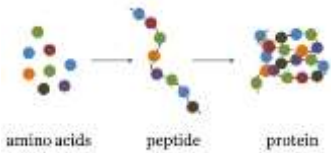
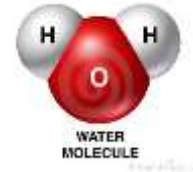
- Hydration of wound sites
- Oxygen perfusion
- Solvent for minerals, vitamins, amino acids, glucose
- Transports vital materials to cells and removing waste from cells



**WATER
MOLECULE**

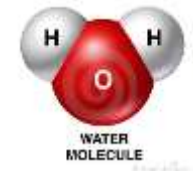
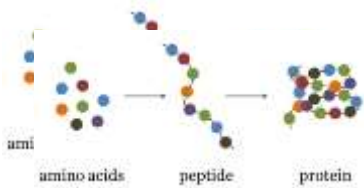
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Nutritional Recommendations At Risk & Wounds



- Calories: 30-35 kcal per kilogram of body weight per day (CHO, proteins, fats)
- Protein: 1.25-1.5 g of protein/kg/day (will ↑ calories); 20-25% of total caloric intake
- Carbohydrates: 50-60% total caloric intake
- Fats: 20-25% of total caloric intake
- Water: 1 ml of fluid intake per kcal/day

Nutrients & Wound Healing Recommendations



Vitamin A: 10,000-50,000 International Units x 7-21 days

Vitamin C: 100-1,000 mg /day

Zinc: 15-30 mg x 10-14 days

Iron: 20-30 mg /day

Case Study #2

Left breast



- 82 year-old female admitted from home with fungating tumor
- Diagnosed with breast cancer 1 year PTA; refused treatment
- Wound - increased drainage, odor; saturated dressings
- Patient states her usual weight was 120 lbs; lost 20 lbs progressively since her cancer diagnosis
- She consumes about 500 kcal day
- Appears cachectic with bi-temporal wasting



Pop Quiz

Which characteristics of malnutrition are the patient exhibiting?

1. Weight loss
2. Inadequate energy intake
3. Loss of muscle fat mass
4. Fluid accumulation
5. Reduce hand grip strength

How Do You Measure Malnutrition

Weight loss - 5% in a month; 7.5% in 3 months; 10% in 6 months; 20% in a year

Inadequate energy intake - assess current dietary; e.g., patient eats less than 75% of their needs in a month

Loss of muscle mass & Loss of subcutaneous fat
- temporal wasting, sunken eyes, cachectic appearance

Hand grip strength - – dynamometer (OT)

Fluid accumulation – ascites, edema

Note: Need 2/6 characteristics to meet diagnosis of malnutrition

Nutritional Assessment & Support

- Undernutrition: Inadequate intake of macronutrients or micronutrients or patient unable to absorb/metabolize nutrients
- **ICD-10 Severe and moderate malnutrition**
 - **Moderate-E44.0**
 - **Severe-E43**
- Impact on wound healing: loss of protein-loss of repair ability, cell multiplication, collagen and connective tissue synthesis

Stotts, 2012



Moderate vs. Severe Malnutrition

Moderate Protein-Calorie Malnutrition in the context of **acute illness or injury**

- < 75% of estimated energy requirements for > 7 days
- 1-2% weight loss in 1 week | 5% weight loss in 1 month | 7.5% weight loss in 3 months
- Mild body fat loss
- Mild muscle mass loss
- Mild fluid accumulation

Moderate Protein-Calorie Malnutrition in the context of **chronic illness or injury**

- < 75% of estimated energy requirements for ≥ 1 month
- 5% weight loss in 1 month | 7.5% weight loss in 3 months | 10% weight loss in 6 months | 20% weight loss in 1 year
- Mild body fat loss
- Mild muscle mass loss
- Mild fluid accumulation

Moderate Protein-Calorie Malnutrition in the context of **social or environmental circumstances**

- < 75% of estimated energy requirements for ≥ 3 months
- 5% weight loss in 1 month | 7.5% weight loss in 3 months | 10% weight loss in 6 months | 20% weight loss in 1 year
- Mild body fat loss
- Mild muscle mass loss
- Mild fluid accumulation

Moderate vs. Severe Malnutrition

Severe Protein-Calorie Malnutrition in the context of **acute illness or injury**

- $\leq 50\%$ of estimated energy requirements for ≥ 5 days
- $> 2\%$ weight loss in 1 week | $> 5\%$ weight loss in 1 month | $> 7.5\%$ weight loss in 3 months
- Moderate body fat loss
- Moderate muscle mass loss
- Moderate to severe fluid accumulation
- Measurably reduced grip strength

Severe Protein-Calorie Malnutrition in the context of **chronic illness or injury**

- $< 75\%$ of estimated energy requirements for ≥ 1 month
- $> 5\%$ weight loss in 1 month | $> 7.5\%$ weight loss in 3 months | $> 10\%$ weight loss in 6 months | $> 20\%$ weight loss in 1 year
- Severe body fat loss
- Severe muscle mass loss
- Moderate to severe fluid accumulation
- Measurably reduced grip strength

Severe Protein-Calorie Malnutrition in the context of **social or environmental circumstances**

- $\leq 50\%$ of estimated energy requirements for ≥ 1 month
- $> 5\%$ weight loss in 1 month | $> 7.5\%$ weight loss in 3 months | $> 10\%$ weight loss in 6 months | $> 20\%$ weight loss in 1 year
- Severe body fat loss
- Severe muscle mass loss
- Moderate to severe fluid accumulation
- Measurably reduced grip strength

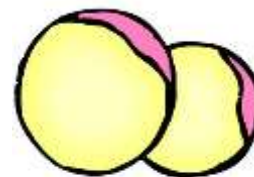
Malone & Hamilton, 2013
ASPEN Guidelines

Nutritional Assessment & Support

- Overnutrition: Results in obesity defined as $BMI \geq 30$; morbid obesity $BMI \geq 40$
 - **ICD-10-E66.01 (severe obesity due to excess calories)**
 - Impact on wound healing: delayed wound healing, dehiscence, & infection **PLUS** comorbidities e.g., DM, HTN, pulmonary restrictive disease
 - **BUT** obesity does not equate to adequate nutritional health

Stotts, 2012

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Fat Cells



Intertrigo
<http://www.wocn.org/page/ImageLibrary>

Pediatric Nutritional Recommendations At Risk & Wounds

- Ensure adequate intake of all nutrients
- Protein intake minimum of 1.5-2X RDA
- Liberalize diet restrictions as appropriate
- Start MVI
- Offer oral supplements/shakes
- EN or PN if unable to tolerate oral intake



Thompson et al., 2014



Pediatric Nutritional Recommendations At Risk & Wounds



- Vitamin C
 - 5X RDA for age daily divided into 2 doses
- Zinc (only if deficient)
 - 2X RDA for age daily divided into 2 doses
- Do not exceed upper limit

Thompson et al., 2014

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Objectives Revisited

The participant has:

- Identified nutritional assessment basics
- Recognized the nutritional burden wounds place on the body
- Described the necessary nutritional management required for the patient with a wound

References

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