

Nutrition in Catastrophic Injury

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Disclaimer

- No financial affiliations

What is a Dietitian

- A dietitian is a healthcare professional who specializes in the science of nutrition and the management of diet and nutrition in order to promote health and prevent disease.

Education Requirements

- Complete Bachelor of Science in Dietetics or Nutrition
- Complete 1200 hour supervised internship
- Pass the Commission on Dietetic Registration (CDR) exam to become a registered dietitian (RD)
- Continue education of 75 years per 5 year clinical
- Continue education for states differ

Difference between RD and Nutritionist

- Dietitian > Nutritionist

Careers

- Clinical (hospitals)
- Food Service
- Management
- Long Term Care
- Private Practice
- Food Science-recipe development, etc
- Sports Nutrition
- Social Media
- Research
- Education
- Consultant
- etc.

Nutrition Assessment

- A nutrition assessment done by a dietitian to assess calories, protein, fluid needs for individual.
- In completing a nutrition assessment the dietitian will review PMH, labs, weight, height, and ask the patient a series of questions.
- In the series of questions the dietitian will ask if there are chewing or swallowing issues, how is your appetite, can you tell me if there has been any weight changes, and other questions specific to the condition.

Nutrition Counseling

- Assessing an individual's nutritional needs and developing a personalized plan to meet those needs
- Providing education on healthy eating and lifestyle habits
- Helping individuals manage chronic conditions such as diabetes, heart disease, and obesity
- Assisting with weight management and weight loss
- Addressing disordered eating and eating disorders

Nutrition Counseling

- Counseling on dietary restrictions, such as food allergies or intolerances
- Advising on sports nutrition for athletes and active individuals
- Advising on nutrition during pregnancy and lactation
- Advising on nutrition for older adults
- Advising on nutrition for children and adolescents

Motivational Interviewing

- Motivational Interviewing (MI) is a client-centered counseling style for eliciting behavior change by helping clients to explore and resolve ambivalence. MI is often used in the fields of addiction treatment, mental health and healthcare to help individuals make positive changes in their lives. It is a collaborative, non-confrontational and non-judgmental approach that aims to strengthen a person's own motivation and commitment to change

Nutrition Counseling Coding

- 97802 - Medical nutrition therapy; initial assessment and intervention
- 97803 - Medical nutrition therapy; re-assessment and intervention, individual, face-to-face with the patient
- 97804 - Medical nutrition therapy; group (2 or more individuals)
- 97805 - Medical nutrition therapy; individual, face-to-face with the patient, each additional 15 minutes.

Inpatient

- Working in hospital a RD will see anyone who has a consult. This can come from a MD, APRN, and nursing.
- At the beginning of each admission nursing staff will conduct a Nutrition Screen process that will generate a consult if warranted.
- Chart will flag an automatic consult for BMI <18
- Nutrition education

Inpatient Nutrition Coding

- 97802: Nutritional assessment and counseling
- 97803: Medical nutrition therapy
- 97804: Medical nutrition therapy, group session
- G0270: Parenteral and enteral nutrition therapy management and training
- TPN (Total Parenteral Nutrition): Z51.11
- Enteral feeding: Z34.89

Nutrition in Health Individual

- 25-30 kcals per kg
- 0.8-1.0 g protein per kg
- 30-35 ml per kg for fluid needs

Conditions an RD is involved with

- Weight loss
- Chewing or swallowing issues
- DM
- Electrolyte Imbalance
- Nutrition Support
- Wounds
- Amputations
- Catastrophic Injuries
- Weakened strength in upper extremities
- CKD/ESRD on RRT
- Poor appetite
- N/V/D/C
- Cirrhosis
- Nutrition Education
- Thyroid Disorders
- BMI <18

Continued

- HIV
- Genetic disorders
- Cancer
- Malabsorption
- Weight gain
- Transplant
- Celiac disease
- Food aversions
- Obesity
- Mental Health Disorders
- Food Allergies
- Heart Disease
- Autoimmune Disorders
- Surgery
- Malnutrition
- Residential (LTC, SNF, etc.)

Malnutrition

- World Health Organization (WHO), malnutrition affects an estimated 1 in 3 hospital patients globally
- In developed countries, the prevalence of malnutrition among hospitalized patients ranges from 20-50%, while in developing countries, it can be as high as 60-80%
- Malnutrition is associated with increased morbidity, prolonged hospital stay, and higher healthcare costs
- Dietitian plays a critical role in the prevention, diagnosis, and treatment of malnutrition

Malnutrition in LTC

- Malnutrition is a common problem among residents in long-term care facilities, affecting an estimated 40-60% of older adults in these settings. The risk factors for malnutrition in long-term care include poor oral health, depression, dementia, limited mobility and financial difficulties.

Malnutrition in LTC

- The consequences of malnutrition in long-term care can be serious, including increased risk of infections, falls, hospitalization, and death.
- To prevent malnutrition in long-term care, healthcare providers and facilities should implement regular assessments of nutritional status, implement interventions to improve oral health, promote adequate fluid and food intake, and provide individualized nutrition support as needed.

Malnutrition Diagnosis

- Dietitians use what is known as a Nutrition Focused Physical Exam (NFPE) that diagnoses malnutrition
- NFPE includes height, weight, physical assessment of muscle mass, fat, and signs of nutritional deficiencies
- Food recall or food diary

NFPE

- <https://youtu.be/9T9kNzvDJLU>

Different Types of Malnutrition

- Severe malnutrition
- Non-severe malnutrition
- Malnutrition in Acute Illness/Injury (Severe or Non-Severe)
- Malnutrition in Chronic Illness (Severe or Non-Severe)
- Malnutrition in Social/Behavioral/Environmental Circumstances (Severe or Non-Severe)

Weight Loss

| Moderate Malnutrition in context of acute Illness/Injury | Moderate Malnutrition in context of Chronic Illness | Moderate Malnutrition in the context of Social/Environmental Circumstances |
|---|--|---|
| 1-2% in 1 week 5% in 1 month 7.5% in 3 months | 5% in 1 month 7.5% in 3 months 10% in 6 months 20% in 12 months | 5% in 1 month 7.5% in 3 months 10% in 6 months 20% in 12 months |

Weight Loss

| Severe Malnutrition in context Acute Illness/Injury | Severe Malnutrition in context of Chronic Illness | Severe Malnutrition in the context of Social/Behavioral/ Environmental Circumstances |
|--|--|--|
| >2% in 1 week >5% in 1 month >7.5% in 3 months | >5% in 1 month >7.5% in 3 months >10% in 6 months >20% in 12 months | >5% in 1 month >7.5% in 3 months >10% in 6 months >20% in 12 months |

Muscle Loss in Upper Body

| Exam Area | Severe | Mild-Moderate | Well Nourished |
|---|---------------------------------------|---|--|
| Temple Region- Temporalis Muscle | Hollowing, Scooping, depression | Slight depression | Can See/Fell well defined muscle |
| Clavicle Bone Region- Pectoralis major, Deltoid, Trapezius muscles | Protruding, prominent bone | Visible in males, some protrusion in female | Not visible in male, visible but not prominent in females |

Muscle Loss Lower Body

| Exam Area | Severe | Mild-Moderate | Well Nourished |
|--|--|---------------------------------------|---------------------------------------|
| Patellar Region- Quadriceps Muscle | Bones prominent, little sign of muscle around the knee | Knee cap less prominent, more rounded | Muscles protrude, bones not prominent |
| Anterior Thigh Region- Quadriceps | Depression/line on thigh, obviously | Mild depression on inner thigh | Well rounded, well developed |
| Posterior Calf Region- Gastrocnemius Muscle | This, minimal to no muscle definition | Not well developed | Well-developed bulb of muscle |

Muscle Loss: Clavicle and Acromion Process

Clavicle Bone Region:

- Look for prominent bone
- Make sure pt. is not hunched
- Patient arms at side, observe shape



Well-Nourished:

- Clavicle not visible in male
- Visible not prominent in females
- Rounded curves

Mild-moderate muscle loss:

- Visible in males
- Protrusion in females
- AP may protrude



Severe muscle loss:

- Protrusion is prominent

Muscle Loss

Regions to examine

- Temple
- Clavicle Bone
- Clavicle and Acromion
- Scapula Bone
- Dorsal Hand
- Patellar
- Anterior thigh
- Posterior calf



Fat Loss

| Exam Area | Severe | Mild-Moderate | Well Nourished |
|----------------------------|---|--|---|
| Orbital Region | Hollow look, depressions, dark circles, loose skin | Slightly dark circles, somewhat hollow look | Slightly bulged fat pads |
| Upper Arm Region | Very little space between folds, fingers touch | Some depth pinch, but not ample | Ample fat tissue obvious between folds of skin |
| Thoracic and Lumbar Region | Depression between the ribs very apparent. iliac crest very prominent | Ribs apparent, depression between them less pronounced, iliac crest somewhat prominent | Chest is full, ribs do not show. Slight to no protrusion of the iliac crest |

Fat Loss

| Exam Area | Severe | Mild-Moderate | Well Nourished |
|-----------------------------------|---|---|---|
| Clavicle and Acromion Bone Region | Shoulder to arm joint looks square | Acromion process may slightly protrude | Rounded =, curves at arms/shoulder/neck |
| Scapular Bone Region | Prominent, visible bones, depressions between ribs/Scapula or shoulders/spine | Mild depression or bone may show slightly | Bones not prominent, no significant depressions |
| Dorsal Hand | Depressed area between thumb-forefinger | Slightly depressed | Muscles bulges |

Subcutaneous Fat Loss

- **Orbital Region**
- **Upper Arm**
- **Thoracic Lumbar**



Energy Intake

| Moderate Malnutrition in context of Acute Illness/Injury | Moderate Malnutrition in Context of Chronic Illness | Moderate Malnutrition in the context of Social/Environmental Circumstances |
|---|--|---|
| <75% energy intake compared to estimated energy needs for >7 days | <75% energy intake compared to estimated energy needs for >= 1 month | <75% energy intake compared to estimated energy needs for >= 3 months |

Energy Intake

| Severe Malnutrition in context of Acute Illness/Injury | Severe Malnutrition in context of Chronic Illness | Severe malnutrition in context of Social/Behavior/Environmental Circumstances |
|---|--|--|
| <= 50% energy intake compared to estimated energy needs for >= 5 days | <75% energy intake compared to estimated energy needs for >= 1 month | <= 50% energy intake compared to estimated energy needs for >= month |

Fluid Accumulation

| Severe | Mild-Moderate | Well Nourished |
|---|---|-------------------------------|
| Deep to very deep pitting, depression lasts a short to moderate time (31-60 sec) extremity looks swollen (3-4+) | Mild to moderate pitting, slight swelling of the extremity, indentation subsides quickly (0-30 sec) | No sign of fluid accumulation |

Micronutrient Deficiencies Skin

- Color: Pallor-iron, folate or B12 deficiency
- Lesions, pigmentation: Dermatitis-essential fatty acid, zinc, niacin, or riboflavin deficiency. Pellagrous dermatitis-niacin or tryptophan deficiency. Flaky paint dermatitis; hyperpigmented areas on thighs, buttocks-protein deficiency. Petechiae, ecchymosis-Vitamin C or K deficiency.
- Texture: scaly dry-vitamin A or essential fatty acid deficiency
- Wound healing: Poor wound healing- zinc, vitamin C, and/or protein deficiency
- Moisture, turgor: Poor skin turgor-dehydration

Micronutrient Deficiencies

- Nails: spoon shape-iron deficiency; Lackluster, dull-protein deficiency; mottles, pale, poor blanching- vitamin A or C deficiency
- Scalp/Hair- Dull, lackluster, thin sparse-protein, iron, zinc, or essentially fatty acid deficiency
- Eyes: Night Blindness-Vitamin A Deficiencies
- Lips: Bilateral cracks, redness of lips-riboflavin, niacin and/or pyridoxine deficiency
- Tongue: Magenta color-riboflavin deficiency; Beefy red color- niacin, folate, riboflavin, iron deficiency. Smooth, slick, loss of papillae- niacin, iron, riboflavin, B12 deficiency, zinc deficiency

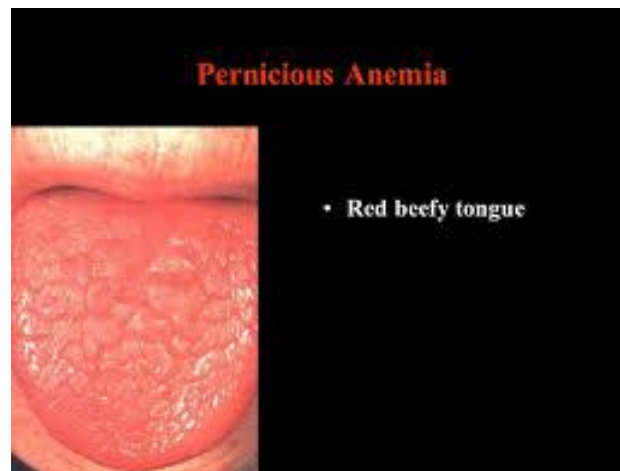
Micronutrient Deficiencies



Spoon Shaped
Nails



Bilateral
cracked Lips



Malnutrition Diagnosis

- Must at least two malnutrition criteria are required to identify as Severe or Non-Severe Malnutrition
- Dietitian use PES (Problem, Etiology, Signs/Symptoms statements with ICD-10 codes to diagnosis Malnutrition
- In PES statements it is stated whether malnutrition is in context of acute, chronic or social

Malnutrition Coding

- E43.0-Severe Protein-Calorie Malnutrition
- E44.0- Malnutrition of Moderate Degree

Malnutrition PES Statements

- Moderate Malnutrition in setting gastroenteritis as evidenced by 2 lb (2%) wt loss in 1 week and <75% energy intake compared to estimated energy needs for >7 days due to n/v for 2 weeks (E44.0).
- Severe Protein-Calorie Malnutrition in setting of esophageal cancer as evidenced by 15 lb (12.2%) wt loss in 6 months, <75% energy intake compared to estimated energy needs for >1 month due to pt only consume soft foods due to difficulty swallowing, severe subcutaneous fat loss: Orbital Region-hollow look, dark circles, upper arm region: very little space between folds, fingers touch; severe muscle loss: temple region: hollowing, scooping; anterior thigh region-obviously thin, posterior region-minimal to no muscle definition (E43.0).

Malnutrition Treatment

- Assessing the patient's nutritional status and determining the cause of malnutrition.
- Developing and implementing a customized nutrition plan to meet the patient's specific needs.
- Monitoring the patient's progress and adjusting the nutrition plan as needed.
- Educating the patient and their family on proper nutrition and healthy eating habits.
- Collaborating with other healthcare professionals to ensure a comprehensive approach to treatment.

Malnutrition Prevention

- Promoting healthy eating habits and nutrition education.
- Assessing an individual's nutritional status and risk for malnutrition.
- Developing and implementing personalized nutrition plans.
- Monitoring and reassessing nutritional status regularly.
- Collaborating with other healthcare professionals to address underlying health conditions that may contribute to malnutrition.

Catastrophic Injury

- Nutrition is an important aspect of recovery from catastrophic injuries, as the body requires adequate nutrients to repair damaged tissue and maintain overall health.
- A person with a catastrophic injury may require a higher calorie and protein intake, as well as specific vitamins and minerals, to support the healing process. They may also need to avoid certain foods or food groups that could worsen their condition.

Catastrophic Conditions

- Traumatic brain injury
- Spinal cord injury
- Multiple traumas
- Stroke
- Dialysis
- Transplant
- Pressure ulcers
- Mental illness

Traumatic Brain Injury

- Some common nutritional issues in TBI include difficulty swallowing, changes in taste and smell, and changes in metabolism.
- A diet high in protein, healthy fats, and carbohydrates is recommended to support brain function and repair.
- Important to stay hydrated and avoid excessive intake of sugar and alcohol.
- Labs to monitor are CBC, CMP, ALT, AST and bilirubin, electrolytes, amylase and lipase, blood glucose levels.

Spinal Cord Injury

- Individuals with SCI may have increased nutritional needs due to increased muscle loss and metabolic changes.
- They may also have difficulty with eating and swallowing, and may require a modified diet or enteral/parenteral nutrition.
- Labs to monitor: CMP and CBC to check for infections, electrolyte imbalances, and other health markers.

Multiple Trauma

- In multiple trauma it is important to provide adequate protein to provide healing.
- 1.5-2.5g protein per kg®
- It is important to watch glucose levels and provide insulin as needed (Accu-Chek®).
- Monitor electrolytes (CMP).

Multiple Trauma

- Refeeding syndrome is common among individuals who have multiple trauma or individuals who are already malnourished.
- Refeeding syndrome is a metabolic disturbance that occurs when a malnourished individual begins to eat again after a period of starvation. It can cause a shift in fluids and electrolytes, leading to symptoms such as heart failure, breathing difficulties, seizures and muscle weakness, among others. It is a serious medical condition that requires careful monitoring and management.
- Monitor K, PO₄, Mag.

Stroke

- Maintaining adequate calorie and protein intake to support healing and preserve muscle mass.
- Increased protein needs for a patient in PT/OT to help rebuild that loss of muscle mass.
- Monitor for decreased upper extremity strength and provide adaptive utensils.
- Labs to monitor CBC, lipids.

Pressure Ulcers

- Sufficient intake of protein to support the growth and repair of damaged tissue.
- 1.0-1.5 g protein per kg.
- 1.5-2.5g protein per kg for multiple wounds and other factors that require increase protein needs (dialysis, multiple trauma, cirrhosis).
- Additionally, it is important to consume a variety of protein sources, including lean meats, fish, eggs, dairy products, beans, and nuts to ensure adequate intake of all essential amino acids.

Wound Healing

- Vitamin C: helps to produce collagen, a protein that is essential for skin and connective tissue repair.
- Vitamin A: helps to support cell growth and differentiation in the wound healing process.
- Vitamin K: plays a role in blood clotting and wound healing.
- Iron: helps to transport oxygen to the cells that are involved in wound healing.

Wound Healing

- Zinc: helps to support the immune system and is necessary for the formation of new tissue.
- Copper: helps to produce collagen and elastin, which are important for skin and connective tissue repair.
- Selenium: helps to support the immune system and may be important in preventing infection.

Supplements in Wound healing

- Juven (Abbot)
- Arganaide (Nestle)
- ProSource
- ProCel
- Protroneix
- Multiple vitamin

ESRD on Dialysis

- Monitor for adequate protein and calorie intake.
- Monitor fluid status.
- Labs to monitor Hgb, K, PO₄, PTH, Ca, Na.
- Monitor K, Na, and PO₄ because increased levels can be dangerous .
- Monitor for PTH, PO₄ and Ca for bone health.

Transplant

- Nutrition is an important aspect of care for transplant patients. Malnutrition can negatively affect the healing process and increase the risk of infection and other complications. Transplant patients may have unique nutritional needs due to their underlying medical conditions and the medications they are taking.
- Some transplant patients may have difficulty eating or absorbing nutrients due to side effects of medications or complications from the transplant surgery.

Transplant

- It is also important for transplant patients to avoid foods that could potentially interfere with their medications or cause infection, such as raw or undercooked meat and shellfish, unpasteurized dairy products, and certain fruits and vegetables that are difficult to clean.

Mental Illness

- A healthy balanced diet has shown to reduce depression and anxiety.
- On the other hand, a diet high in processed foods, sugary drinks, and saturated fats is associated with an increased risk.
- Additionally, deficiencies in certain nutrients such as omega-3 fatty acids, vitamin D, and B vitamins have been linked to mental health conditions.

Monitoring in Catastrophic Injury

- Individuals with catastrophic injuries, such as spinal cord injuries or traumatic brain injuries, receive ongoing nutritional support and monitoring from a dietitian.
- Frequency of follow-ups may vary depending on the specific needs of the individual and the severity of their injury.
- It is important to work closely with a dietitian to ensure that the individual's nutritional needs are being met, as well as to monitor for any complications related to their injury.

Long Term Care

- Dietitian in long-term care works with residents in assisted living facilities, nursing homes, and other long-term care settings to ensure that their dietary needs are met.
- Malnutrition is common among older individuals.
- In LTC dietitians work with a multidisciplinary team.

Multidisciplinary Team

- Nurses
- Techs/CNA
- Speech Therapist
- Occupation Therapist
- Physical Therapist
- Doctors
- Kitchen Staff

Nursing Staff

- Dietitians and nursing staff often work together in healthcare settings, such as hospitals and long-term care facilities, to ensure that patients receive proper nutrition and hydration. Dietitians assess patients' nutritional needs and develop meal plans, while nursing staff assist with administering those plans and monitoring patients' progress. The two groups also collaborate on education and training for patients and families on topics such as healthy eating and managing chronic conditions.

Speech Therapy

- A speech pathologist and dietitian may work together in cases where a patient has difficulty with swallowing, also known as dysphagia. The speech pathologist would assess the patient's swallowing function and provide therapy to improve it, while the dietitian would make recommendations for an appropriate diet that the patient can safely consume with their swallowing limitations. Additionally, a dietitian may also work with a speech pathologist to ensure a patient is receiving adequate nutrition if they have difficulty eating or drinking due to speech or language problems.

Occupational Therapist

- Dietitians and occupational therapists also often work together, particularly in rehabilitation settings such as hospitals, nursing homes, and clinics. Occupational therapists help patients regain the ability to perform daily living activities, while dietitians assess patients' nutritional needs and develop meal plans that support the patient's rehabilitation goals.

Occupational Therapist

- Occupational therapists help patients regain the ability to perform daily living activities, while dietitians assess patients' nutritional needs and develop meal plans that support the patient's rehabilitation goals
- For example, an occupational therapist may work with a patient recovering from a stroke to regain the ability to feed themselves, while a dietitian may provide recommendations on the types of foods that would be easy to eat and provide the necessary nutrients for the patient's recovery.

Dietitian's Role in Life Care Planning

- Dietitians can work with a multidisciplinary team to assess the individual's nutritional needs, taking into account factors such as their medical condition, medications, and any physical limitations they may have. They can develop an individualized diet plan to promote health and support healing, while also taking into account the individual's preferences and cultural background.

Resources

- "Nutrition in Catastrophic Illness: A Practical Guide" by D.J. Dowsett and J.E. O'Riordan (2007)
- "Nutrition Support in Catastrophic Illness: A Clinical Guide" by S.J. Dutta and J.K. Dutta (2011)
- "Nutrition in Catastrophic Illness: A Review" by G.R. Lichtenstein and A.N. Krasinski (2013)
- "Nutrition in Catastrophic Illness: Current Concepts and Controversies" by J.B. Heyland and L.M. Novak (2015)
- "Nutrition in Catastrophic Illness: An Update" by J.B. Heyland and L.M. Novak (2018)
- "Nutrition Support in Catastrophic Illness: An Evidence-Based Approach" by R.L. Kreymann and K.M. Berger (2019)

Resources

- "Nutrition and Wound Healing" by John A. Efron and David N. Herndon
- "The Role of Nutrition in Wound Healing" by M.E. Van Scott and E.J. Leyden
- "Micronutrients and Wound Healing" by R.S. Bearden and D.S. Nix
- "Protein and Energy Nutrition in Wound Healing" by D.B. Dowsett and J.S. Lewis

Resources

- "Nutrition and Wound Healing: An Overview" by M.E. Rogers and J.E. Myers
- "Nutrition and Wound Healing" by J.M. Finnerty and L.J. Martindale
- "The Role of Vitamin C in Wound Healing" by J.M. Levine and E.H. Padayatty
- "Amino Acids and Wound Healing" by S.R.M. Williams and R.E. Ingraham
- "The Impact of Trauma on Nutrition and Feeding" by Susan L. McElroy and Mark R. Lock in the Journal of Child Neurology (2007)

Resources

- World Health Organization. (2021). Malnutrition. <https://www.who.int/news-room/fact-sheets/detail/malnutrition>
- Academy of Nutrition and Dietetic. (2023). Clinical Malnutrition. <https://www.eatrightpro.org/practice/dietetics-resources/clinical-malnutrition>
- White JV, Guenter P, Jensen G, et al. Consensus State: Academy of Nutrition and Dietetics and American Society for Parental and Enteral Nutrition: Characteristics recommended for the identification and documentation of malnutrition (undernutrition). JPEN. 2012; 36:275.

Questions

