

FUNCTIONAL NUTRITION ASSESSMENT

Nancy Strange, RDN, CD, CNSC, CLT
IU Health Clinical Nutrition Specialist
IU Health Ambulatory Services
nstrange@iuhealth.org



Financial Disclosures

■ No Financial Relationships to disclose



OBJECTIVES

Participant will be able to:

Define parameters of a functional nutrition assessment

Explain the use of differential diagnosis process

Explain the process of utilizing subjective symptoms, objective data and diet history to identify macro and micronutrient sufficiency or deficiency



Different Points of View



POINTS OF VIEW FROM A FUNCTIONAL PERSPECTIVE



"If there is one thing I could encourage everyone to do, it is to take just one week to see just how powerful a drug food can be. There is nothing to lose but our suffering. It doesn't take months or years to see change. That happens in days or weeks."

- Mark Hyman, MD
- Medical Director, Functional Medicine
- Cleveland Clinic, Cleveland Ohio



Point of view from other professionals

• "I would consult dietitians, saw them spend very little time with the patient and gave them Boost tid. I could do that so I stopped consulting the RD. I can't do what you do and my patient gets better quicker."

RN, 25 years in acute care

• "Not sure why, but when I have you work with my patients, they get better. I want to study what you do."

• HPB surgeon, President of IU Health Physicians



Nutritional Assessment

A comprehensive approach to defining nutrition status that uses medical, social, nutrition, and medication histories; physical exam, anthropometric measurements, laboratory data.

ASPEN Core Curriculum, 2012



Indiana University Health

Purpose Of A Nutritional Assessment

"Is to collect and interpret relevant patient/client information to identify nutrition-related problems and their causes."

International Dietetics and Nutrition Terminology Manual, First Edition

"Is a more comprehensive evaluation to make a diagnosis of malnutrition syndrome and to guide intervention and expected outcomes."

ASPEN Core Curriculum, 2nd edition 2012



Functional Nutrition

How we looked at nutrition function historically :

- Ability to perform ADLs
- Physical performance
- Protein/calorie focused
- Function was not always at the middle of the thought process

Use of functional nutrition assessment focus:

- Uses a more 3 dimensional process
- Includes routine micronutrient assessment
- Utilizes evidence based differential diagnosis process



Functional Nutrition Assessment

Uses the **FUNCTION** of nutrients to complete a nutrition assessment.

Includes all the traditional parameters of a nutrition assessment as defined by **AND and ASPEN**

- Examples
- Wound healing
- Weight management
- Diabetes management



Functional Nutrition Assessment

Also includes :

- Metabolic / synthetic pathways
- Biochemical nutrient needs
- Effects of drugs on nutrients
- How the microbiome affects the nutrition status of an individual
- Genetic effects of diet



Functional Nutrition Assessment is Population Focused

- HOSPITALIZED
- LONG TERM CARE
- ESRD
- COMMUNITY
- SPORTS NUTRITON
- INDIVIDUAL PRACTICE ASSESSMENT



GOALS OF FUNCTIONAL NUTRITIONAL ASSESSMENT

Nutrition Care Process

Assess degree of malnutrition/risk

Evaluate nutrient adequacy of individual

Develop and implement a POC

Evaluation of POC

Goal directed interventions based on nutrition diagnosis/PES



Functional Nutritional Assessment

Three critical components

- Diet History
- Physical Exam
- Subjective symptoms
- Use of these components together results in a high percentage accuracy in identification of macro and micronutrient depletion/deficiency



DIET HISTORY

▪ PROVIDES A WINDOW FOR DETERMINING NUTRIENT SUFFICIENCY, INSUFFICIENCY, TOXICITY



What is present? Not present?

How does this affect what is happening with the client?

Subjective Symptoms are symptoms as experienced and expressed by the patient/client.

There are many **symptoms** and many reasons for these symptoms. Our goal is to deal with nutrition causes for any subjective symptoms related to an alteration in nutrition status.

Patients sometimes believe this is their "normal" until you bring them up in your questions/assessment.



Subjective Symptoms Commonly Associated with Nutrition Issues

DECREASED OR NO APPETITE	EARLY SATIETY	LIGHT SENSITIVITY
TASTE CHANGES	FOOD CRAVINGS	DIFFICULTY CHEWING/SWALLOWING
FOOD BALLS UP IN MOUTH WHEN CHEWING	FATIGUE	NEUROPATHY



Physical Signs



• Physical signs are any objective evidence of disease or malnutrition. It is a phenomenon that can be detected by someone other than the individual affected by the disease/malnutrition.



Physical Exam- Beyond the Temple and Clavicle

- Takes practice and time to become comfortable
- Patient is accustomed to having medical professionals touch them
- Majority of nutrition physical exam requires little movement of clothing
- Work with team members to learn



TIME OUT!

- DO YOU KNOW HOW BUSY I AM?



Diagnostic Reasoning and Differential Diagnosis

Diagnostic Reasoning: A scientific process in which the practitioner suspects the cause of a patient's *symptoms and signs*. The practitioner gathers relevant information, selects necessary tests, makes an accurate diagnosis and recommends therapy;



Differential Diagnosis

Differential Diagnosis

- Systematic method
- Identifies the potential issues causing a patient's symptoms
- Method to narrow down the list of possible diagnoses until one emerges as the best
- Process taught in medical, NP and PA schools



Do we really need to look for micronutrient issues?

- Yes Yes Yes !!!
- All malnutrition, including vitamin and mineral depletion/deficiencies occur on a continuum. Most text books only include severe examples for micronutrient issues.
 - Learn early sign/symptoms including toxicity
 - Use subjective symptoms, physical exam and diet history to guide you.



Micronutrient Assessment

- Goal: Find issues as early as possible
- Evidence Based Information
 - Text books
 - Consensus Guidelines
 - Case studies
 - Biochemistry/metabolic pathways



Know roles of your nutrients!

Examples:

- You cannot effectively heal w/o zinc
 - What are the early s/s?
- You cannot lose weight if you are vitamin A, C or iron deficient
 - What pathway is involved?
 - What weight management behavior would these nutrients affect?



Can you use supplements to treat micronutrient issues?

AND Position Paper, November 2018

- Considers use of micronutrient supplementation within the scope of practice for RDN
- Base uses of supplementation on nutritional assessment, documenting need for the client/patient
- Requires RDN to understand the safety issues with supplementation



Case Study One

- 64 YEAR OLD FEMALE
 - 4 MONTHS AFTER BREAST CA TX W/CHEMO
 - FAILURE TO THRIVE
 - WHEEL CHAIR BOUND
 - IN REMISSION WITH BREAST CANCER
 - NO DIABETES, CAD, THYROID DISEASE
 - HTN



BIOCHEMICAL PARAMETERS

- HEMOGLOBIN OF 10 W/ MCV AND MCH ABOVE NORMAL
- ALBUMIN OF 2.8
- TSH, T4, T3 WNL



Case Study One

- WEIGHT HISTORY
 - WEIGHT GAIN
 - UNABLE TO WEAR SHOES D/T LOWER EXTREMITY EDEMA
- DIET HISTORY
 - STEAK AND SHAKE MILKSHAKES X 3 MONTHS
 - NO SUPPLEMENTS OF ANY TYPE
 - NO GRAINS, MINIMAL PROTEIN INTAKE
 - WILL EAT PEACHES OR PEARS
 - DRINKS ICED TEA
 - FOOD BALLS UP IN HER MOUTH WHEN CHEWING
 - COLD FOODS APPEAL TO HER, HOWEVER SHE STILL ONLY CONSUMES SMALL AMOUNTS



Physical S/S

- | | |
|---|----------------------------------|
| ■ TENDER FEET, PAINFUL BURNING IN EXTREMITIES | ■ SEVERE LOWER EXTREMITY EDEMA |
| ■ EXCESSIVE FATIGUE | ■ THINNING, FRAGILE SKIN WITH |
| ■ WHITE COATED TONGUE | ■ CELLOPHANE APPEARANCE |
| ■ DRY FLAKY SKIN, INCLUDING THE SCALP | ■ POOR SKIN TURGOR |
| ■ DIARRHEA | ■ RIDGED NAILS |
| ■ NAUSEA, CHRONIC | ■ EARLY SATIETY |
| ■ JOINT PAIN | ■ BLAND TASTE CHANGES |
| ■ BONE PAIN | ■ NO DESIRE TO EAT |
| | ■ DEPENDENT ON FAMILY TO DO ADLs |



Case Study One

- WHERE DO WE START?
- DIET HISTORY REVEALS:
 - WATER SOLUBLE VITAMIN INTAKE IS DEFICIENT
 - LASIX DECREASES AVAILABILITY OF THIAMINE TO CARDIAC TISSUE
 - TEA CONSUMPTION DECREASES THIAMINE ABSORPTION BY 50% WHEN TAKEN WITH MEALS
 - NO ADEQUATE SOURCES OF VITAMIN C RICH FOODS
- PHYSICAL EXAM
 - PENDANT LOWER EXTREMITY EDEMA, CELLOPHANE SKIN,
 - WHITE COATED TONGUE
 - FRAGILE SKIN, MULTIPLE AREAS OF BRUISING
 - RIDGED NAILS
 - DRY FLAKY SKIN WITH NEW PROBLEM WITH DANDRUFF
 - FOLLICULAR PETECHIA



Case Study One

- BIOCHEMICAL FINDINGS
 - DECREASED ALBUMIN
 - INCREASED MCV AND MCH W/ ANEMIA
- MEDICATIONS
 - LASIX



Case Study One

- DIAGNOSIS
 - Severe Chronic Disease Protein Calorie Malnutrition with probable micronutrient deficiencies
 - < 75% of oral intake
 - Severe Muscle loss
 - (weight loss masked by lower extremity edema)
- THRUSH
- SCURVY
- ZINC DEFICIENCY
- B COMPLEX DEPLETION
- MACROCYTIC ANEMIA
- CHRONIC UNDERHYDRATION WITH DIURETIC USE D/T LOWER EXTREMITY EDEMA, RESISTANT TO DIURETICS
- DIARRHEA MAY BE D/T VIT C OR ZINC DEPLETION OR NEED FOR ADDITIONAL PROBIOTICS
- POSSIBLE ESSENTIAL FATTY ACID DEPLETION
- POSSIBLE VITAMIN D DEFICIENCY



Case Study Charted With NCP

- PES STATEMENT:
 - Severe Chronic Disease Protein Calorie Malnutrition due to inadequate nutrient intake related to decreased appetite/anorexia as evidenced by anorexia; chewing difficulty, patient diet history/recall, physical exam that reveals s/s of muscle wasting, vitamin C, B complex, zinc and vitamin D depletion.



Case Study One

- NUTRITION INTERVENTIONS
 - Contact MD for thrush treatment, orders for 25(OH)D, folate and B12 levels
 - Multivitamin w/ minerals 1x per day taken with food that has at least a small amount of fat
 - Higher dose vitamin B complex 1x/day x 7 days
 - Vitamin C, 500 mg TID for 2 weeks then decrease to 1x/day
 - Zinc sulfate 220 mg bid, taken away from calcium containing foods or supplements
 - Use 1-2 tbsp. canola oil per day
 - Use yogurt/kefir or VSL#3 q day x 2-3 weeks
 - Education on the results of the nutrition assessment
 - Education on use of diet to increase nutrient intake once po intake improves
 - Follow up appointment in 14 days
 - Food diaries for 3 days prior to next appointment



Case Study One

- If you only looked at protein and calorie parameters?
 - What changed w/ the physical exam the diet history, and asking about subjective parameters?
 - If micronutrient depletion had not been the cause of the anorexia, how would the plan of care changed?
 - Food diaries every day
 - Weekly follow up
 - Possible use of tube feedings at home



Case Study One

NUTRITION MONITORING/EVALUATION AT 2 WEEK FOLLOW-UP

MD ORDERED ALL TESTS, APPROVED ALL INTERVENTIONS

2 WEEK FOLLOW UP SCHEDULED



- FULLY INDEPENDENT
- EDEMA COMPLETELY RESOLVED
- >20# WT LOSS FROM EDEMA
- EATING NORMALLY, TASTE CHANGES IMPROVING
- ABLE TO PUT SHOES ON
- RESOLUTION OF FATIGUE
- RESOLUTION OF DIARRHEA
- THRUSH RESOLVED
- DRY FLAKY SKIN IMPROVING
- LAB TESTS REVEALED VIT D, B12, ZINC DEFECIENCIES

Outcome/Re-assessment

- Pt food diaries reveal current intake meeting 100% of calorie/protein needs. Nutrient rich foods consumed on a daily basis.
- Physical s/s of vitamin depletion showing significant improvement



Plan Of Care

- Continue with supplementation as initially ordered
- Continue yogurt q day as initially ordered
- RDN available on an as needed basis
- Add higher dose of vitamin D3 q day
 - 2000IU/day w/ fat



Case study Two

- 51 year old female with a new diagnosis of gastric adenocarcinoma
- Recent thyroidectomy
- Very poor oral intake > 2 weeks due to severe nausea which has increased in intensity, even with two anti-nausea medications being used.
- No MVI use
- Has only taken 8 ounces of Boost in the last 48 hours d/t nausea
- Unable to hydrate due to nausea
- Planned neoadjuvant chemotherapy then surgical resection of the tumor
- 10# involuntary weight loss in the past 10 days with BMI at 27.9 kg/m²
- Subjective symptoms: Severe nausea, ataxia, cognitive decline, difficulty answering questions, processing information
- Wheel chair required d/t ataxia
- Frequent fluttering of her eyes while being interviewed. Husband states he has also noticed this happening. Patient unaware of this



Case study two

- What nutrient/s could be the source of her symptoms?
- What would her treatment be?

- What could potentially be an adverse outcome if left untreated?



Case Study Three

- 50 year old male, presented to surgery clinic for evaluation for abdominal wall hernia repair.
- RDN consult to evaluate for any method for reducing ileostomy output
 - PMHx: Colectomy d/t severe, non resolving colitis; High output ileostomy with chronic severe dehydration and resulting ESRD requiring RRT, hemodialysis 3 x/week.
 - Social: Married, supportive wife; middle aged children; history of tobacco use; no ETOH use



Case Study Three

- RDN entered the room with a focus of education
- Completed a full assessment
- Subjective symptoms
 - Cognitive issues, major; wife had to answer all questions
 - Severe muscle tension/cramping
 - Severe hair loss
 - Decreased oral intake with bland, cardboard, bitter taste changes
 - Increasing irritability at home



Case Study Three

Physical exam

- Severe dry flaky skin
- Grey appearing dermatitis, gets worse in the summer months. Has been present long term
- Severe muscle/fat wasting
- Lower extremity edema

What are you seeing/hearing?



Case Study Three

- Dermatitis
 - Dementia
 - Diarrhea
- Treatment: Supplement support needed to be modified due to what disease state present?
- Remember to look at what is before you, not just the initial consult request.



Learning Curve Ahead!

- Learn one nutrient at a time
 - Nutrients overlap so be aware of this when learning new information
- Learn nutrients that you will use every day in your specialty
- You will always be learning with this process
- Complex, yet so rewarding iiiiii



Results?

- Surgical program development
- Published results: Average 60% reduction in post operative infections
- > 2 day LOS reduction
- MDs are now actively asking for nutrition information and initiating studies around nutrition
- Magnet Survey

• Annals of Surgery, October 2018



Questions/ Comments



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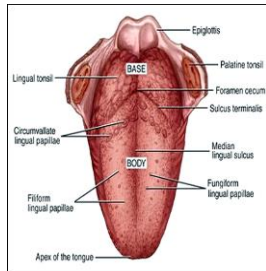
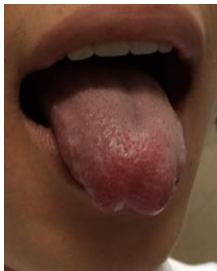
Vitamin C Depletion- Scurvy



NHANES: 7%
Diabetics: 50% Cardiovascular: 40%



Oral Mucosa What does normal look like?



Oral Signs Of B complex and iron deficiency



B12



- Beefy red tongue
- Glossitis
- Yellow hue to skin on extremities with a glossy appearance
- Tissue stores depleted at 300 pg/ml
- Subjective: constipation, loss of appetite; fatigue; difficulty getting to sleep; Balance issues



Vitamin B 6



- Stomatitis: Inflamed mouth and inflamed lips
- Angular Cheilosis: fissures on corners of mouth
- Microcytic anemia, low pyridoxal 5 phosphate level
- Subjective symptoms: Burning mouth, confusion



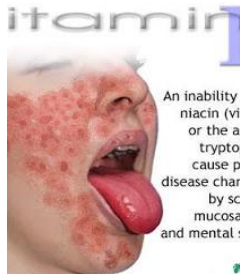
Riboflavin, B2



- Deficiency not common, in many foods
- Subjective symptoms: sore tongue; fatigue
- Enlarged fungiform papillae
- Purplish color to tongue



Niacin B3



An inability to synthesize niacin (vitamin B3) or the ability to convert tryptophan to niacin cause pellagra, a disease characterized by skin lesions, mucositis, and mental changes.

- Subjective Symptoms: vomiting, diarrhea, constipation; cognitive deficits
- Skin rash from sun exposure
- Rash at pressure points on the body (elbow)
- Red tongue
- Increased risk for deficiency with carcinoid tumors



Niacin - Pellagra



- Earlier pellagra without sun exposure - found on pressure points



Folate or B9



- Not common due to fortified foods
- Subjective Symptoms:
 - Sore red tongue
 - Cheilosis: dry ulcerated lips
 - Bald tongue with red tip or borders



Iron



- Most prevalent nutrient deficiency
- Subjective Symptoms:
 - weakness, fatigue, short term memory issues; Irritability; dysphagia; temperature dysregulation; difficulty sleeping through the night; lack of endurance;
- Iron required for T4-T3 conversion





Fig. 4 Follicular hyperkeratosis resulting from vitamin A deficiency resembles "gooseflesh" but can be distinguished from it because the bumps do not disappear when the skin is rubbed. These lesions commonly appear on the lateral surface of the arm and extensor surface of the thigh.

Follicular Hyperkeratosis



Hyperkeratosis