Pediatric Nutrition Focused Physical Exam

Jennie Lueckler RD, CSP

Intermountain
Primary Children’s Hospital
NFPE – Why is it important?

No single parameter can determine nutrition status and the degree of malnutrition

NFPE can be comprehensive, moving from head to toe

Or focused with close attention paid to specific areas based on medical history

Etiology of micronutrient deficiencies can be multifactorial - NFPE is used to assess physical findings associated with these deficiencies
Nutrition Assessment Domains

- Biochemical Data & test Results
- Social History
- NFPE Findings
- Anthropometric Measurements
- Food - Nutrition History
Techniques of Physical Examination

- **Inspection**
  - Capillary return - compress the nail bed

- **Palpation (hand on)**

- **Percussion (tapping)**

- **Auscultation (stethoscope)**
General Observation

- Overall appearance
- Vital signs
- Skin
- Head, Eyes, ENT
- Extremities, muscles & bones
- Cognition
- Positioning
What is your first impression?
NFPE for Muscle Loss

- Temple
- Clavicle
- Shoulder

- Hand Grip Strength
  - Dynamometer
  - Squeeze hand
NFPE - Temple

- Wash hands before and after. Gloves if precautions
- Ask them to remove glasses if needed
- Explain what you are going to do and why
- When I ask to do the exam I often show them on myself where I will be touching
- Explain what you are identifying or learning from each exam. I will tell them if the temple looks hollow or depressed and if the muscle offers resistance when palpated
NFPE – Temple Assessment Procedure

Procedure

- Horizontally – sphenoid to temporal
- Vertically – frontal to sphenoid
- Diagonally – sphenoid to parietal

**It's much more comfortable for the patient if you press on the temporal muscle instead of sliding along it.**
NFPE – Temple Assessment Procedure
NFPE – Temple Assessment

- **Well nourished**: firm muscle, the movement of the skin is restricted by attachment to the bone

- **Malnourished**: some degree of independence of the skin from the temporal muscle

- **Obesity**: the pit of the temple will quickly depress w/only a residual watery feeling above the bone. May not appear visibly sunken
Assessing the Clavicle

• Ask if okay to unsnap their gown or pull back their blanket to access this area

• Explain that you are pressing above and below the clavicle bone to determine if the muscles in this area will offer some resistance.

• Explain what you learn about the muscles. You can also point out if this bone is particularly prominent. Note: women often have more prominent clavicle bones
Clavicle

Trapezius

Pectoralis Major

Clavicular Portion of the Pectoralis Major

NFPE – Clavicle Assessment

**Procedure**

- Slide hand down the neck focusing on the angle of the slope (45 degrees) when nearing the base of the neck
- Place fingers above & below the clavicle, slide from the neck to the shoulder scooping fingers around the clavicle
- Depress the upper ribs & trapezius regions to feel the muscle tension
NFPE – Clavicle Assessment

• **Well nourished**: little to no visible indentation. Trapezius & pectoralis muscles will be tough & the surrounding skin taut

• **Malnourished**: visual sloping indentation leading underneath the clavicle. Depressions both beneath the clavicle (on chest) and above the clavicle (on the trapezius) will be extremely defined. Below the clavicle it will be easy to feel the ribs & pectoris major will depleted. The base of the neck & trapezius will be stringy & loose.

• **Obesity**: the adipose tissue may mask the severity of the lean tissue wasting by about half
NFPE – Shoulder Assessment

Explain that you will be examining the muscles around the shoulder

Explain what you learn

The shoulder of a malnourished person is often angular and sharp from the acromion process to the elbow. The acromion process may be prominent. Tell them if the muscle offered resistance when palpated.

Re-snap up the gown or arrange things back the way they were
End of Clavicle (not visible)

Acromion Process

Medial (Lateral) Head of Deltoid

NFPE – Shoulder Assessment

Procedure

- Slide finger from the acromion process down the medial head of the deltoid to assess the angle of the shoulder.

- Squeeze the deltoid with a cupped hand to palpate the 3 heads of the muscles together.

- Press fingers into the space below the end of the clavicle & the acromion process to feel for the presence of connective tissue as well as for the shape of the musculature & bone.
NFPE – Shoulder Assessment

• **Well nourished**: the rounding of a well nourished shoulder should be a 45 degree angle. When depressing portions of the muscle, other portions that are not depressed will maintain their integrity & not distort. The medial head of the deltoid is substantial in size & firm to the touch.

• **Malnourished**: muscle wasted patients might have detectable bone at the posterior & the acromion. The cavernous portions under the bones will have little connective tissue & that which is present will have a stringy texture.

• **Obesity**: Although it will appear visually adequate, an obese malnourished patient’s shoulder will still have a boxy, bony feeling when assessed and the deltoid heads will offer very little resistance when depressed.
NFPE – Head Circumference

**For children <36 months old

Explain that you will be examining the diameter of the head.

Explain what you learn.

This measurement can be combined with the physical examination of the temple.

Make sure to leave the patient as comfortable as possible when you are done.
NFPE – Head Circumference

Growth: from 0 to 24 months

- Male
- Female

[Blank fields for Age (months), OR Date of birth, Date of measure, Weight (kg), Head circumference (cm), Length (cm), Optional: GA at birth]

Submit

www.peditools.org
NFPE – Mid Upper Arm Circumference

**For children 2 months to 222 months.**

Explain that you will be examining the circumference of the upper arm.

Explain what you learn.

This measurement can be combined with the physical examination of the shoulder.

Make sure to leave the patient as comfortable as possible when you are done.
NFPE – Mid Upper Arm Circumference

**Mid-upper arm circumference **NEW **

**From 2 to 222 months**

- Male  Female

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**Age (months)***

**Date of birth**

**Date of measure**

**Arm circumference (cm)**

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**Optional: GA at birth**

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Submit

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NFPE – Skin Assessment

• Skin is the heaviest organ in the body and accounts for 16% of body weight.

• Functions
  - Protective barrier
  - Regulates body temperature
  - Caloric reserve
  - Sensory preservation
  - Vitamin D metabolism
  - Excretion of waste such as sweat, urea and lactic acid
NFPE – Skin Assessment

Pitting Edema
NFPE – Skin Assessment

Dehydration

An important part of the NFPA is to assess hydration
• Weight loss
• Low urine output
• Sunken and dry eyes
• Dry mucous membranes
• Sticky salvia
NFPE – Skin Assessment

Micronutrient Deficiencies

Vit C

Zinc

Vit A

EFAD
NFPE – Skin Assessment

Follicular Hyperkeratosis

skin condition characterized by excessive development of keratin in hair follicles, resulting in rough, cone-shaped, elevated papules

May result from deficiencies in vitamins A, E, B complex, and essential fatty acids
NFPE – Skin Assessment

**Flaky Dermatosis**
- Protein Deficiency

**Pellagra**
- Chronic Niacin Deficiency
NFPE – Hair Assessment

Pluckable Hair

- Protein
- Zinc
- Essential fatty Acids
- Biotin
NFPE – Fingernails Assessment

Koilonychia
- “Spoon nails”
- Iron deficiency
- Protein deficiency

Beau’s Lines/Bridging
- PCM
- Zinc deficiency
NFPE – Mouth Assessment

Cheilosis
• Vitamin B₆ deficiency
• Vitamin B₂ deficiency
• Niacin (B₃) deficiency
• Riboflavin deficiency

Scorbutic Gums
• Vitamin C deficiency
NFPE - Mouth

Glossitis/Beefy Red Tongue
- B₆
- B₂
- Niacin (B₃)
- B₁₂

Magenta Tongue
- Riboflavin
NFPE – A Powerful Tool

Nutrition-focused Physical Exam (NFPE) process/decision support

• Defining a process for identifying priority patients for NFPE will help ensure effective use of RD time/resources and that pts that will most benefit from NFPE are engaged

• RDs to use clinical assessment/judgement along with decision support process for NFPE delivery
  Integrating NFPE into standard nutrition care for malnutrition and other nutrition risks
NFPE – A Powerful Tool

Consensus on the important role of NFPE in assessment for malnutrition

In a 2012 consensus statement, AND and ASPEN defined malnutrition as the presence of two or more of the following characteristics*:

• insufficient energy intake;
• weight loss;
• loss of muscle mass;
• loss of subcutaneous fat;
• localized or generalized fluid accumulation; and
• decreased functional status (as measured by hand grip strength)

NFPE: Integrates into Existing Nutrition Care

Key decision point:
identify priority patients (and appropriate) for NFPE as part of existing initial nutrition assessment process

*See NFPE Decision Support Tool

Highest priority patients for NFPE:
• At risk for/dx with malnutrition
  • Criteria for dx needed
  • Severity unclear
• Other higher nutrition risk populations
  • Critically ill/need for Nutrition Support
  • Have pressure injury/non-healing wound(s)
  • Obesity (BMI >=30)
  • Pts with multiple co-morbid conditions and/or known for high nutrition risk
  • GI surgeries, ESRD, ESLD, Cancer, CHD, DM
NFPE: A Powerful Tool

Nutrition-focused Physical Exam (NFPE) Documentation

RDs will document if pt was/wasn’t appropriate for NFPE as well as outcome/findings from NFPE in order to meet Inpatient audit criteria.

Include physical findings from the NFPE as part of the assessment/monitoring section of the nutrition note as well as any signs/symptoms for nutrition diagnosis statements (PES).

Include reasons if/when NFPE is not performed for pt that might have been appropriate (such as pt not able/willing to participate).
NFPE: Nutrition Note Documentation

Assessment and Monitoring
Neuroendocrine tumor with a mesenteric tumor causing a SBO. Surgical resection of the small bowel and tumor on 2/18.

Pt reports that he got sick the end of September 2016 and hasn’t been eating very well since that time. His usual body weight in September before he got sick had been ~165 lbs (75 kg) which he reports he had weighed for “a long time”. His current weight this admission is ~130 lbs (59 kg). He has lost ~35 lbs over the past 5 months.

Completed a nutrition focused physical exam which indicated both visually and physically that he has lost muscle mass and subcutaneous fat. The temporal area appears very sunken and hollow and it is difficult to palpate muscle in that area. The shoulder is very angular visually and the shoulder muscles render very little muscle resistance when palpated. The clavicle bone is very prominent visually. Was able to palpate some muscle below the clavicle bone with some resistance.

Diet: advanced from a clear liquid to a full liquid today. Provided him with a liquid menu and explained what his options were and the diet advancement process. Added new supplements including a milkshake and a boost at snack times per discussion with him. Encouraged him to eat and explained how adequate protein and calories can help to rebuild muscle and help to maintain or regain weight.

Per MD note pt is having flatus, but has not yet had a BM since surgery.

Nutrition Diagnosis
Chronic, Severe Malnutrition related to mesenteric tumor with SBO requiring surgical resection as evidenced by <50% of est energy needs and 21% wt loss over ~5 months with loss of muscle and subcutaneous fat

NFPE Findings:
Included in Assessment and Monitoring section, PES referencing standardized terminology for physical finding
Case Study 1

**Patient 1:** Sally Mitchell

- 2 year old female with ESLD r/t Biliary Atresia, s/p failed Kasai
- Height: 80 cm (z-score = -1.43)
- Weight: 8.8 kg (z-score = -3.3)
- IBW: 10.8 kg (wt-for-ln z-score = -2.74)
- BMI: <3rd%ile, z-score = -2.22
- Weight Changes: Average 2g/day wt gain over the past 3m
- Appetite: Receives nocturnal TF. Mom sometimes stops feeds early or does not run feeds if Sally is having intolerance.
- Functional status: no energy, sleeps for 12-18 hours daily
- Edema: significant ascites
Case Study 2

Sam Jenkins

- 17y 7m old male
- PMH: obesity, auto-immune hemolytic anemia
- Ht: 170 cm (z-score = -0.8)
- Wt: 101.2 kg (z-score = 2.11)
- IBW: >95th%ile, z-score = 2.38
- Weight Changes: No weight history available
- Appetite: Thirsty, not hungry. NPO x 8-9 days since admit to the hospital.
- Functional status: tired a lot, watches a lot of television, does not participate in sports.
- Edema: anasarca