Nutrition in ALS: How to EAT MORE!

Presented by:

Anne-Marie A. Wills, M.D., M.P.H.
Jane L. Hubbard M.S., R.D., L.D.N.
Meet Today’s Expert Panelists

Anne-Marie A. Wills, M.D., M.P.H.

Jane Hubbard, M.S., R.D.
Weight Loss and ALS

- Body Mass Index (BMI) is a measure of weight/height.
- Being underweight (BMI<19) is associated with reduced survival in ALS

Desport, Neurology 1999
Survival by BMI category in ALS

Paganoni et al. 2011
Survival increased in G93A mice

Hypercaltoric enteral nutrition in patients with amyotrophic lateral sclerosis: a randomised, double-blind, placebo-controlled phase 2 trial

Anne-Marie Wills, Jane Hubbard, Eric A Macklin, Jonathan Glass, Rup Tandan, Ericka P Simpson, Benjamin Brooks, Deborah Gelines, Hiroshi MitsuMoto, Tahseen Mozaffar, Gregory P Hanes, Shafeeq S Lodha, Terry Heiman-Patterson, Jonathan Katz, Jau-Shin Lou, Katy Mahoney, Daniela Grass, Robert Lawson, Hong Yu, Merit Cudkowicz, for the MDA Clinical Research Network*
Survival Data

Wills et al. The Lancet, 2014
EAT MORE Study

Electronic-health Application To Monitor Outcomes REMotely
EAT MORE Study Design

- In-person RD counseling
- Counseling using mHealth App
- Standard Care

78 ALS Participants
MGH ALS Clinic
Randomized 1:1:1

6 month dietary intervention
Outcomes measured at clinic visits
mHealth App

- **NuPlanit App for iPhone or iPad.**
- **Participants received iPad for duration of study.**
- **App provided customized dietary goals.**
- **Participants were prompted automatically to enter their dietary intake x 4 days and weights x 2 days, every 2 weeks.**
- **RD (Jane Hubbard) could message participants directly through the application to provide recommendations and reminders.**
## Nutrition Goals

- In-Person and App arms received personalized goals using Kasarskis Equation (Kasarskis et al. AJCN, 2014)

<table>
<thead>
<tr>
<th>Baseline BMI</th>
<th>Self-reported weight change since diagnosis</th>
<th>Weight goal during study</th>
<th>Calorie Goals/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;25</td>
<td>Positive or negative</td>
<td>+1 kg/month</td>
<td>Deficit +235 Kcal</td>
</tr>
<tr>
<td>25≤30</td>
<td>&lt;5% of body weight lost</td>
<td>+0.5 kg/month</td>
<td>Deficit +117.5 Kcal</td>
</tr>
<tr>
<td>25≤30</td>
<td>&gt;5% of body weight lost</td>
<td>+1 kg/month</td>
<td>Deficit +235 Kcal</td>
</tr>
<tr>
<td>30-35</td>
<td>&lt;5% of body weight lost</td>
<td>Weight Stability</td>
<td>Deficit +0 Kcal</td>
</tr>
<tr>
<td>30-35</td>
<td>&gt;5% of body weight lost</td>
<td>+0.5 kg/month</td>
<td>Deficit +117.5 Kcal</td>
</tr>
<tr>
<td>&gt;35</td>
<td>Positive or Negative</td>
<td>Weight Stability</td>
<td>Deficit +0 Kcal</td>
</tr>
</tbody>
</table>
Kasarskis Equation

- **Men**
  \[(66 + (13.7 \times \text{weight}) + (5 \times \text{height}) - (6.76 \times \text{age})) + (55.96 \times \text{ALSFRS6 score}) - 168\]

- **Women**
  \[(665 + (9.6 \times \text{weight}) + (1.8 \times \text{height}) - (4.7 \times \text{age})) + 55.96 \times \text{ALSFRS6 score}) - 168\]

- Weight in kg
- Height in cm
- Age in years
- ALSFRS-6 (cumulative score of 6 questions)

ALS Functional Rating Scale (ALSFRS-6)

- Question 1: Speech
- Question 4: Handwriting
- Question 6: Dressing and Hygiene
- Question 7: Turning in Bed/Adjusting Bed Clothes
- Question 8: Walking
- Question 10a: Dyspnea
Example of Kasarskis Calculation

- **Age:** 60 years old
- **Sex:** male
- **Weight:** 180 lbs
- **Height:** 5’ 10” (70”)
- **ALSFRS-6 Score:** Score 19 of 24
  - **Speech:** 4
  - **Handwriting:** 2
  - **Dressing:** 2
  - **Turning in Bed:** 3
  - **Walking:** 4
  - **Dyspnea:** 4
- **Harris-Benedict BMR=** 1670 kcal
- **Adjust for ALS functional status:** \((55.96 \times \text{ALSFRS-6 score}) - 168 = 895\) kcal
- **Total Estimated Daily Caloric Need=** 1670 + 895 = 2565 kcal
**Study Results**

- **Screened=88**
  - **Excluded=10**
    - Failed swallow evaluation=6
    - Concurrent enrollment in trial=1
    - Unable to weigh themselves=1
    - Diagnosis changed from ALS=2

- **Randomized=78**

**Allocated to mHealth=26**
- Used mHealth app=20
- Did not use app=6

- **Completed Primary Outcome=20**
  - Deceased=0
  - Withdrew consent=1
  - Did not return to clinic=2
  - Televisit only=1
  - Discontinued due to AE=2
    - Due to Stroke
    - Due to Cancer

- **Analyzed=26**

**Allocated to In-Person=26**
- Communicated with RD=21
- Did not communicate=5

- **Completed Primary Outcome=19**
  - Deceased=4
  - Did not return to clinic=2
  - Televisit only=2*

- **Analyzed=26**

**Allocated to Standard Care=26**

- **Completed Primary Outcome=23**
  - Deceased=1
  - Withdrew Consent=1
  - Did not return to clinic=4*
  - Televisit only=1*

- **Analyzed=26**

*Provided weight and/or ALSFRS-R remotely*
## Baseline Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Standard Care N=26</th>
<th>In-person N=26</th>
<th>mHealth N=26</th>
<th>Overall p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male N(%)</td>
<td>11 (42.3%)</td>
<td>16 (61.5%)</td>
<td>20 (76.9%)</td>
<td>0.04</td>
</tr>
<tr>
<td>Age (mean±SD yrs)</td>
<td>57.5±10.9</td>
<td>58.5±11.9</td>
<td>54.7±11.5</td>
<td>0.47</td>
</tr>
<tr>
<td>Bulbar Onset N(%)</td>
<td>3 (11.5%)</td>
<td>2 (7.7%)</td>
<td>4 (15.4%)</td>
<td>0.69</td>
</tr>
<tr>
<td>ALSFRS-R (mean±SD)</td>
<td>36.7±5.4</td>
<td>34.9±6.7</td>
<td>37.4±6.2</td>
<td>0.35</td>
</tr>
<tr>
<td>Months since symptom onset (mean±SD)</td>
<td>22.3 (18.0)</td>
<td>26.1 (16.8)</td>
<td>27.1 (18.9)</td>
<td>0.60</td>
</tr>
<tr>
<td>BMI (mean±SD kg/m²)</td>
<td>26.8±5.1</td>
<td>25.7±4.1</td>
<td>26.0±4.5</td>
<td>0.70</td>
</tr>
<tr>
<td>Weight loss since diagnosis (mean ±SD kg)</td>
<td>3.4±5.5</td>
<td>6.3±7.1</td>
<td>2.1±3.4</td>
<td>0.03</td>
</tr>
</tbody>
</table>
Effects of Nutritional Counseling on Dietary intake

A. Carbohydrate Intake (grams)
B. Protein Intake (grams)
C. Fat Intake (grams)
D. Energy Intake (kCal)

Treatment Group: mHealth, In-Person, Standard Care
Change in Weight and Calories

A) Weight Change from Baseline

B) Calories Consumed as a Percent of Recommended

P-values for different treatment groups:
- Month 3: P=0.4, P=0.5
- Month 5: P=0.9
- Month 6: P=0.06, P=0.6, P=0.8
Change in Secondary Outcomes

A) ALSFRS-R Change from Baseline

B) PROMIS QOL Score Change from Baseline
Summary

- Nutritional counseling with a mHealth app led to greater dietary compliance than nutritional counseling alone.
- Counseling with an mHealth app led to greater weight stability, although not significantly different.
- Counseling with an mHealth app led to improved ALSFRS-R and QOL using PROMIS.
- Next steps?
ALS Nutrition App

- Nutritional Goals
- Tips to eat more calories
- Example Recipes
- Monitor your symptoms
  - Screen for swallowing problems
  - Monitor your ALSFRS-R progression
  - Notify providers
- Perform tasks for research
Bitesnap App

- Simply photograph your food
- Bitesnap will recognize what you are eating
- Tell Bitesnap how much you ate
- Bitesnap will calculate how many calories you ate
- Bitesnap will send those calorie results to Apple Healthkit or GoogleFit
Interested in Participating?

- Patient and caregiver volunteers will be needed to
  - Beta test the app
  - Publicize the app
  - Enroll in a research study using the app
- If interested, please contact:
  - Mansi Sharma
    - Phone: (508) 395-3479
    - Email: msharma13@mgh.harvard.edu
Healthy Eating in ALS

Jane Hubbard MS, RD, LDN, CBDT
Metabolism & Nutrition Research
Massachusetts General Hospital
Overview

- Nutrition Management in ALS
  - Your Team
  - Your Numbers

- Calculating Daily Calorie Requirements

- Weight Gain/Maintenance Techniques
  - Food Group Recommendations
  - High Calorie Suggestions
  - Symptom Management
Nutrition Management in ALS

- Current research suggests that it is important to prevent weight loss in patients with ALS.

- Maintaining and/or gaining weight may help increase the length and quality of your life.

- A well balanced diet is essential to maintaining body composition (preserving muscle mass and body fat stores) – this is the goal.
Nutrition Management in ALS

- Assessing calorie needs in people with ALS is very complex
- Weight loss and subsequent malnutrition is very common and may be due to:
  - Loss of appetite
  - Dysphagia
  - Difficulty feeding
  - Increased metabolism
  - Other symptoms
Nutrition Management in ALS

It's a Team Effort

- Physician
- Registered Nurse
- Registered Dietitian
- Physical Therapist
- Speech-Language Pathologist
- Occupational Therapist
- You and Your Caregiver
Nutrition Management in ALS
Your Team

- Physician (MD)
- Registered Nurse (RN)
  - Coordinate your medical care
Nutrition Management in ALS
Your Team

- **Physical Therapist (PT)**
  - Determine safe exercise and stretching habits and help you obtain necessary splints
Nutrition Management in ALS
Your Team

- Occupational Therapist (OT)
  - Evaluate the need for assistive devices for eating and drinking
  - Offer tools and techniques to grip utensils and assist with eating
Nutrition Management in ALS
Your Team

- Speech-Language Pathologist (SLP)
  - Swallow evaluation/food texture modification
  - Determine your safe food consistency
Nutrition Management in ALS
Your Team

- Registered Dietitian (RD)
  - Determine Calorie (energy) and Fluid Needs
  - Complete Body Measurements
    - Height/weight/waist/hip/BMI
  - Provide Appropriate Diet/Recipes Suggestions
  - Assist with Symptom Control
Know Your Numbers

- Simple measurements and calculations
  - Height
  - Weight (invest in a home scale)
  - BMI Calculation – aim for a BMI of >30
    - kg /m²
    - lb/(inches²) 703
  - Online Calculator
Determining Calorie Requirements

Predictive Equations

- **Mifflin-St Jeor Formula**

- **Harris Benedict Equation**
  Men: RMR = 66.47 + 13.75 X weight + 5.0 X height – 6.75 X age
  Women: RMR = 655.09 + 9.56 X weight + 1.84 X height – 4.67 X age

Height (cm)  Weight (kg)  Age (years)
Determining Calorie Requirements

- Use predictive equations with an ALS factor to calculate how many calories you need

- Kasarskis Calculator:
  - Men \((66+(13.7*\text{weight})+(5*\text{height})-(6.76*\text{age}))+ (55.96* \text{ALSFRS6 score})-168\)
  - Women \((665+(9.6*\text{weight})+(1.8*\text{height})-(4.7*\text{age}))+55.96*\text{ALSFRS6 score}-168\)

  - Weight in kg
  - Height in cm
  - Age in years
  - ALSFRS\(_{r}\) (cumulative score of 6 questions)
Determine Current Calorie Intake

- Determine the number of calories you are consuming now
  - Use the 24 hour recall method or
  - Use the 4 day food record method
    - Work with your Dietitian to determine your current calorie intake
Make up the difference

- Add more calories to promote weight gain
  - 3500 calories = 1 pound (rule of thumb)
    - 3500 calories/7 days = 500 extra calories per day
  - To gain 1 lb/week, add an extra 500 calories per day
  - Too fast?, add 250 calories per day
to gain ½ pound per week.
Weight Gain Recommendations

- Gaining weight is all about increasing the number of calories you consume in relation to the amount of energy you expend.
- Eating more calories than your body needs will tip the scales.
- Aim for slow and steady weight gain.
  - .5 to 1 pound per week.
Weight Gain Recommendations
add 250-500 calories per day

- Food Only – add calories to foods
- Supplements – add commercial drinks or make your own smoothies
- Tube Feeding – supplement your intake with a nighttime tube feeding.
Example Calculation

**Example**

<table>
<thead>
<tr>
<th>Daily Calorie Requirements (calories/day)</th>
<th>Current Calorie Intake (phone app)</th>
<th>Difference</th>
<th>BMI Value</th>
<th>BMI Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>2600</td>
<td>1800</td>
<td>800 deficit</td>
<td>20</td>
<td>25-30</td>
</tr>
</tbody>
</table>

- 800 calorie deficit
- Add 800 calories just to maintain current weight
- Low BMI – Add more calories to gain weight
  3500 calories = 1 pound (rule of thumb)
  Add an extra 125-250 calories per day to gain 1-2 pounds per month
Weight Gain Techniques

Keep it healthy. Choose foods from all 5 food groups

Dairy

Vegetables

Fruit

Protein

Fats/Oils
Separate calories into food groups and consume colorful foods to ensure that you get what you need in terms of macronutrients and micronutrients.

If your base calories come from the 5 food groups and are within the recommended amount, your extra calories can come from whatever feels right.
### What 1800 Calories Looks Like

<table>
<thead>
<tr>
<th>Food Group</th>
<th>Serving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy (milk, yogurt)</td>
<td>3 cups</td>
</tr>
<tr>
<td>Protein (meat, fish, poultry/eggs/nuts/ seeds)</td>
<td>5 oz.</td>
</tr>
<tr>
<td>Fruit</td>
<td>2 cups</td>
</tr>
<tr>
<td>Vegetables</td>
<td>2.5 cups</td>
</tr>
<tr>
<td>Grain (bread, rice, pasta)</td>
<td>6 oz. (equivalents)</td>
</tr>
<tr>
<td>Fat (oils, butter)</td>
<td>4 tsp</td>
</tr>
<tr>
<td>Treats</td>
<td>1</td>
</tr>
<tr>
<td>Food Item</td>
<td>Food Group Category</td>
</tr>
<tr>
<td>----------------------------------------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>Instant Oatmeal Prepared with Water (1 packet)</td>
<td>G</td>
</tr>
<tr>
<td>Low Fat Milk (4oz)</td>
<td>D</td>
</tr>
<tr>
<td>Wheat Toast (1 slice) with Jelly (1 tsp)</td>
<td>G/O</td>
</tr>
<tr>
<td>Orange Juice (8oz)</td>
<td>F</td>
</tr>
<tr>
<td>Tuna Sandwich (1/2 can, water packed) w/mayo/lettuce/tomato slices</td>
<td>G/P/O/V</td>
</tr>
<tr>
<td>Fresh Banana</td>
<td>F</td>
</tr>
<tr>
<td>Low Fat Milk (8oz)</td>
<td>D</td>
</tr>
<tr>
<td>Grilled Chicken Breast (3 oz)</td>
<td>P</td>
</tr>
<tr>
<td>Baked Potato (medium) with butter (1 tsp)</td>
<td>G/O</td>
</tr>
<tr>
<td>Steamed Mixed Vegetables (1.5 cup)</td>
<td>V</td>
</tr>
<tr>
<td>Chocolate Ice Cream (1 cup)</td>
<td>Treat/D</td>
</tr>
<tr>
<td>Low Fat Yogurt (6 oz) and Berries (3/4 cup)</td>
<td>D/F</td>
</tr>
<tr>
<td><strong>Total Calories</strong></td>
<td></td>
</tr>
</tbody>
</table>
## What 2600 Calories Looks Like

<table>
<thead>
<tr>
<th>Food Group</th>
<th>Serving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy (milk, yogurt)</td>
<td>3 cups</td>
</tr>
<tr>
<td>Protein (meat, fish, poultry/eggs/nuts/seeds)</td>
<td>6.5 oz.</td>
</tr>
<tr>
<td>Fruit</td>
<td>2 cups</td>
</tr>
<tr>
<td>Vegetables</td>
<td>3.5 cups</td>
</tr>
<tr>
<td>Grain (bread, rice, pasta)</td>
<td>10 oz. (equivalents)</td>
</tr>
<tr>
<td>Fat (oils, butter)</td>
<td>4 tsp</td>
</tr>
<tr>
<td>Supplement (240 calories)</td>
<td>1</td>
</tr>
</tbody>
</table>
## Adding Calories with Food

<table>
<thead>
<tr>
<th>Carbohydrate Foods</th>
<th>Protein Foods</th>
<th>Fats and Oils</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 calories per gram</td>
<td>4 calories per gram</td>
<td>9 calories per gram</td>
</tr>
</tbody>
</table>
## Adding Calories with Food

<table>
<thead>
<tr>
<th>Food Item</th>
<th>Calories</th>
<th>Protein</th>
<th>Fat</th>
<th>CHO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butter TB</td>
<td>102</td>
<td>0.12</td>
<td>11.5</td>
<td>0.009</td>
</tr>
<tr>
<td>Margarine TB</td>
<td>100</td>
<td>0.023</td>
<td>11.1</td>
<td>0.099</td>
</tr>
<tr>
<td>Mayo TB</td>
<td>94</td>
<td>0.132</td>
<td>10.3</td>
<td>0.078</td>
</tr>
<tr>
<td>Olive Oil TB</td>
<td>119</td>
<td>0</td>
<td>13.5</td>
<td>0</td>
</tr>
<tr>
<td>Canola Oil TB</td>
<td>120</td>
<td>0</td>
<td>13.6</td>
<td>0</td>
</tr>
<tr>
<td>Corn Oil TB</td>
<td>123</td>
<td>0</td>
<td>13.6</td>
<td>0</td>
</tr>
<tr>
<td>Avocado Oil TB</td>
<td>120</td>
<td>0</td>
<td>13.6</td>
<td>0</td>
</tr>
</tbody>
</table>

CHO = carbohydrate
## Adding Calories with Food

<table>
<thead>
<tr>
<th>Food Item</th>
<th>Calories</th>
<th>Protein gm</th>
<th>Fat gm</th>
<th>CHO gm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avocado 1/2</td>
<td>114</td>
<td>1.3</td>
<td>10.5</td>
<td>5.9</td>
</tr>
<tr>
<td>Peanut Butter 2TB</td>
<td>193</td>
<td>7.2</td>
<td>16.6</td>
<td>7.2</td>
</tr>
<tr>
<td>Almond Butter 2TB</td>
<td>192</td>
<td>6.6</td>
<td>17.3</td>
<td>5.9</td>
</tr>
<tr>
<td>Cashew Butter 2TB</td>
<td>188</td>
<td>5.6</td>
<td>15.8</td>
<td>8.8</td>
</tr>
<tr>
<td>Peanuts 1/4cup</td>
<td>214</td>
<td>8.9</td>
<td>18.1</td>
<td>7.8</td>
</tr>
<tr>
<td>Walnuts 1/4cup</td>
<td>191</td>
<td>4.5</td>
<td>19.1</td>
<td>4.0</td>
</tr>
<tr>
<td>Almonds 1/4cup</td>
<td>206</td>
<td>7.2</td>
<td>18.1</td>
<td>7.2</td>
</tr>
<tr>
<td>Hazelnuts 1/4cup</td>
<td>218</td>
<td>5.1</td>
<td>21.1</td>
<td>5.9</td>
</tr>
</tbody>
</table>
# Adding Calories with Food

<table>
<thead>
<tr>
<th>Food Item</th>
<th>Calories</th>
<th>Protein</th>
<th>Fat</th>
<th>CHO</th>
<th>Calcium</th>
<th>Vitamin D mcg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yogurt (whole) 6oz</td>
<td>104</td>
<td>5.9</td>
<td>5.5</td>
<td>7.9</td>
<td>206</td>
<td>.085</td>
</tr>
<tr>
<td>Yogurt (Greek) 6oz</td>
<td>198</td>
<td>6.1</td>
<td>16.4</td>
<td>7.3</td>
<td>225</td>
<td>.081</td>
</tr>
<tr>
<td>Cheese (whole) 1oz</td>
<td>115</td>
<td>6.5</td>
<td>9.4</td>
<td>.88</td>
<td>201</td>
<td>.17</td>
</tr>
<tr>
<td>Cow’s Milk (whole) 8oz</td>
<td>149</td>
<td>7.7</td>
<td>7.9</td>
<td>11.7</td>
<td>276</td>
<td>3.1</td>
</tr>
<tr>
<td>Soy Milk (sw/fort) 8oz</td>
<td>104</td>
<td>6.3</td>
<td>3.6</td>
<td>12</td>
<td>299</td>
<td>2.6</td>
</tr>
<tr>
<td>Soy Milk (usw/fort) 8oz</td>
<td>74</td>
<td>7.8</td>
<td>3.8</td>
<td>3.6</td>
<td>300</td>
<td>3.0</td>
</tr>
<tr>
<td>Almond Milk (sw/fort) 8oz</td>
<td>56</td>
<td>1.0</td>
<td>2.5</td>
<td>8.1</td>
<td>450</td>
<td>2.5</td>
</tr>
<tr>
<td>Coconut Milk (uns/fort) 8oz</td>
<td>43</td>
<td>.47</td>
<td>4.5</td>
<td>.87</td>
<td>100</td>
<td>3.0</td>
</tr>
</tbody>
</table>
Easy Ways to Measure out Extra Calories

**Visual Hand Guide to Portion Sizes**

- Your fingertip is about 1 teaspoon
- Your thumb is about 2 tablespoons
- *Measure one tablespoon from your knuckle to the tip of your thumb
- The front of your closed fist is about 1/2 cup
- A clenched fist is the size of a 1 cup serving
- Your palm is 3-4 oz, which is a standard serving of meat
Techniques to Increase Calorie Intake

- Limit your intake of non-caloric foods and beverages (coffee, tea, water) These have no calorie benefit
- Capitalize on the times you have an appetite and add a few extra bites
- Try not to skip any meals
- Consume small frequent meals, every 2-3 hours throughout the day
- Try drinking some of your calories (whole milk, 100% fruit juice, a smoothie, meal replacement formula)
Adding Calories Without Adding Too Much Volume

- Add regular sour cream or plain whole fat Greek yogurt as a topping to baked potatoes or casseroles.
- Sprinkle chopped or ground nuts and seeds on cereals, salads, yogurt, or into smoothies.
- Add a scoop of nut butter and/or dried fruit or syrup to oatmeal.
- Always choose regular mayo, salad dressings, cream cheese, etc. Avoid diet or low fat products.
Adding Calories Without Adding Too Much Volume

- Add a TB of ground flax seeds, chia seeds or wheat germ to recipes for increased calories, healthy fats and fiber

- Add dried milk powder into milk, smoothies, or soups for added protein and calories

- Add sliced avocado to sandwiches or salads for a creamy texture and additional calories
250 Calorie Snack Ideas

- 2 oz cheese (any kind) and crackers
- Oatmeal/whole milk/honey/fruit
- Mini bagel with peanut butter
- Yogurt/berries/granola (look for whole milk yogurt)
- Hot chocolate with whole milk and whipped cream
- Tortilla chips and guacamole (100 Calorie servings available)
- Whole wheat crackers, nut butter and fresh apple
- Prepackaged peanut butter and crackers
- Prepackaged granola bar (any kind you like) and Juice
<table>
<thead>
<tr>
<th>Food Item</th>
<th>Food Group Category</th>
<th>Calories</th>
<th>Changes</th>
<th>Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instant Oatmeal Prepared with Water (1 packet)</td>
<td>G</td>
<td>165</td>
<td>Whole milk</td>
<td>315</td>
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<tr>
<td>Low Fat Milk (4oz)</td>
<td>D</td>
<td>50</td>
<td>Whole milk</td>
<td>75</td>
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<tr>
<td>Wheat Toast (1 slice) with jelly (1 tsp)</td>
<td>G/O</td>
<td>85</td>
<td>Butter or Marg</td>
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<tr>
<td>Orange Juice (8oz)</td>
<td>F</td>
<td>110</td>
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<td>110</td>
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<tr>
<td>Tuna Sandwich (1/2 can, water packed) w/mayo/lettuce/tomato slices</td>
<td>G/P/O/V</td>
<td>340</td>
<td>Oil packed</td>
<td>410</td>
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<td>Fresh Banana</td>
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<td>75</td>
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<td>75</td>
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<tr>
<td>Low Fat Milk (8oz)</td>
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<td>100</td>
<td>Whole milk</td>
<td>150</td>
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<tr>
<td>Grilled Chicken Breast (3oz)</td>
<td>P</td>
<td>145</td>
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<td>145</td>
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<tr>
<td>Baked Potato (medium) with butter (1 tsp)</td>
<td>G/O</td>
<td>150</td>
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<td>150</td>
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<tr>
<td>Steamed mixed vegetables (1.5 cup)</td>
<td>V</td>
<td>85</td>
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<td>85</td>
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<tr>
<td>Chocolate Ice Cream (1 cup)</td>
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<td>Premium brand</td>
<td>500</td>
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<tr>
<td>Low Fat Yogurt (6oz) and Berries (3/4 cup)</td>
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<td>210</td>
<td>Greek yogurt</td>
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<td><strong>Total Calories</strong></td>
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<td><strong>2605</strong></td>
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Adding Calories with Smoothies or Liquid Supplements
Constructing a Smoothie

- **Begin with Colorful Fruits and Vegetables**
  - Peeled (apples, pears, peaches, banana, mango)
  - Berries (any kind) fresh, frozen, dried, canned
  - Greens (kale, spinach, arugula, collard, mustard)
  - Herbs & Spices (cinnamon, ginger, cloves, turmeric, cocoa)
  - Fruit Juices or Nectars

Choose Color
Boosting Calories in a Smoothie

- **Liquid Base** (choose a high calorie base)
  - Milk (choose any type – cows, soy, almond, coconut, etc)
  - Supplement such as Boost or Ensure

- **Add Protein**
  - Whey or plant based protein powder
  - Silken Tofu, or soft cheese (cottage or mascarpone)
  - Nut butters (almond, peanut, etc.)
  - Powdered milk
  - Whole milk, or Greek yogurt
Boosting Calories in a Smoothie

- Additional Calories and Fiber.
  - Seeds (flax, chia, etc)
  - Nuts or nut butters (almonds, walnuts, pecan, etc)
  - Avocado – adds a creamy texture
  - Oils (olive, canola, coconut, etc)
  - Ice cream, heavy cream
Blueberry Avocado Smoothie

- 1 cup blueberries
- ½ avocado
- ½ cup apple juice (or any 100% fruit juice)
- ½ cup whole milk (any kind)
- 6 oz regular vanilla yogurt
- 1 TB flaxseed

Recipe = 550 calories
Techniques to Increase Calorie Intake

- Oral Supplements are a convenient source of calories/protein
- Some of these may also be used as tube feedings

- Ensure Original (8oz) 220 calories
- Boost Original (8oz) 240 calories
- Carnation Breakfast Drink (8oz) 240 calories
- Fibersource HN (8.45oz) 300 calories
- Ensure Plus (8oz) 350 calories
- Isosource 1.5 (8.45oz) 375 calories
- Resource 2.0 (8oz) 480 calories

- https://www.nestlehealthscience.us/brands
What About Other Supplements?

- There are many supplements on the market (vitamin, mineral, herbal, amino acid, etc.)
- Packaging can be confusing and/or misleading
- Manufacturers of supplements do not have to provide the FDA with data that demonstrate the safety or purity of their products prior to marketing
- Many supplements interact with medications, using the same metabolic pathways and may interfere with absorption.
- Ask your Physician, Nurse or Dietitian prior to use
Symptom Management

- Exhaustion
  - Try to nap before meals
  - Eat soft foods that involve less chewing
  - Cut your food into small pieces
  - Substitute a high calorie supplement for all or part of a meal
  - Choose from all foods groups for more balanced meals
  - Consume small, more frequent meals (6 per day). Try smaller portions at mealtimes and nutritious snacks between meals and in the evening
  - Avoid foods that require lengthy chewing like steak and salad
  - Use your feeding tube to supplement your intake
Symptom Management

■ Constipation

Constipation can be helped by eating a diet high in fiber and by drinking lots of fluids. Fiber and fluid work together to make the stool soft and to keep your bowel movements regular.

■ Foods that contain Fiber

■ Whole grain and whole wheat products, such as breads, cereals, pasta, brown rice, oats, barley and quinoa
■ Legumes such as cooked dried peas, beans, and lentils
■ Seeds, such as flax, and chia. Nuts
■ Vegetables and fruits, including dried
■ Supplements that contain fiber (Fibersource, Jevity)
Symptom Management

- **Dehydration**
  - Water is the best to rehydrate your body, but fruit juices, milk and broth are all good choices.
  - Eat foods with high water content. Liquid in your solid food counts towards your daily total. Choose fruits, vegetables, soups, stews, popsicles, water ice and gelatins.

- Fluid Needs = 1 cc per calorie (rule of thumb)
- 2600 calories = 2600 cc / 30 cc = 86.6 oz / 8 oz = 10.8 cups
  - (30 cc per fluid ounce)
Symptom Management

- **Swallowing**
  - Diets with modified textures are a key strategy for people who have difficulty chewing or swallowing.
  - Work with your Speech-Language Pathologist to determine the appropriate food texture and beverage thickness, then your dietitian for diet/food suggestions.
  - It is very important to continue to consume a variety of foods and to maintain intake of liquids while following a modified texture diet.
  - Modified texture diets change throughout the progression of ALS – reevaluate your needs often!
Symptom Management

- **Excess Saliva Production**
  - Remember to swallow frequently, but slowly and carefully.
  - Foods that are very sweet or very sour may stimulate salivation.
  - Stay well hydrated.
  - If you feel that milk thickens your saliva, try soy substitutes for milk, ice cream, and yogurt in drinks and cereal.
  - You may be better able to tolerate foods with “cooked” milk such as pudding and custard.
  - Eat foods with higher water content such as canned fruits, well cooked vegetables, yogurt, custard and pudding.
Key Points

■ Evaluate and re-evaluate nutritional status often – use your team!
  ■ Weight / BMI
  ■ Calorie needs change throughout the progression of ALS
  ■ Swallowing
  ■ Breathing
  ■ Calorie Needs / Calorie Intake / Fluid Intake
  ■ Symptoms

■ Consider a feeding tube early
  ■ When ALS interferes with the ability to swallow food and fluids
  ■ When nutrition needs cannot be met by eating
  ■ Before significant weight loss
  ■ Before breathing is severely impaired
Thanks!

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