

Nutrition Therapy Recommendations in Prevention and Recovery of Brain Injury and Stroke

Northeast Rehabilitation Hospital Network
Wendy Jeffco MS, RDN, LD



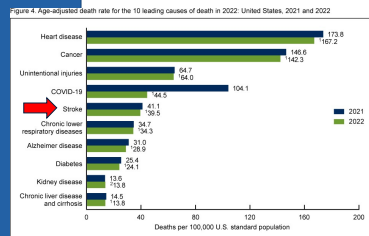
1

Learning Objectives

- Identify two diet or lifestyle recommendations for primary stroke prevention.
- Identify two diet or lifestyle modifications after a brain injury to aid in recovery and/or secondary stroke prevention.
- Demonstrate how to read a nutrition label and implement diet and lifestyle changes.

2

Stroke Statistics



- Each year 600,000 US residents have a first stroke.
- 200,000 will have a recurrent event.
- Nearly 160,000 will pass away.
 - Fifth leading cause of death in the United States.

1.) 2024 Guideline for the Primary Prevention of Stroke: A Guideline From the American Heart Association/American Stroke Association. [Stroke](#). Volume 55, Issue 12, December 2024; Pages e344-e424
2.) Kochanek KD, Murphy SL, Xu JQ, Arias E. Mortality in the United States, 2022. NCHS Data Brief, no 492. Hyattsville, MD: National Center for Health Statistics. 2024. DOI: <https://dx.doi.org/10.15620/cdc:135850>

3

Stroke Prevention

- Half of stroke events could be prevented.
 - Implementation of strategies to improve risk factors
 - Modifiable risk factors
 - Healthy Diet



1.) 2024 Guideline for the Primary Prevention of Stroke: A Guideline From the American Heart Association/American Stroke Association. [Stroke](#). Volume 55, Issue 12, December 2024; Pages e344-e424

4

Healthy Diet Recommendations

- Primary Prevention
- Mediterranean Diet



1.) 2024 Guideline for the Primary Prevention of Stroke: A Guideline From the American Heart Association/American Stroke Association. *Stroke*. Volume 55, Issue 12, December 2024; Pages e344-e424

5

Mediterranean Diet

- Focus on overall healthy eating and lifestyle patterns
- Based on traditional foods of countries bordering the Mediterranean Sea
- Emphasis on plant-based foods and healthy fat



3.) American Heart Association. What is the Mediterranean Diet? (<https://www.heart.org/en/healthy-living/healthy-eating/eat-smart/nutrition-basics/mediterranean-diet>) Accessed 3/14/2024.
4.) Cleveland Clinic. Mediterranean Diet. (<https://my.clevelandclinic.org/health/articles/16037-mediterranean-diet>) Accessed 3/14/24.

6

Mediterranean Diet

- Fruits
 - 2-3 servings fruits/day
 - Serving: 1 medium piece or 1 cup
- Add at breakfast or as dessert
- Include as a snack
- Add to salads
- Make a smoothie
- Wash fruit when you bring it home from the store so it is ready to go.



4.) Cleveland Clinic. Mediterranean Diet. (<https://my.clevelandclinic.org/health/articles/16037-mediterranean-diet>) Accessed 3/14/24.

7

Mediterranean Diet

- Vegetables
 - 3-4 servings of vegetables/day
 - Serving: 2 cups of leafy greens, 1 cup of raw veggies, or ½ cup of cooked
- Add to omelets or have a breakfast wrap
- Add to smoothies, soups
- Have as a salad
- Grill or roast vegetables
- Make a stir fry
- Have vegetables prepped and accessible



4.) Cleveland Clinic. Mediterranean Diet. (<https://my.clevelandclinic.org/health/articles/16037-mediterranean-diet>) Accessed 3/14/24.

8

Mediterranean Diet

- Whole Grains
 - 3-6 servings/day
 - Serving: ½ cup cooked grains, pasta or cereal, 1 cup of dry cereal, 1 slice of bread
- Oats, barley, quinoa, brown rice
- Baked or roasted potato or sweet potato
- Whole grain bread, cereal, couscous, pasta



4.) Cleveland Clinic. Mediterranean Diet. (<https://my.clevelandclinic.org/health/articles/16037-mediterranean-diet>) Accessed 3/14/24.

9

Choosing Whole Grain

- “100% Whole Grain”
- The first ingredient listed contains the word “whole” it is likely predominantly whole grain product
- Look for the whole grain stamp



5.) The Whole Grain Council. <https://wholegraincouncil.org>. Accessed 3/24/25.

10

Mediterranean Diet

- Extra Virgin Olive Oil
 - 1-4 servings per day
 - Serving: 1 tablespoon
- Use in cooking
- Drizzle on salads, cooked vegetables, pasta
- Use as a dip for bread
- Avocado oil also a good choice
 - Higher smoke point



4.) Cleveland Clinic. Mediterranean Diet. (<https://my.clevelandclinic.org/health/articles/16037-mediterranean-diet>) Accessed 3/14/24.

11

Mediterranean Diet

- Legumes
 - 3 servings per week
 - Serving: ½ cup
- Lentils and Beans: cannellini, chickpeas, fava, kidney
- Add to salads, soups or pasta dishes
- Try hummus or bean dip
- Choose veggie or bean burger




4.) Cleveland Clinic. Mediterranean Diet. (<https://my.clevelandclinic.org/health/articles/16037-mediterranean-diet>) Accessed 3/14/24.

12

3 Servings per week

Mediterranean Diet

- Fish and Seafood
 - 3 servings per week
 - Serving: 3-4 ounces
- Select omega-3 rich fish:
 - Salmon, Sardines, Herring, Tuna, Mackerel
- Bake, broil or grill



EAT AT LEAST 3 SERVINGS A WEEK.

Fish/seafood, nuts, legumes


4.) Cleveland Clinic. Mediterranean Diet. (<https://my.clevelandclinic.org/health/articles/16037-mediterranean-diet>) Accessed 3/14/24.

13

3 Servings per week

Mediterranean Diet

- Nuts
 - 3 servings per week
 - Serving: ¼ cup nuts or 2 TBS nut butter
- Ideally choose walnuts, pistachio, Brazil
 - Raw and unsalted
- Add to cereal, salad, yogurt
- Eat alone or with dried fruit as a snack



EAT AT LEAST 3 SERVINGS A WEEK.

Fish/seafood, nuts, legumes

4.) Cleveland Clinic. Mediterranean Diet. (<https://my.clevelandclinic.org/health/articles/16037-mediterranean-diet>) Accessed 3/14/24.

14

1 Servings per day

Mediterranean Diet

- Poultry
 - 1 serving per day
 - Serving: 3-4 ounces
- Choose white meat
- Remove the skin
- Bake, broil or grill



LIMIT TO 1 SERVING A DAY.

Poultry, low-fat dairy, eggs


4.) Cleveland Clinic. Mediterranean Diet. (<https://my.clevelandclinic.org/health/articles/16037-mediterranean-diet>) Accessed 3/14/24.

15

1 Servings per day

Mediterranean Diet

- Dairy
 - 1 serving per day
 - Serving: 1 cup milk or yogurt, 1 ½ ounce of cheese
- Choose low-fat cheese
- Choose fat-free or 1% milk, yogurt, cottage cheese
- Avoid cream-based sauces, dressings and soups
 - Ask for items on the side



LIMIT TO 1 SERVING A DAY.

Poultry, low-fat dairy, eggs

4.) Cleveland Clinic. Mediterranean Diet. (<https://my.clevelandclinic.org/health/articles/16037-mediterranean-diet>) Accessed 3/14/24.

16

1 Servings per day

Mediterranean Diet

- Eggs
 - 1 egg per day
- No limit on egg whites
- Wine (optional)
 - 1 serving: 3.5 ounces
 - Women: 1 serving per day
 - Men: 2 servings per day
 - But if you don't already drink, don't start

LIMIT TO 1 SERVING A DAY.



Poultry, low-fat dairy, eggs

4.) Cleveland Clinic. Mediterranean Diet. (<https://my.clevelandclinic.org/health/articles/16037-mediterranean-diet>) Accessed 3/14/24.


17

1 Servings per week

Mediterranean Diet

- Red meat
 - 1 serving per week
 - Serving: 3-4 ounces
- Choose lean cuts (tenderloin, sirloin, flank steak)
- Sweets and Dessert
 - Avoid commercially prepared items
 - Limit homemade goods to no more than 3 per week

LIMIT TO 1 SERVING PER WEEK.



Red meat, sweets

4.) Cleveland Clinic. Mediterranean Diet. (<https://my.clevelandclinic.org/health/articles/16037-mediterranean-diet>) Accessed 3/14/24.

18

Mediterranean Lifestyle


- Exercise regularly, ideally with others
- Avoid smoking or using any tobacco products
- Prepare and enjoy meals with family and friends
- Cook more often than you eat out



4.) Cleveland Clinic. Mediterranean Diet. (<https://my.clevelandclinic.org/health/articles/16037-mediterranean-diet>) Accessed 3/14/24.

19

Sodium Intake



- Recommended daily sodium intake:
 - Less than 2300 milligrams a day^{USDA}
 - Less than 1500mg for those with hypertension^{AHA}
- Average American consumes ~3300mg/day^{CDC}
- 1 tsp table salt has 2300mg of Sodium
 - Celtic Sea Salt: 1 tsp has 1920mg
 - Himalayan Salt: 1 tsp has 2000mg

4.) Cleveland Clinic. Mediterranean Diet. (<https://my.clevelandclinic.org/health/articles/16037-mediterranean-diet>) Accessed 3/14/24.

20

Salt Substitute

- Use of salt substitute reduced risk of stroke,
 - Potassium Chloride vs. Sodium Chloride
 - Caution if taking potassium-sparing diuretic
 - Caution with kidney disease
 - Check with your physician

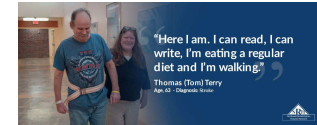


1.) 2024 Guideline for the Primary Prevention of Stroke: A Guideline From the American Heart Association/American Stroke Association. *Stroke*. Volume 55, Issue 12, December 2024; Pages e344-e424

21

Eating for Recovery

- Nutrition Assessment by RD
 - Ideally within first 48hrs,
- Create an individualized nutrition treatment.
- Patients with individualized nutrition treatment had improved skeletal muscle mass, motor function, dysphagia and shortened length of stay,



7.) Ko SH, Shin YI. Nutritional Supplementation in Stroke Rehabilitation: A Narrative Review. *Brain Neurorehabil.* 2022 Mar 25;15(1):e3.

22

Eating for Recovery

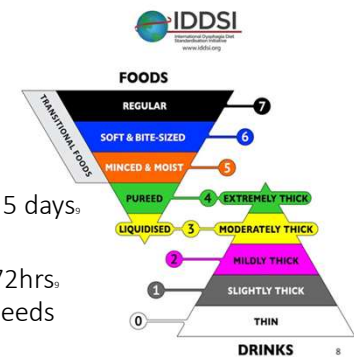
- Malnutrition
 - Present in 25% of stroke patients in the first weeks after a stroke,
 - Higher mortality rate at 6mos.
 - Predictor of lower functional outcome improvements.

7.) Ko SH, Shin YI. Nutritional Supplementation in Stroke Rehabilitation: A Narrative Review. *Brain Neurorehabil.* 2022 Mar 25;15(1):e3.

23

Eating for Recovery

- Early nutrition support
 - Within first 24-48hrs,
 - ≤50% needs anticipated > 5 days,
- Dysphagia
 - SLP evaluation within 24-72hrs,
 - Revisit nutrition support needs
 - ≤50% needs > 5 days
 - ≤75% needs > 7 days



8.) International Dysphagia Diet Standardization Initiative. <https://iddsi.org>. Accessed 3/24/25.

9.) Ojo O, Brooke J. The Use of Enteral Nutrition in the Management of Stroke. *Nutrients*. 2016 Dec 20;8(12):827.

24

Eating for Recovery

- Cognitive Deficits
 - Small, frequent meals
 - Proper environment
- Self-feeding deficits
 - Assistance at meals
 - Assistive devices
- Meal Preparation
 - Assistance with shopping and cooking
 - Food delivery programs



25

Eating for Recovery

- Fatigue
 - Plan meals and snacks accordingly
 - Monitor for dehydration
- Increased nutritional needs
 - 25-45 calories/kg¹⁰
 - 1.2-1.5 gram of protein/kg¹¹
 - 25-35 ml fluids/kg
- Diet liberalization until prognosis and/or disability improves¹¹



10.) Escott-Stump, S. (2022). *Nutrition and Diagnosis Related Care* (9th ed., pp. 335-339). Academy of Nutrition and Dietetics.
 11.) American Dietetic Association. *Nutrition Care Manual. Ischemic Stroke and Cerebrovascular Accident (CVA)*. www.nutritioncaremanual.org. Accessed 12/18/2024.

26

Eating for Recovery

- Nutritional Supplement
 - For patients with, or at risk, of malnutrition
 - Reduced pressure sores
 - Increased energy and protein intake
 - Improved cognitive function
 - Improved motor function
- High protein: 15-20grams per serving
 - Research considering specific amino acid supplementation
- Shakes, bars, powders



7.) Ko SH, Shin YI. Nutritional Supplementation in Stroke Rehabilitation: A Narrative Review. *Brain Neurorehabil.* 2022 Mar 25;15(1):e3.

27

Eating for Recovery

- Vitamin Supplementation
- B Vitamins (B6, B12, Folate):
 - Promoted functional stroke recovery
 - Promoted recovery of learning and memory functions
 - Lowered hazard of major depression
- Vitamin D:
 - For those with vitamin D deficiency or insufficiency
 - Improved activity levels
 - Improved balance
- More research needed



7.) Ko SH, Shin YI. Nutritional Supplementation in Stroke Rehabilitation: A Narrative Review. *Brain Neurorehabil.* 2022 Mar 25;15(1):e3.

28

Eating for Recovery

- Mineral Supplementation
- Magnesium Sulfate:
 - Neuroprotective effect
 - Reduced risk of ischemic stroke
 - Better neurologic recovery
- More research is needed



7.) Ko SH, Shin Yi. Nutritional Supplementation in Stroke Rehabilitation: A Narrative Review. Brain Neurorehabil. 2022 Mar 25;15(1):e3.

29

Healthy Diet Recommendations

- Secondary Prevention
- Mediterranean Diet
- DASH (Dietary Approaches to Stop Hypertension)¹¹



1.) 2024 Guideline for the Primary Prevention of Stroke: A Guideline From the American Heart Association/American Stroke Association. Stroke. Volume 55, Issue 12, December 2024; Pages e344-e424
11.) American Dietetic Association. Nutrition Care Manual. Ischemic Stroke and Cerebrovascular Accident (CVA). www.nutritioncaremanual.org. Accessed 12/18/2024.

30

DASH Diet

- Hypertension is the number one modifiable factor in secondary stroke prevention ¹²
- Reductions of 10mmHg systolic and 5mmHg diastolic associated with 40% reduction in stroke risk ¹²
 - DASH Diet have shown to reduce BP by 5.5mmHg systolic and 3mmHg diastolic ¹³
- The DASH diet was developed to combat hypertension ¹³



12.) Bochner AK, Eisenwa C, Elkind MS. Stroke Risk Factors, Genetics, and Prevention. Circ Res. 2017 Feb 3;120(3):472-495.
13.) Sheenam Suri, et al. DASH Dietary Pattern: A Treatment for Non-communicable Diseases. Curr Hypertens Rev. 2020 Aug; 16(2):108-114.

31

DASH Diet

- Emphasizes:
 - Vegetables, fruits, and whole grains
 - Moderate fat-free or low-fat dairy products, fish, poultry, beans, nuts, and vegetable oils
 - Limit Saturated Fat (meats, dairy)
 - Limiting sugar-sweetened beverages and sweets
- Keeps sodium intake to less than 1500mg

DASH Eating Plan	
The Benefits: Lowers blood pressure & LDL "bad" cholesterol.	
✓ Eat This	⚠ Limit This
Vegetables	Fatty meats
Fruits	
Whole grains	Full-fat dairy
Fat-free or low-fat dairy	Sugar sweetened beverages
Fish	Sweets
Poultry	
Beans	Sodium intake
Nuts & seeds	
Vegetable oils	
www.nhlbi.nih.gov/DASH	

13.) Sheenam Suri, et al. DASH Dietary Pattern: A Treatment for Non-communicable Diseases. Curr Hypertens Rev. 2020 Aug; 16(2):108-114.

32

DASH vs. Mediterranean

Food	DASH	Mediterranean
Fruits	4-5 daily	2-3 daily
Vegetables	4-5 daily	3-4 daily
Whole Grains	6-8 daily	3-6 daily
Fats and Oil	2-3 daily	1-4 daily <i>*Olive Oil</i>
Dry beans, peas or legumes and Nuts	4-5 weekly	6 weekly
Fish and Seafood		3 weekly
Poultry	2-3 daily	1 daily
Meats		1 weekly
Fat-free or Low-Fat Dairy	2-3 daily	1 daily
Sweets	5 or less weekly	Limit

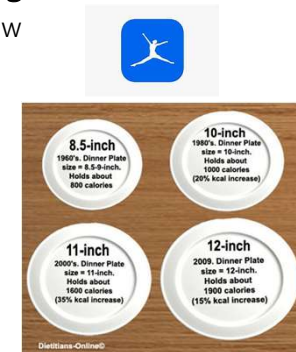
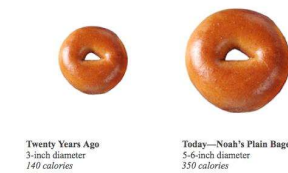
33

Making Lifestyle Changes

Assess Where You Are Now

- Current diet?
- Myfitnesspal.com

Control Portion Sizes



34

Making Lifestyle Changes

- Have support
 - Can everyone in the house participate?
- Set yourself up for success
 - Don't bring home poor food choices
 - Plan, plan, plan!
- Set goals you can reach
 - Make small changes
 - One change every 2-3 weeks
 - You don't have to be perfect



35

Lifestyle Changes

Use Olive Oil Replace butter and processed oils with extra virgin olive oil for cooking, dressings and dipping.	Appreciate the Meal Eat at the table with friends or family. Slow down and focus on your meal.	Fruits Include 2-3 servings per day. One serving of fruit: medium piece of whole fruit or one cup of chopped.
Vegetables Include 3 – 4 servings per day. One serving of vegetables: two cups of leafy greens, one cup of raw veggies, or half a cup of cooked.	Include Plant-Based Protein Include 3 servings per week of beans, peas, soybeans, lentils. One serving is ½ cup.	Enjoy some Dairy Skim or 1% milk, low-fat cottage cheese, and low-fat Greek or plain yogurt. Limit how much cheese you eat. One serving is about the size of four dice.
Spice It Up Herbs and spices boost flavor and lessen the need for salt. Consider salt substitute.	Whole Grains Aim to have at least 3 oz of whole grains daily. 1 ounce = a slice of bread, a cup of ready-made cereal, or half a cup of cooked rice or pasta.	Avoid Added Sugar Avoid commercially prepared sweets. Choose water over sugary beverages. Avoid refined grains.
Eat Nuts Each week, aim to eat four servings of raw, unsalted nuts. One serving = quarter of a cup.	Avoid Smoking Ask those around you for support and create an environment for success.	Eat more Seafood Fish 3 times a week. One serving of fish = around 3 to 5 ounces for adults. That's about the size of a deck of cards.
Eat out Less Cook at home more often than you eat out. This allows you to control what is going into your food and on your plate.	Reduce red and processed meat Eat more fish, poultry or beans instead. If you eat meat, make sure it's lean and keep portions small. And before you cook it, first try to remove any fat you can see.	Exercise Regularly 150 minutes of activity per week. Take a brisk walk with family or friends. Try a new sport.

36

USDA Food and Nutrition Service
U.S. DEPARTMENT OF AGRICULTURE

Start simple with MyPlate

Healthy eating is important at every life stage, with benefits that add up over time, bite by bite. Small changes matter.

MyPlate.gov

Limit Choose foods and beverages with less added sugars, saturated fat, and sodium.

Activity Being active can help you prevent disease and manage your weight.

FNS-921
January 2022
USDA is an equal opportunity provider, employer, and lender.

37

USDA Food and Nutrition Service
U.S. DEPARTMENT OF AGRICULTURE

Start simple with MyPlate

Healthy eating is important at every life stage, with benefits that add up over time, bite by bite. Small changes matter.

Calories Count!
Keeping track of how many calories you are getting helps with weight management.

Eat More of These:
Fiber, Vitamin D, Calcium, Iron and Potassium help keep your body working properly. Aim for higher amounts of these.

Check Serving Size First:
Compare the serving size to how much you will eat or drink. If the serving size is one cup and you eat two cups, you're getting twice the calories, fat, and other nutrients listed on the label.

Eat Less of These:
Too much Saturated Fat, Trans Fat, Sodium, and Added Sugars are unhealthy and can lead to weight gain, heart disease, and other chronic diseases.

Tip!
Lower % DV is 5% or less
Higher % DV is 20% or more

38

USDA Food and Nutrition Service
U.S. DEPARTMENT OF AGRICULTURE

Let's Go Shopping!

- For Dinner tonight:
 - Tomato soup
 - Grilled Cheese
 - Peas
 - Peaches with Cinnamon

FNS-921
January 2022
USDA is an equal opportunity provider, employer, and lender.

39

USDA Food and Nutrition Service
U.S. DEPARTMENT OF AGRICULTURE

Let's Go Shopping!

- For Dinner tonight:
 - Tomato soup
 - Grilled Cheese
 - Peas
 - Peaches with Cinnamon

FNS-921
January 2022
USDA is an equal opportunity provider, employer, and lender.

40