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OPTIMIZING NUTRITION IN PARKINSON'S DISEASE

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Speaker

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Disclosures

I have no financial disclosures or conflicts of interest with the presented material in this presentation

Objectives

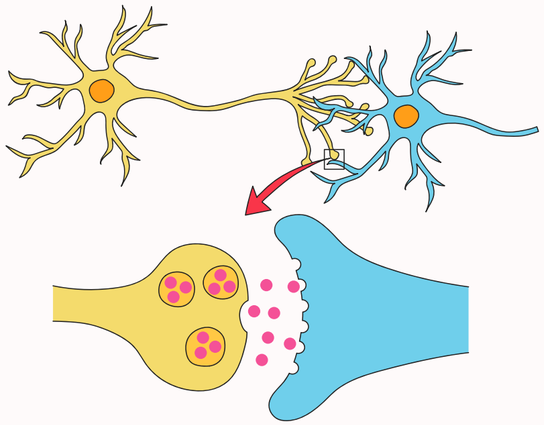
- Overview of national nutrition guidelines and nutrient recommendations
- The Mediterranean and MIND diets and potential associated benefits in Parkinson’s Disease
- The gut microbiome, antioxidants and anti-inflammatory food's role in Parkinson’s Disease
- Identify Parkinson’s Disease related nutrition complications and interventions

Parkinson’s Disease

Chronic neurodegenerative disorder resulting from the decreased production of dopamine by the substantia nigra cells in the basal ganglia of the brain

Physical symptoms- slowed movements, rigidity, resting tremors and poor balance

Additional symptoms- hypophonia, swallowing difficulty, delayed gastric emptying, mood disorders, gastroesophageal reflux and constipation



[1]Ferguson, C.C., et al. (2023)

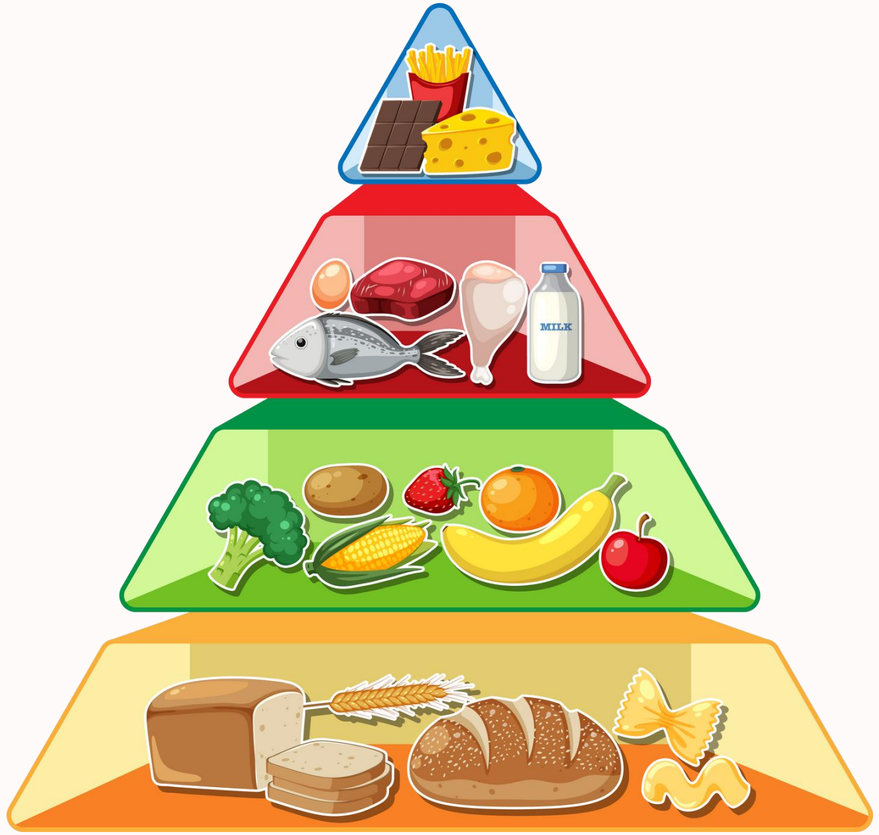
Why is nutrition important?

Nutrition effects all aspects of the human body

Consistent intake of nutrients is required to provide our body with the energy it needs (calories) and micronutrients (vitamins/minerals/trace elements) to support essential bodily functions

Parkinson's Disease (PD) can affect nutritional status

Food/nutrition can be viewed as a controllable factor in chronic disease



Food Pyramid

MyPlate

Recommended Daily Intakes

Dietary Reference Intakes (DRIs) - Term used to refer to the following dietary recommendations for healthy individuals:

- Recommended Dietary Allowance (RDA) - Average daily nutrient intake to meet the requirements of 97-98% of healthy individuals
- Adequate Intake (AI) - Consumption level assumed to meet nutrient needs when evidence is insufficient to create an RDA
- Tolerable Upper Intake Level (UL) - Maximum daily intake unlikely to cause adverse effects

[2]National Institute of Health, (2019)

DRIs: Macronutrients

Requirements for Males (M) and Females (F) ages 31-50 years, 51-70 years and >70 years

Carbohydrates- 130 gm per day M/F, all age ranges

Protein- M - 56 gm per day, all age ranges
F- 46 gm per day, all age ranges

Fat: Linoleic Acid (LA) and a-Linolenic Acid (ALA)
M- 17 gm/day LA ages 31-70, 14 gm/day >70 years
1.6 gm/day ALA for all ages
F- 12 gm/day of LA ages 31-50, 11 gm per day for ages >51 years
1.1 gm/day of ALA for all ages

Fiber- M- 38 gm/day ages 31-50 years, 30 gm/day ages >50 years
F- 25 gm/day ages 31-50 years, 21 gm/day ages >50 years

[3]National Institute of Health, (2002/2005)

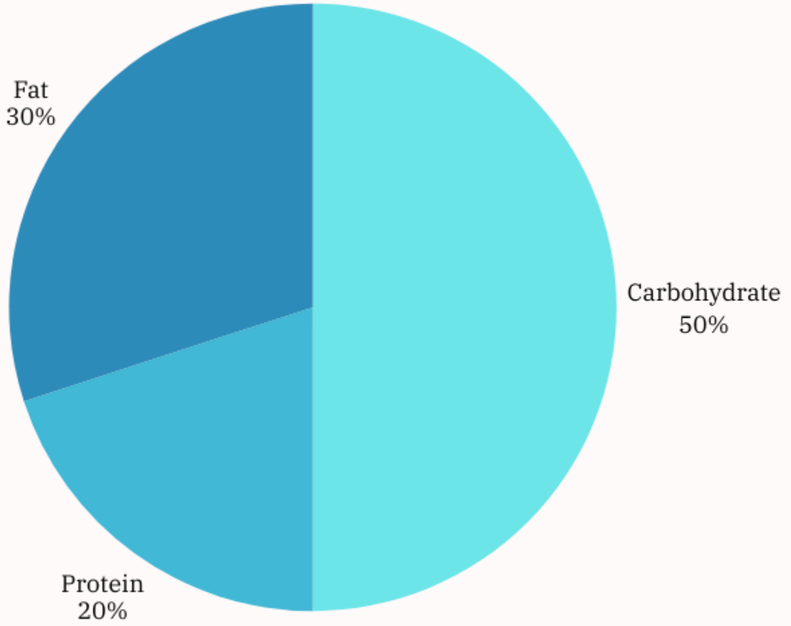
Recommended Daily Intakes Cont.

<u>Acceptable Macronutrient Distribution Ranges</u>

45-65% of daily caloric intake from carbohydrates

20-35% of daily caloric intake from fat sources

10-35% of daily caloric intake from protein sources



[4]National Institute of Health, (2002/2005)

Essential Micronutrients

Vitamins

B1- thiamin
B2- riboflavin
B3- niacin
Pantothenic acid
B6- pyridoxine
Biotin
Folic Acid
B12- cyanocobalamin
Vitamin C
Vitamin A
Vitamin D
Vitamin E
Vitamin K
Choline

Minerals

Calcium
Phosphorous
Magnesium
Sodium
Potassium
Chloride

Trace Elements

Iron
Manganese
Copper
Iodine
Zinc
Cobalt
Selenium
Molybdenum
Chromium

Additional Guidelines and Diet Recommendations

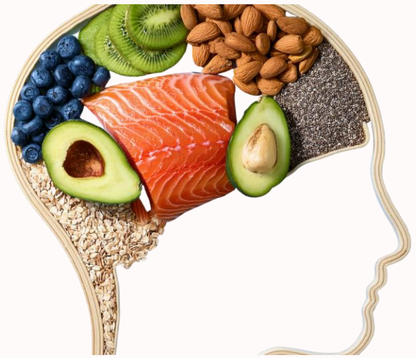
Mediterranean Diet

MIND Diet

DASH Diet

Dietary Guidelines for Americans

Estimated average requirements (EARs)



Mediterranean Diet

Mediterranean diet summarizes the traditional eating habits of countries bordering the Mediterranean Sea

Eating pattern is associated with preventing heart disease, stroke and improve brain health

Emphasizes non-starchy vegetables, whole grains, nuts, legumes, beans, olive oil with small amounts of low fat/fat free dairy products, fish, poultry and red wine in moderation

Limits foods high in saturated fats, high sodium, added sugars, processed foods and fatty/red meat

Mediterranean Diet and Parkinson's Disease

Mischley, L. K. et al. (2017) conducted an observational study investigating whether dietary intakes are associated with self reported PD symptom severity and disease progression

Participants: 1053 individuals with idiopathic PD

Methods: Participants completed a food frequency questionnaire to assess dietary intakes and completed a (PRO-PD), patient-centered measure of disease severity as the primary outcome measure

Results: Individuals who ate a plant and fish-based diet had lower self reported PD severity scores

- Lower rates of PD progression was associated with increased intakes of fresh fruits/vegetables, nuts/seeds, fish, olive oil, wine, coconut oil, fresh herbs, and spices

[5]Mischley, L. K., Lau, R. C., & Bennett, R. D. (2017)

Mediterranean Diet Foods List

Vegetables	Fruit	Grains	Beans/legumes	Nuts/Seeds
Bell peppers Onions Green beans Asparagus Beets Cabbage Broccoli Cauliflower Brussel sprouts Green leafy vegetables	Blackberries Strawberries Blueberries Raspberries Oranges Plums Apricots Grapefruit Pear Peaches	Quinoa Farro Couscous Brown Rice Barley Bulgar Oats Rye Millet 100% whole wheat products	Black beans Pinto beans Garbanzo Beans Cannelloni Beans Edamame Lentils Peas Soybeans Kidney Beans Peanut	Almonds Brazil Nuts Macadamia Nuts Pistachios Cashews Sunflower Seeds Chia Seeds Pine Nuts Flax Seeds

MIND Diet

MIND diet = Mediterranean-DASH Intervention for Neurodegenerative Delay

The DASH diet **emphasizes** fruits, vegetables, whole grains, low fat/fat free dairy products, fish, poultry, nuts/seeds and **limiting** foods high in sodium and saturated fats, fatty meats, sugar sweetened beverages and sweets

MIND diet focuses on recommended intakes of **specific foods** on a **daily/weekly basis**

[6] Academy of Nutrition and Dietetics, (2023)

MIND Diet and Parkinson's Disease

Agarwal, P. et al. (2018) investigated the association between MIND diet adherence and the incidence and progression of PD in old age

Participants: 706 individuals ages 59-97 without PD at baseline

- Participants were assessed annually for the presence of four parkinsonian signs. PD progression was assessed by changes in a global parkinsonian score
- MIND, Mediterranean and DASH diet pattern scores were computed using a validated FFQ

Results: Participants with a higher MIND diet adherence score were associated with a decreased risk of PD and **slower disease progression**

- Adherence to the Mediterranean diet was marginally associated with delayed PD progression
- No association between DASH diet adherence and delayed PD progression

[7]Agarwal, P., Wang, Y., Buchman, A. S., Holland, T. M., Bennett, D. A., & Morris, M. C. (2018)

MIND Diet Food Frequency Recommendations

Daily Recommendations

Food Item	Quantity
Vegetables	2 cups, 1 cup of green leafy vegetables
Whole Grians	3 servings
Extra Virgin Olive Oil	2 tbps

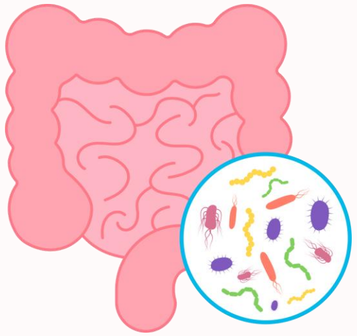
Weekly Recommendations

Food Item	Quantity
Berries	2-5 servings
Nuts	5 servings
Beans	3-4 servings
Seafood	1 or more servings
Poultry	2 or more servings

[6]Academy of Nutrition and Dietetics, (2023)

Gut Microbiome and Brain Health

The gut microbiome encompasses all the microorganisms in the intestines



Direct relationship between the gut and the brain, the gut-brain axis (GBA)

- The flow of information is bi-directional, each affecting the other

Dysbiosis is a disturbance in the relationship between *different types* of microbes in the gut microbiome, leading to decreased diversity and potential overgrowth of pathogenic microbes

Dysbiosis of the gut microbiome has been linked with inflammation, alteration in immune responses, alterations in metabolism and mood disorders

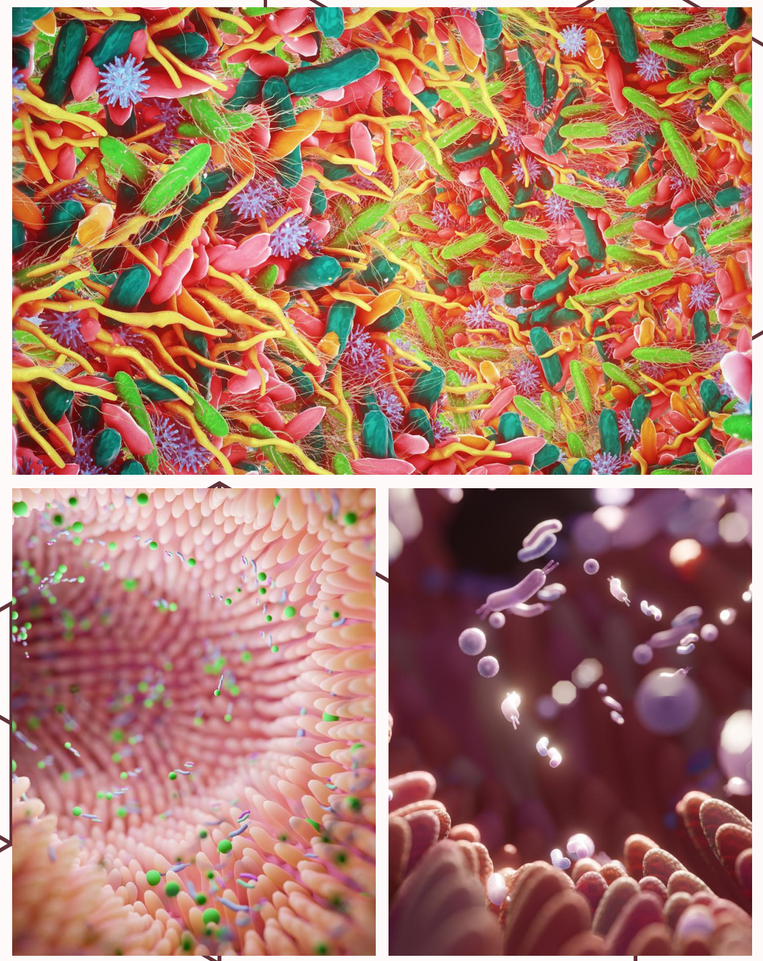
[8]Carabotti, M., Scirocco, A., Maselli, M. A., & Severi, C. (2015)
[9]Cresci, G. A., & Bawden, E. (2015)

Negative Effects to the Gut Microbiome

Some beneficial gut microbiota are negatively affected by **antimicrobial food additives**

Emulsifiers carboxymethylcellulose (CMC) and polysorbate 80 (P80) were found to negatively affect the gut microbiome of mice test subjects who had implanted human gut microbiome, as seen by an increase in inflammation-associated bacteria

Artificial sweetener Sucralose intake has been linked with gut dysbiosis - study findings show a significant decrease in the abundance of the beneficial microbe *Lactobacillus acidophilus*, which is associated with regulating insulin and glucose levels



[10]Hrncirova, L., Machova, V., Trckova, E., Krejsek, J., & Hrncir, T. (2019)
[11]Chassaing, B., Van de Wiele, T., De Bodt, J., Marzorati, M., & Gewirtz, A. T. (2017)
[12]Méndez-García, L. A., et al. (2022)

Optimizing the Gut Microbiome

Probiotics - Non-pathogenic organisms that when taken, result in a host benefit

- Proposed benefits :
  - Maintain the gut lining and increased clearance of pathogens from the gut
  - Stimulate the innate and acquired immune system
  - Mucosal serotonin release
- Yogurt, kefir, miso, kimchi, and sauerkraut

Prebiotics- Food for probiotic organisms

- onions, leaks, garlic, artichoke, asparagus, bananas, whole grains and oats

Symbiotic- Combination of pre and probiotics

Balanced diet that contains fruits, vegetables, whole grains, beans, legumes, nuts/seeds

[13] Cersci, G. A. M., & Izzo, K. M. (2017)

[14] Akram, N., et al. (2023)

Anti-inflammatory foods

Inflammation is a normal protective physiological response to stress or injury

Increased and prolonged inflammatory response can negatively impact the blood-brain barrier resulting in neuroinflammation and contribute to neurodegenerative diseases

Vitamin C, Vitamin D, Vitamin E, Omega-3 fatty acid

Food sources: Oranges, red pepper, broccoli, fatty fish, dairy, sunflower seeds, peanuts/peanut butter, almonds, walnuts, flax and chia seeds

[15]Vasefi, M., Hudson, M., & Ghaboolian-Zare, E. (2019)

Neuroprotective Foods

Extra virgin olive oil

Walnuts, hazelnuts, almonds, macadamia nuts and brazil nuts

Spices- turmeric and cinnamon

[16]Nakhaee, S., Kooshki, A., Hormozi, A., Akbari, A., Mehrpour, O., & Farrokhfall, K. (2024)

Antioxidants

Antioxidants may help protect cells from free radical damage

If not neutralized, free radicals can cause tissue damage and contribute to disease

Antioxidants can neutralize free radicals and are naturally occurring substances in some plants

Antioxidant containing foods*: artichokes, tomatoes, carrots, kale, spinach, Brazil nuts, pecans, blackberries, raspberries, and blueberries*

[17]National Center for Complementary and Integrative Health, (2023)

Supplements

Coenzyme Q-10 - Not definitively proven to have a benefit in PD

Glutathione- May slightly improve motor functions but not without adverse events

Vitamin C and **Vitamin E**- Exhibit anti-inflammatory benefits

Vitamin B6- When levodopa is taken with vitamin B6 supplement, it can decrease the drugs effectiveness

- Not recommended to supplement with >15 mg/day

Before starting any supplement or adjusting dose of current supplements, consult with your doctor

[18]Jiménez-Jiménez, F. J., Alonso-Navarro, H., García-Martín, E., & Agúndez, J. A. G. (2022)
[19]Wang, H. L., Zhang, J., Li, Y. P., Dong, L., & Chen, Y. Z. (2021)
[20]Nahikian Nelms, Marcia, and Sucher, Kathryn (2016)

Nutrition related complications in PD

Chewing difficulty - adjust moisture and texture of foods and address oral cavity concerns

Dysphagia- swallowing dysfunction

Dry mouth- potential drug related side effect

- Choose moist foods, add sauces/gravies/condiments to foods, chew gum/suck on hard candies between meals

Decreased taste or taste changes

- If experiencing metallic taste avoid metal silverware, try different food temperatures to identify what is best tolerated, brush teeth and use tongue scrapper between meals to cleanse palate

Gastroesophageal Reflux Disease (GERD)

- Limit intake of acidic foods (citrus, tomato products, coffee) and foods that affect lower esophageal sphincter efficacy (chocolate, peppermint, high fat containing foods, alcohol)

[21]Jones Irwin, Kathy, and Hansen-Petrik, Melissa (2016)

Nutrition related complications in PD Cont.

Gastroparesis- Delayed gastric emptying resulting in feelings of fullness and abdominal bloating/distention

- Limit high fat, high fiber foods, eat small frequent meals, drink liquids between meals

Impaired ability to prepare food/meals and feeding ability

- Collaborate with an occupational therapist, obtain adaptive silverware/feeding utensils, assistance

Inadequate fluid intake and dehydration

- Choose high moisture foods including fruits/vegetables, add flavorings to water to improve palatability, schedule small/frequent intakes of liquid between meals

Food-drug interactions, malnutrition and constipation

[21]Jones Irwin, Kathy, and Hansen-Petrik, Melissa (2016)

Constipation

Constipation can result from decreased physical activity, dehydration, inadequate fiber intake and as a medication related side effect

Soluble fiber - gelatinizes stool by attracting water

- Apples, bananas, broccoli, carrots, prunes, oats and barley

Insoluble fiber- adds bulk to stool to help propel through the gastrointestinal tract

- Wheat bran, whole grains, nuts/seeds, fruit skins, avocado, peas, corn

Goal: **25-35 gm** of total fiber daily

Hydration - recommended at least 8 cups of hydrating liquids per day

Physical activity- aids GI motility

Dysphagia

Dysphagia- swallowing difficulty

Signs and symptoms- pocketing of food in the cheeks, drooling, coughing or choking, feeling of food being stuck, decreased intakes, weight loss and aspiration

Intervention- Speech therapy evaluation

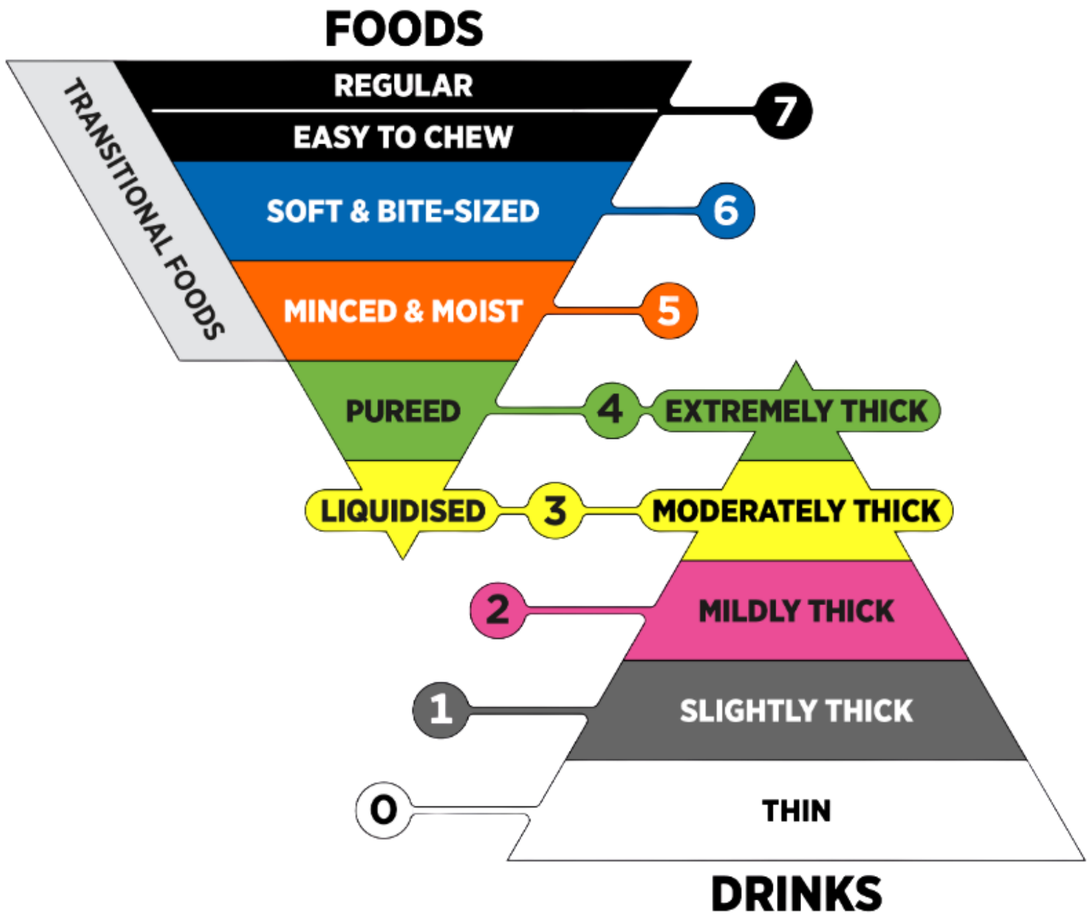


Image 1

Drug/nutrient interactions

Levodopa (L-dopa)

Amino acids use the same carriers as L-dopa for transport in the body and complete for transport across the blood/brain barrier, may affect medication effectiveness

For individuals who experience “on-off” syndrome, discuss with provider if needing to limit protein intake before/after medication

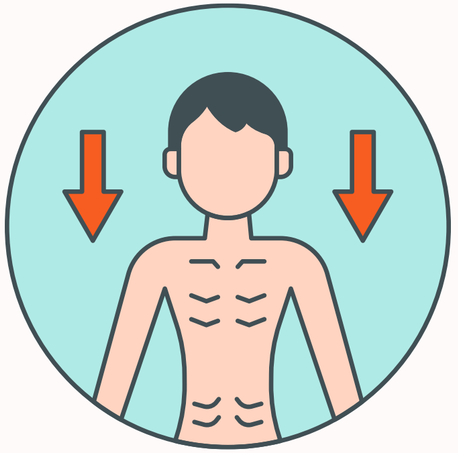
MAOIs- Antidepressant

Monoamine Oxidase (MAO) enzyme breaks down the amino acid tyramine
MAOI medication blocks this activity

Individuals who are prescribed MAOIs may need to limit food/drink that contain high levels of tyramine:
alcoholic beverages (especially beer and wine), anchovies, cured meats, aged cheese, fermented foods, and smoked or pickled meats

[20]Nahikian Nelms, Marcia, and Sucher, Kathryn (2016)
[21]Jones Irwin, Kathy, and Hansen-Petrik, Melissa (2016)

Malnutrition



Malnutrition can develop as eating/swallowing becomes more difficult, feeding ability declines, appetite suppresses, and adverse GI symptoms persist

Signs: Muscle and fat wasting, unintended weight loss, decreased food intakes over weeks/months/years, reduced grip strength and abnormal fluid retention

Symptoms : Hair loss/thinning, increased weakness/falls, suppressed immune system, delayed wound healing, neurological deficits and altered metabolism

Malnutrition Treatment

Increase daily energy intakes with calorically dense foods

Avoid skipping meals

Incorporate liquids that contain calories

Snack between meals and before bed

Trial an oral nutrition supplement

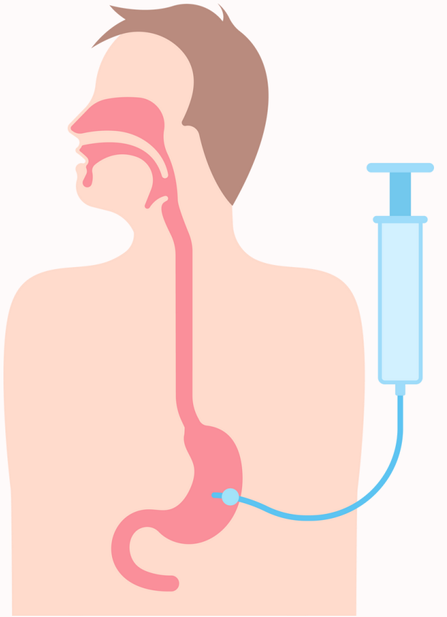
Discuss with your physician and dietitian if enteral nutrition would be appropriate

Enteral Nutrition Support

Enteral Nutrition support or tube feeding is way of providing adequate nutrition for those who are unable to take sufficient nutrition by mouth

Typical route for enteral nutrition is through the stomach via a gastrostomy tube

Individuals who struggle with significant GERD or gastroparesis refractory to maximal treatment may benefit from enteral nutrition administered directly into the small intestine



Pros/Cons of Enteral Nutrition

Benefits

- Meet the nutrient needs of an individual who cannot take adequate nutrition by mouth
- Reliable route for medication administration
- Prevent nutrient deficiencies
- Prevent inducing malnutrition or worsen existing malnutrition
- Support immune function
- Support normal gastrointestinal digestion, absorption and metabolism

Potential Adverse Effects

- GI intolerance
- Decreased sense of autonomy
- Decreased perceived quality of life

Nutrient and Parkinson’s Disease

Recommendations-

1. Meet your daily caloric, macro and micronutrient needs
2. Increase daily fluid intake with the goal to drink 8 cups or more per day
3. Increase daily fruit, vegetable and fiber intake
4. Incorporate nuts/seeds on a daily/weekly basis
5. Swap butters/margarines for extra virgin olive oil
6. Limit daily sodium intake
7. Try probiotic containing foods including yogurt, kefir, miso, kimchi, or sauerkraut
8. Identify barriers to taking in adequate nutrition

Take Home Message

- Focus on the foods that can be added to your typical diet rather than taken away
- Incorporate more fruits, vegetables, nuts/seeds, whole grains, probiotic containing foods and increase daily fluid intakes
- Recognize nutrition related complication in PD and recommended interventions
- Identify barriers to taking in adequate nutrition and signs/symptoms of malnutrition
- Communicate with your provider and consult with a dietitian for any nutrition related concerns

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Image 1 “International Dysphagia Diet Standardization Initiative 2019, The IDDSI Framework. Accessed April 2025. https://www.iddsi.org/standards/framework

Questions?