Nutrition and exercise after brain injury

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Topics for today

- Discuss nutrition for general health
- Discuss nutrition after brain injury
- Discuss the role of supplements
- Discuss exercise
Brain Injury

- Different types of brain injuries: traumatic brain injury, acquired brain injury (ex: tumor, ischemia, infection)
- Many changes in the brain afterwards


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Immediately after brain injury

- Nutrition plays a huge role
- Brain is “hypermetabolic”
- Feeding tubes, tube feeds
What about in the long term?
Support a healing brain

- Nutrition
- Exercise
- Sleep
- Medications
- Counseling
Nutrition

Benefits of proper nutrition

- Increases energy
- Boosts mood
- Improved health
Gut-Brain Axis

Influence on:
- motility
- secretion
- nutrient delivery
- microbial balance

Influence on:
- neurotransmitters
- stress/anxiety
- mood
- behaviour
Self-reflection #1

How many servings of vegetables do you eat per day?
How many servings of fruit do you eat per day?
How many sweets do you have per day?
What types of grains/carbs do you eat?
How many glasses of water do you have per day?
Food groups

- Vegetables
- Fruits
- Protein
- Dairy
- Grains
Vegetables

Most are naturally low in fat, calories, cholesterol

Good source of potassium, vitamins, fiber

Fiber
- Reduces blood cholesterol
- Bowel function
- Provides a full feeling
Fruits

- Most are naturally low in fat and calories
- Also contain potassium, fiber, vitamins
- Monitor sugar content
- Choose raw fruit over juice
Protein

- Helps maintain muscle mass and strength
- Fuller feeling
- Animal meat (lean beef, chicken, fish, turkey) – vitamin B12
- Eggs, almonds, oats, Greek yogurt, cottage cheese, lentils, chickpeas
Dairy

- Good source of calcium, vitamin D
- Choose low fat milk
- Other options for calcium - Kale, spinach, some fish, cheese
- Supplements
Grains

- **Whole grains**
  - Contain entire grain (germ, bran, endosperm)
  - High in fiber – cardiovascular health
  - Whole wheat, oatmeal, brown rice, quinoa

- **Refined grains**
  - Milled - removes part of the grain
  - Removes dietary fiber, iron, some vitamins
  - May be enriched with vitamins
  - White flour, white bread, white rice

At least ½ of the grains you eat should be whole grains
Oils

- Healthier fats = monounsaturated and polyunsaturated
- Olive oil – high in monounsaturated fatty acids (MUFA)
  - Cardioprotective, anti-oxidant
Mediterranean Diet

- NEJM: Decreased risk of major cardiovascular events
- JAMA: Associated with reduced risk of developing cognitive impairment
Mediterranean Diet

- Fruits and vegetables: Aim for 7-10 servings per day
- Healthy fats: olive oil, nuts and seeds, fatty fish (mackerel, sardines, salmon)
- Dairy: low-fat Greek or plain yogurt, cheese
- Spices: more spices, less salt
- Red meat: Substitute with fish, or eat lean meat
Water

- Plain water
- Carbonated water
- Can add lemon juice
- Herbal teas

At least eight 8 oz glasses of water per day
Questions?
What about “brain foods?”
Polyphenols

- Organic compounds mostly found in plants
- Anti-oxidant and anti-inflammatory properties
- Support a healthy brain and cardiovascular system
- Found in berries, grapes, coffee, green tea, curcumin (turmeric), cocoa (at least 70%), nuts
Brain-Derived Neurotrophic Factor

- Associated with neurogenesis
- Blueberries, fish, turmeric
Omega 3 Fatty Acids

- Fish, nuts, flaxseeds
- May have a role in oxidation and inflammation
- May promote cardiovascular health and cognition
What to avoid

- Foods that are high in unhealthy fats
- Foods that are high in sugar
- Alcohol/other depressants
- Smoking
Cut down on sugar
Dietary supplements

- Dietary supplements are NOT regulated by the FDA
- It is up to the manufacturer to ensure safety of the product
- Better to eat a well-balanced diet to obtain vitamins, minerals
- Some supplements may interact with prescription medications
- Talk to your doctor before starting a supplement
Omega 3 Fatty Acids

- Anti-inflammatory properties, reduce oxidative stress
- May help with cognition
- DHA (Docosahexaenoic acid) and EPA (Eicosapentaenoic acid)
Melatonin

- Sleep modulation
- Can help restore normal sleep/wake cycle
- Start with 1mg and increase as needed
Magnesium

- May help with headaches, mood, sleep
- Start with 100-200mg in the evening
- Monitor for loose stools
B Vitamins

- May help with mood, nerve health, headache prevention
- Vitamin B2 – 400mg daily
- Vitamin B12 – 1000 mcg daily
Probiotics

- Help with gut microbiome
- Many different formulations
- Choose one with several strains of bacteria and adequate colony forming units (CFU)
Boswellia

- Frankincense from tree sap
- Natural anti-inflammatory
- Can use instead of NSAIDs
Feverfew tea

- From Tanacetum parthenium plant
- Natural anti-inflammatory
- May be beneficial in preventing migraines
- 1-3 cups per day
SAM-e (S-Adenosyl-L-methionine)

- Serotonin building block
- May help with mood and headaches
- SAMe 200mg daily
Questions?
How to get started

- Keep track of what you are eating
- Smartphone apps: My Fitness Pal, My Plate, Lose It!
- Mediterranean Diet cookbooks, online recipes
- Accountability
- Dietician
Write down one nutrition goal that you want to work on this week
Exercise

Flexibility Exercise
- Stretching

Aerobic Exercise
- Cycling, Swimming

Anaerobic Exercise
- Weight training, Sprinting
Self-reflection #2

How many minutes of exercise did you do this past week?

What type of exercise did you do? (Flexibility/stretching, aerobic, anaerobic)

What are your barriers to exercise?
Barriers to exercise after brain injury

- Fatigue
- Pain
- Physical changes
- Depression
- Motivation
- Seattle winters
Exercise

- Decrease headaches/chronic pain
- Increase energy
- Improve sleep
- Decrease depression
- Decrease anxiety
- Improve cognition and memory
- Improve bone health
- Increase cerebral blood flow
Physical limitations

- Dizziness, vision issues, musculoskeletal concerns, etc.
- Talk to your doctor about safe forms of exercise
American Heart Association guidelines

- 150 minutes per week of **moderate intensity** aerobic activity
  
  **OR**
  
- 75 minutes of **vigorous intensity**
  
- Muscle strengthening exercise at least 2 days per week
Exercise intensity

- Maximum heart rate is about 220-age

- Target heart rate during moderate intensity activity: 50-70% of maximum heart rate

- Target heart rate during vigorous intensity activity: 70-85% of maximum heart rate

- Rate of perceived exertion
Exercise intensity

Moderate intensity

- brisk walking (at least 2.5 miles per hour)
- water aerobics
- dancing (ballroom or social)
- gardening
- tennis (doubles)
- biking slower than 10 miles per hour
Exercise intensity

**Vigorous intensity**

- hiking uphill or with a heavy backpack
- running
- swimming laps
- aerobic dancing
- heavy yardwork like continuous digging or hoeing
- tennis (singles)
- cycling 10 miles per hour or faster
- jumping rope
Types of exercise

- Endurance
- Strength
- Flexibility
- Balance
Endurance (aerobic)

- Start slow and gradually increase
- Walking
- Running
- Swimming
- Biking
- Taking the stairs
Strength (anaerobic)

- Decrease risk of injury
- Burn more calories
- Bone health
- Resistance training – with or without weights
Flexibility

- Stretching, yoga
- OrthoInfo - AAOS
- Best to stretch when warm
- Hold the stretch for 10 seconds, and gradually increase
- Repeat the stretch several times for different muscle groups
- Breathe
Balance/coordination

- Yoga
- Tai Chi
- Dance classes
- Stand on one foot
- Walk heel to toe
Create a plan

Create a plan incorporating endurance, strength, flexibility, balance/coordination exercises

Example:
Monday – endurance, strength
Tuesday – endurance, flexibility
Wednesday – rest
Thursday – endurance, strength
Friday – endurance, flexibility
Saturday – endurance, balance
Sunday – flexibility, balance
Silver Sneakers

- Designed for all ages, levels and abilities
- Generally covered by insurance
- Access to fitness equipment, exercise classes with trained fitness professionals, pools, walking tracks, social networking, smartphone apps, online resources
Write down one exercise goal that you want to work on this week
Goals

- Exercise and nutrition goals
- Discuss your goal with friends/family or your doctor, therapist, counselor...
- Keep track of your progress in a diary or smartphone app
References

Statement on Exercise: Benefits and Recommendations for Physical Activity Programs for All Americans. Gerald F. Fletcher, MD, Chair, Gary Balady, MD, Steven N. Blair, PED, James Blumenthal, PhD, Carl Caspersen, PhD, Bernard Chaitman, MD, Stephen Epstein, MD, Erika S. Sivarajan Froelicher, PhD, MPH, RN, Victor F. Froelicher, MD, Ileana L. Pina, MD, and Michael L. Pollock, PhD


The American Heart Association, Flint Rehab, Choose My Plate
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Mayo Clinic
Dinner at the zoo
Fitness Vigil
Questions?