Nutrition and exercise after brain injury

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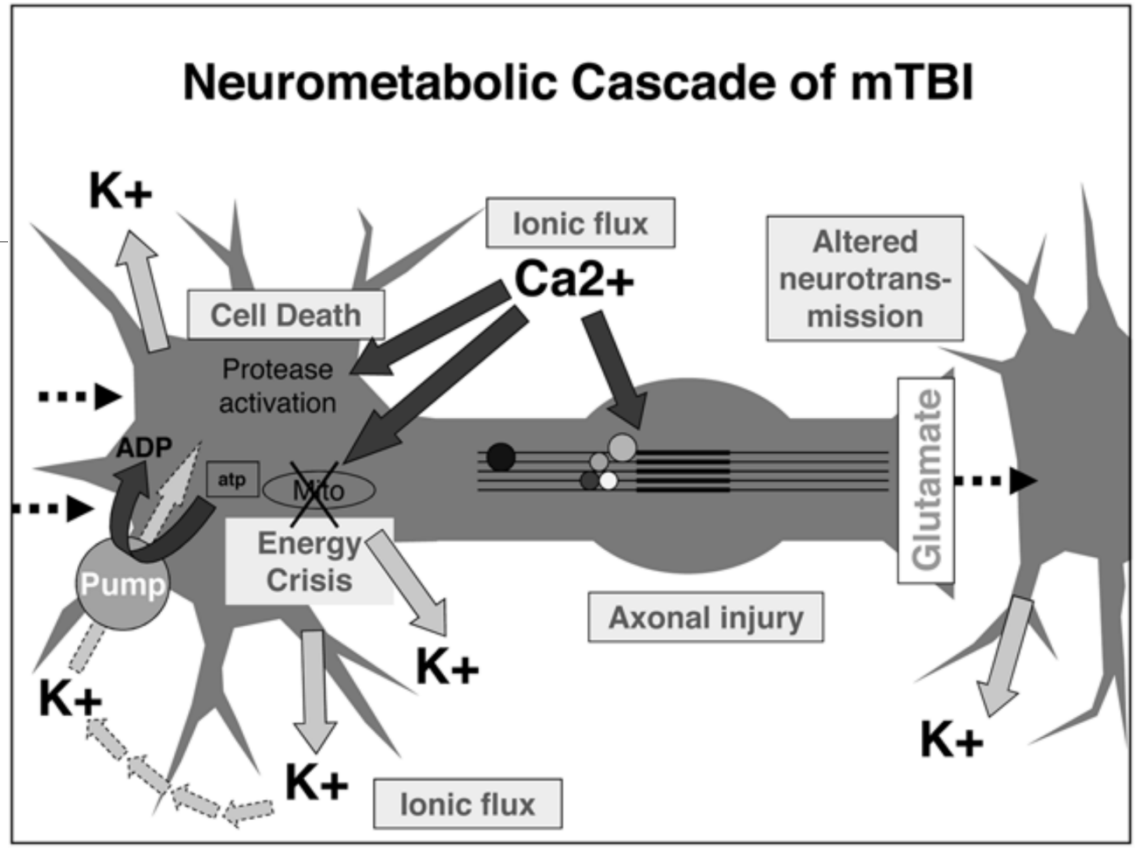
Topics for today

- 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



From: The New Neurometabolic Cascade of Concussion
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doi:10.1227/NEU.0000000000000505
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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?

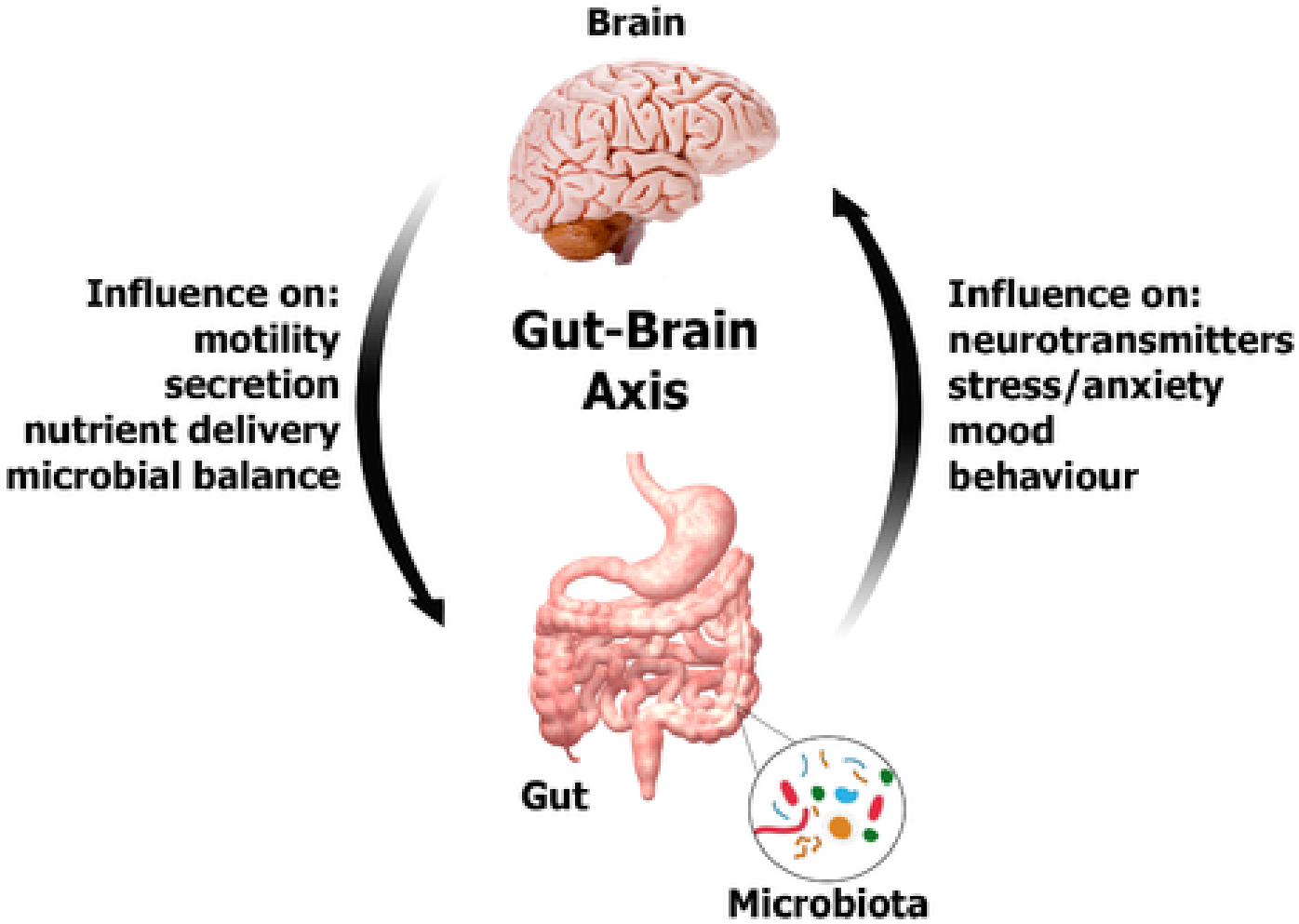
Support a healing brain

- **Nutrition**
- **Exercise**
- Sleep
- Medications
- Counseling

Nutrition

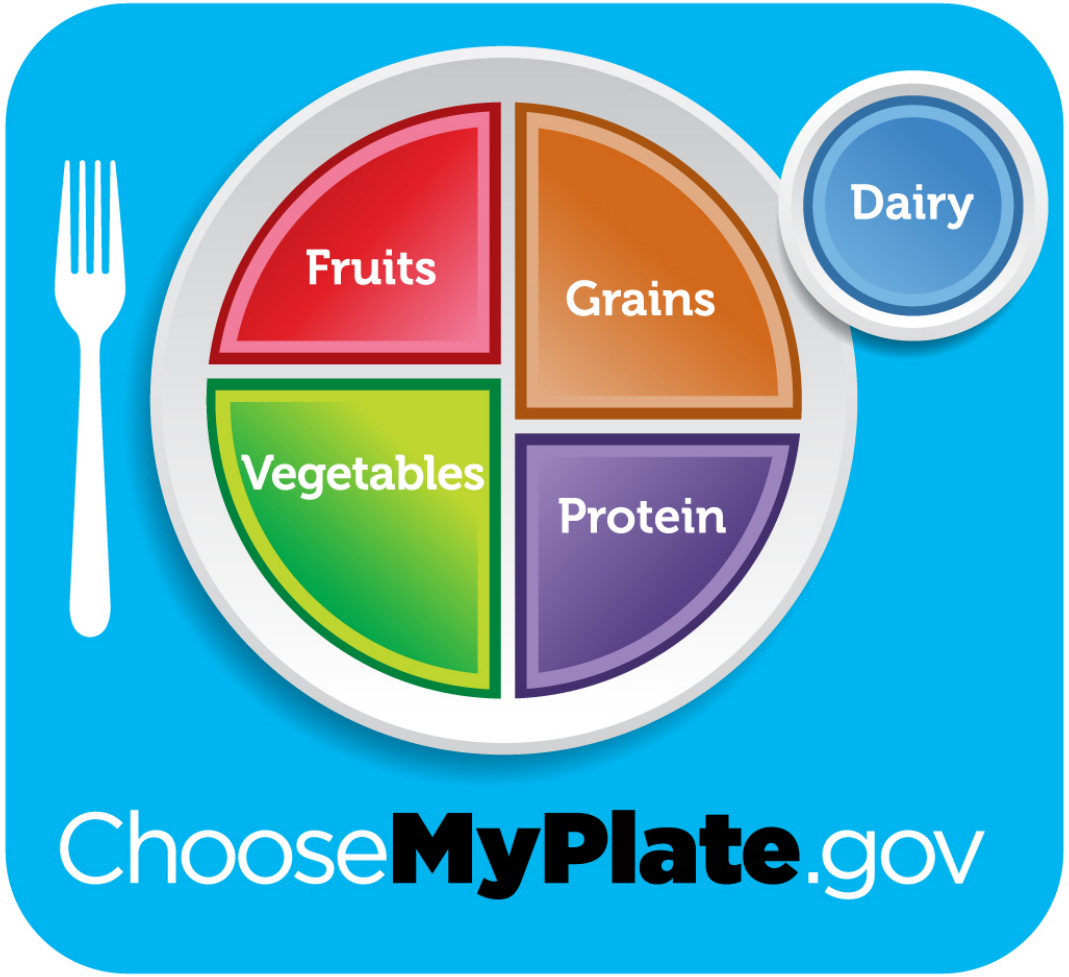
Benefits of proper nutrition

- Increases energy
- Boosts mood
- Improved health


Brain
Influence on:
motility
secretion
nutrient delivery
microbial balance
Gut-Brain Axis
Influence on:
neurotransmitters
stress/anxiety
mood
behaviour
Gut
Microbiota

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 <u>whole</u> grains

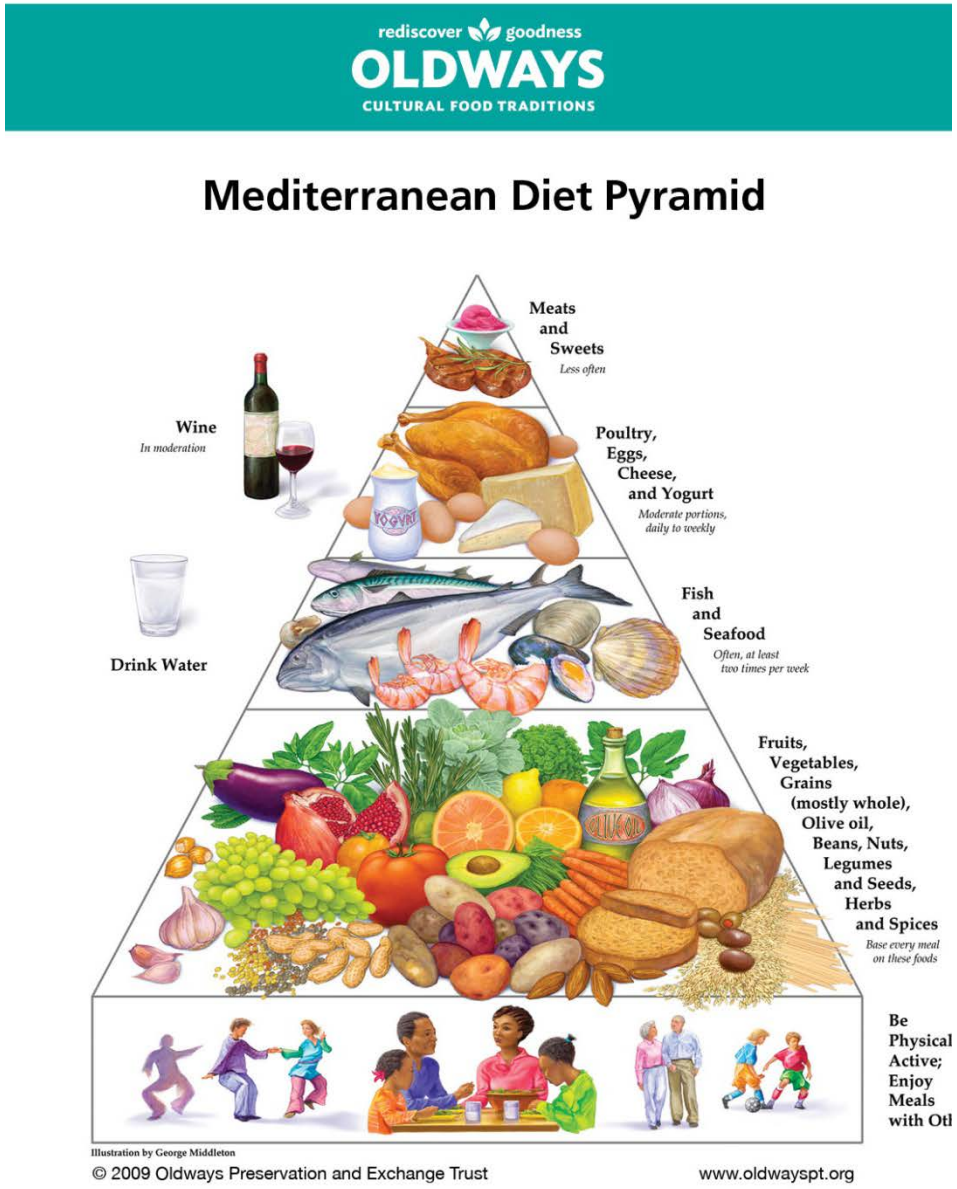
Oils

- 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

Nutrition goal

Write down one nutrition goal that you want to work on this week

Exercise


Buzzle.com
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

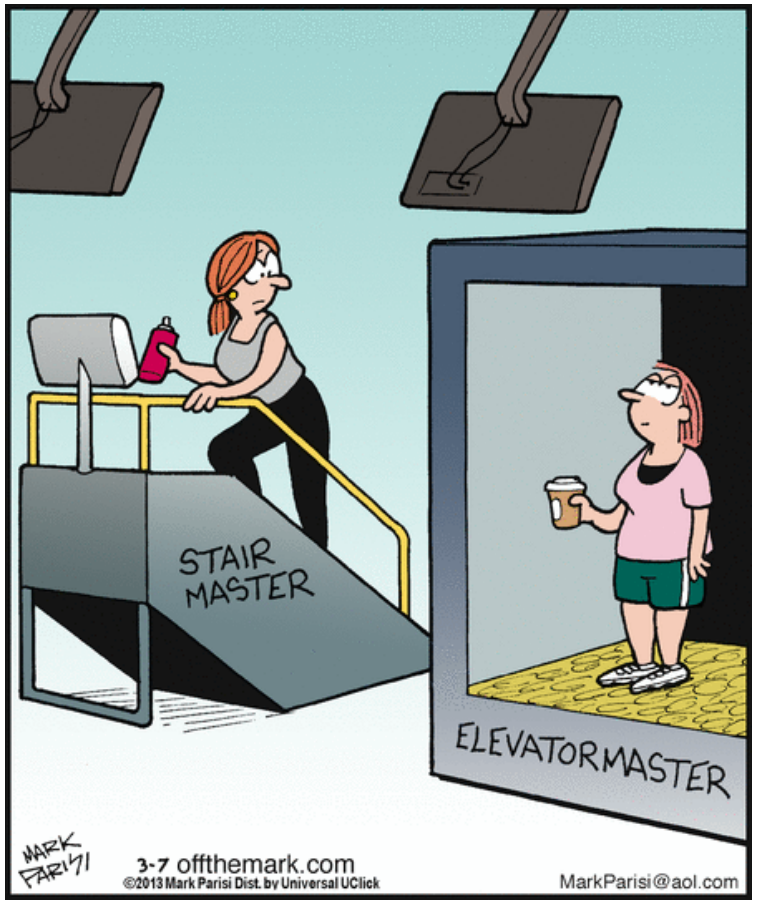
- hiking uphill or with a heavy backpack
- running
- swimming laps
- aerobic dancing
- heavy yardwork like continuous digging or hoeing
- tennis (singles)
- cycling 10 miles per hour or faster
- jumping rope

Types of exercise

- Endurance
- Strength
- Flexibility
- Balance

Endurance (aerobic)

- Start slow and gradually increase
- Walking
- Running
- Swimming
- Biking
- Taking the stairs

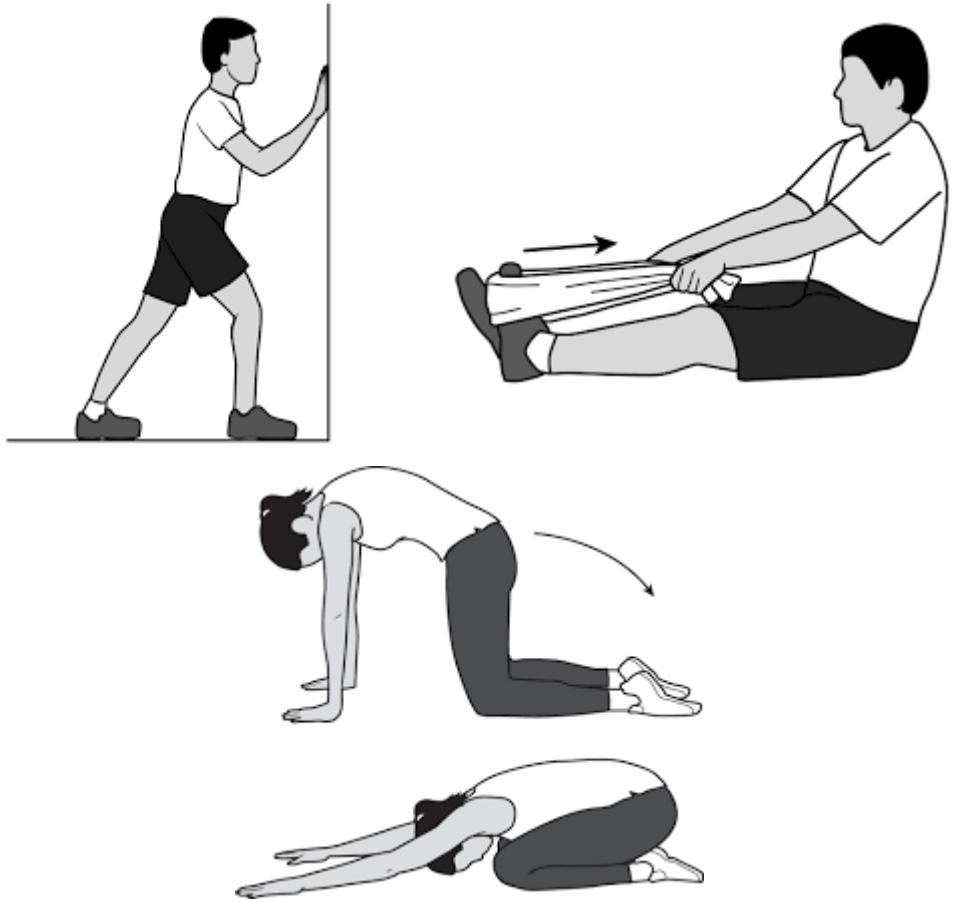


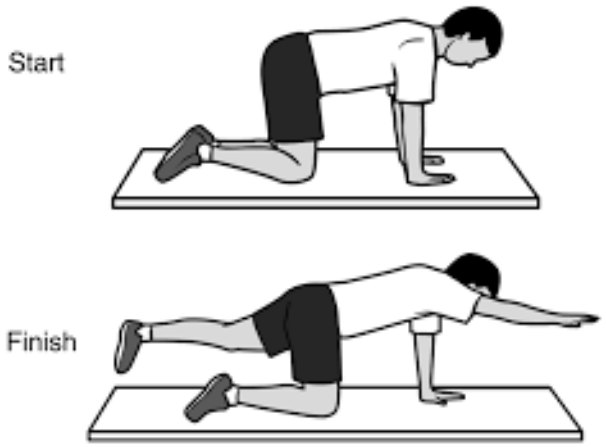
Strength (anaerobic)

- 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

SilverSneakers® FITNESS

Exercise goal

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

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www.royalcaribbean.com
Mayo Clinic
Dinner at the zoo
Fitness Vigil

Questions?