



The Balancing Act

Introduction

Building a healthy plate; eating the right amount of calories for you; and being physically active your way can help promote bone and muscle health.

Bone loss tends to increase with age. Bone loss can result in the bones becoming porous, thin and weak. Excessive alcohol intake can also increase bone loss. Muscle tends to decrease with age which can affect strength, ability to perform daily activities and ability to maintain balance, which can increase the risk of falls.

A healthful diet can help maintain and prevent bone loss and support muscle health. In addition to calcium and vitamin D, many other nutrients are needed to maintain healthy bones.

Regular physical activity, particularly weight bearing activity, also helps to maintain and prevent bone loss. In addition, physical activities that maintain or improve balance can lower the risk of falls, which can increase the risk of breaking bones. Physical activity is also essential in maintaining and building muscle.

The following Dietary Guidelines can help promote bone and muscle health.

Under the concept **Build a Healthy Plate**, including fruits, vegetables, low-fat dairy, whole grains, and a variety of lean protein foods can provide the many nutrients needed to maintain healthy bones and muscles.

Under the concept **Eat the Right Amount of Calories for You**, if you drink alcoholic beverages, doing so sensibly can also help to prevent bone loss.

Under the concept **Be Physically Active Your Way**, regular physical activity, particularly weight bearing activity, can help maintain and prevent bone loss. In addition, physical activities that maintain or improve balance can lower the risk of falls. Muscle-strengthening activities on two or more days a week is essential for maintaining and building muscle.

Objectives

Learn about age-related bone and muscle changes.

Learn about the role of diet and physical activity in bone and muscle health.

Learn how the Dietary Guidelines promote bone and muscle health.

Items needed for Lesson

1. Leader lesson.
2. Member handouts and OSU Fact Sheets T-3211 Journey Through Health: Muscles and OSU Fact Sheet T-3212 Journey Through Health: Bone.
3. Dairy product samples: chocolate milk, whole milk, low-fat (2%), Low-fat (1%) milk, and non-fat (skim) milk.
4. Pencils/pens for each member.

Age-Related Bone and Muscle Changes

Aging is associated with a decline in bone and muscle mass. Throughout life, the bones are constantly changing. From birth to about age 20 to 30, the body builds bone mass faster than it breaks it down. After about age 40 to 50, the body starts to break down bone mass faster than it builds it. This is part of the natural aging process.

(**Leaders** ask the group the following question) “Is bone loss only a problem for women? (**ANSWER:** *Both men and*

women experience bone loss with age. However, after women experience menopause, bone is broken down at even a faster rate due to the loss of estrogen.)

Muscle loss can result in decreased strength. (**Leaders:** ask the group the following question) “What are some concerns associated with muscle loss and decreased strength?” (**ANSWER** -Combined muscle loss and decreased strength can affect ones’ ability to move and maintain balance which can increase the risk of falls.)

One-third of older adults experience a fall each year and falls are the leading cause of nonfatal and fatal injuries among older adults. Furthermore, many older adults who experience a fall, even if they are not injured, develop a fear of falling, which may cause them to limit physical activity. Would limiting physical activity be helpful? Decreased physical activity can actually result in decreased physical fitness which can further increase the risk of falling.

Muscle also contains a large amount of water. Approximately 75% of muscle is water. Therefore, muscle loss also results in a loss of body water. This is a problem because total body water decreases with age, resulting in a smaller margin of safety against additional body water loss.

Loss of bone mass over time can result in the bones becoming porous, thin, and weaker. This can lead to increased risk of osteoporosis. Osteoporosis is a condition where the bones become so thin and weak they easily fracture or break. What bones tend to break easily with osteoporosis? The bones that tend to break easily are in the spine, hip, and wrist. Osteoporosis is called a “silent disease.” Someone may not know their bones have been losing strength for years until they break or fracture a bone. Bone fractures, particularly of the hip, and the resulting complications can have a major role in decreased independence and quality of life.

Diet, Physical Activity and Bone and Muscle Health

What actions can help maintain bone mass and muscle? A healthful diet and regular physical activity can help maintain bone and muscle mass and prevent bone and muscle loss.

Diet. Even after growth stops, the bones are constantly being broken down and rebuilt. How would this affect the need for calcium? This means the need for calcium never ends. Bones are a calcium “bank” for the rest of the body. Bones release calcium when the body needs it and they absorb calcium to rebuild and strengthened. If there is not enough calcium in the diet the body will pull more calcium out of the bones than is put back. How would this affect bone? Over time if too much calcium is pulled from the bones they will become porous, thin and weak.

Absorption of calcium from the intestine tends to decrease with age. This, in addition to increased rate of bone breakdown, is one reason the recommended intake for calcium increases with age. By eating enough calcium rich foods the body will not have to pull as much calcium from the bones.

Vitamin D helps the body to absorb and use calcium. However, the ability of the kidneys to convert vitamin D to its active form decreases with age. This is one reason the recommended intake for vitamin D increases with age.

Inadequate calories and protein are associated with muscle loss. However, with age, calorie needs decline while the need for most nutrients remains relatively unchanged. This places an emphasis on choosing nutrient dense foods in order to meet nutrient needs within an appropriate calorie level.

Regular physical activity, particularly muscle-strengthening activity, is essential for preserving and building muscle and bone mass. Examples of muscle-strengthening activities include lifting weights, working with resistance bands, doing calisthenics using body weight for resistance (such as push-ups, pull-ups, and sit-ups), climbing stairs, carrying heavy loads, and heavy gardening. Because muscle contains more water than fat, building muscle can also help to maintain body water. Weight bearing activities can strengthen bones. Examples include walking, jogging, aerobic dancing, hiking and racquet ball.

The following physical activity guidelines are the same for adults and older adults:

- ◆ All adults should avoid inactivity. Some physical activity is better than none, and adults who participate in any amount of physical activity gain some health benefits.
- ◆ For substantial health benefits, adults should do at least 150 minutes a week of moderate-intensity aerobic physical activity. What would be an example of how this would be distributed over a week? An example: 30 minutes, 5 days. Or 75 minutes a week of vigorous-intensity aerobic physical activity. What would be an example of how this would be distributed over a week? Example: 15 minutes, 5 days. Or an equivalent combination of moderate- and vigorous-intensity aerobic activity. Aerobic activity should be performed in episodes of at least 10 minutes, and preferably, should be spread throughout the week.

- ◆ Adults should also do muscle-strengthening activities that are moderate or high intensity and involve all major muscle groups on 2 or more days a week, as these activities provide additional health benefits.

The following physical activity guidelines are just for older adults:

- ◆ When older adults cannot meet the adult guidelines, they should be as physical active as their abilities and conditions will allow.
- ◆ Older adults should do exercise that maintain or improve balance if they are at risk of falling. What do you think are some examples of exercises that maintain or improve balance? (*Examples include backward walking, sideways walking, heel walking, toe walking, standing from a sitting position, and Tai chi exercises.*)
- ◆ Older adults should determine their level of effort or physical activity relative to their level of fitness.
- ◆ Older adult with chronic conditions should understand whether and how their conditions affect their ability to do regular physical activity safely.

Additional Information (DRI= Daily Recommended Intake)

	<u>DRI for Calcium</u>	<u>DRI for Vitamin D</u>
Men 51 to 70 years of age	1,000 mg/day	600 IU/day
Men 71 years of age and older	1,200 mg/day	800 IU/day
Women 51 to 70 years of age	1,200 mg/day	600 IU/day
Women 71 years of age and older	1,200 mg/day	800 IU/day
UL for adults 51 years of age and older	2,000 mg/day	4,000 IU/day

In addition to calcium and vitamin D, the body needs many other nutrients to build and maintain healthy bones. What other nutrients have a role in bone health? These nutrients include vitamin C, vitamin K, phosphorous, zinc, copper, magnesium, fluoride, manganese and boron.

The role of multiple nutrients in bone and muscle health highlights the importance of a healthful diet including fruits, vegetables, low-fat dairy, whole grains, and lean protein foods.

Additional Recommendations

Further recommendations are to abstain from smoking and not consume alcohol in excess. Smoking and too much alcohol can increase bone loss.

Dietary Guidelines Promoting Bone and Muscle Health

Several of the Dietary Guidelines can help promote bone and muscle health.

Build a Healthy Plate (*healthful diet including fruits, vegetables, low-fat dairy, whole grains, and lean protein foods provides calcium, vitamin D, and other nutrients needed to build and maintain healthy bones and muscles*)

Make half your plate fruits and vegetables.

Switch to skim or 1% milk.

Make at least half your grains whole.

Vary your protein choices.

Eat the Right Amount of Calories for You

If you drink alcoholic beverages, do so sensibly.

Be Physically Active Your Way

At least 150 minutes a week of moderate-intensity or 75 minutes a week of vigorous-intensity aerobic physical activity. If you cannot meet this guideline, be as physical active as your abilities and conditions will allow. Include muscle-strengthening activities that involve all major muscle groups on two or more days a week. Do activities that maintain or improve balance if you are at risk of falling.

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Rolfes SR, Pinna K, Whitney E. *Understanding Normal and Clinical Nutrition*, 7th ed. Thomson/Wadsworth Publishing Co., Belmont, CA., 2008.

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Activities

Calcium in foods

Supplies: variety of dairy products (some examples are listed below, be sure to include chocolate milk, whole milk, low-fat (2%) milk, low-fat (1%) milk, and non-fat (skim) milk.

Background: One of the Dietary Guidelines is to “switch to skim or 1% milk.”

Have participants arrange the dairy products based on the calcium content, from highest to lowest.

Have participants compare the calcium content of three milk products (chocolate, whole milk, low-fat (2%) milk, low-fat (1%) milk, non-fat (skim) milk. Is there a difference in the calcium content of the three milk products?

Tell participants one of the Dietary Guidelines is to “switch to skim or 1% milk.” Have participants compare the calorie and fat content of the three milk products. How does the calorie and fat content of these three milk products compare? If cost allows have participants taste the different milk products.

	<u>Calcium (milligrams)</u>	<u>Calories</u>	<u>Fat (gram)</u>
1 cup whole chocolate milk	280 mg	208	8.5 g
1 cup whole milk (3.25% fat)	276 mg	149	8 g
1 cup low-fat milk (2% fat)	293 mg	122	5 g
1 cup low-fat milk (1% fat)	305 mg	102	2 g
1 cup non-fat milk (skim)	299 mg	83	0 g
½ cup regular cottage cheese (4% fat)	93 mg	110	5 g
½ cup low-fat cottage cheese (2% fat)	103 mg	97	3 g
½ cup low-fat cottage cheese (1% fat)	69 mg	81	1 g

Endurance, Strengthening, and Balance Physical Activities

Direct members to the page in the member’s guide. Ask them to draw a line from each activity on the left to the type of activity they think it is on the right (endurance, strengthening, or balance)

Key:

Endurance: Brisk walking, dancing, swimming, bicycling, tennis

Strengthening: Lift weights, resistance bands, calisthenics using body weight for resistance, climbing stairs, heavy gardening

Balance: backward walking, sideways walking, heel walking, toe walking, standing from a sitting position, tai chi



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