



Nutrition and Bone Health

Lesson 2: Take Calcium and Vitamin D

Getting Ready

1. Review lesson plan before each session.
2. Practice activities.
3. Copy handouts and post-test questions:
 - a. Calcium-Rich Foods
 - b. Calcium-Rich Food Tips
 - c. Lactose Intolerance
 - d. Am I Getting Enough Calcium and Vitamin D?
 - e. Lesson 2: Take Calcium and Vitamin D Post-test
 - f. Lesson on Exercise (must download separately as an individual lesson from NOAHnet Osteoporosis lesson plans)
4. Gather supplies needed for lesson and activities.
5. Check local pharmacy/grocery store for prices on lactase tablets (see script).

Supplies Needed

1. Food models high in calcium and food models low in calcium (actual food boxes, local newspaper clippings or Dairy Council food models from the National Dairy Council @ 1-800-426-8271). Examples to include:
 - a. 1 glass of milk and 1 slice of cheese
 - b. 1 can of salmon with bones and 1 can of sardines with bones
 - c. Lactase tablets

Beginning the Lesson

1. Introduce yourself by name and the organization you represent.
2. Summarize the lesson by giving the objectives.
3. Let the group know the lesson will be informal and they can ask questions anytime.

Objectives – The participants will:

1. Understand the roles of calcium and vitamin D in our bodies.
2. Learn the recommended intakes of calcium and vitamin D.
3. Identify good sources of calcium and vitamin D.
4. Assess their current calcium intake.
5. Will be able to plan a calcium and vitamin D-rich diet plan.



Script

Introduction

Remember, as we age our bones can become weak and fracture or break. Has anyone had a fracture or break or do you know anyone who has? Hip fractures can be very serious. Some people with hip fractures are never able to walk again and may need permanent care. There are four things to remember about protecting our bones. Does anyone remember them? They are:

1. Talk to your doctor. Have any of you talked to your doctor about your medications, family history of osteoporosis, having a bone mineral density test, exercise, smoking or alcohol?
2. Take calcium and vitamin D. Today we are going to talk about these two important nutrients - calcium and vitamin D.
3. Take action. This reminds us to stay active. We can stay active by doing exercises such as walking, dancing, gardening and lifting weights. We'll practice some exercises today, too.
4. Take care. This means preventing falls, and avoiding tripping or slipping. We will talk more about this in another session.

As I mentioned earlier, we will focus on calcium and vitamin D today. Does anyone know why we need calcium and vitamin D? We need calcium and vitamin D because these nutrients keep our bones strong. Let's talk about calcium first.

Calcium

A large portion of your bones are made of calcium. If you do not get enough calcium from foods or supplements, then you may have weak bones, bone loss, and increase your chance of having a fracture. Hip fractures can be very serious. Some people with hip fractures are never able to walk again and may need permanent care. Recently the National Academy of Sciences released a report recommending higher calcium intakes for older Americans. It is believed that as we get older we may need more calcium. For those age 51 and over, the recommendation for calcium is 1,200 milligrams per day. For example, this is the amount of calcium in four 8-ounce glasses of milk (1 quart). Many older adults do not get this recommended amount of calcium in their diets everyday. Diets low in calcium are often also low in vitamin D and other nutrients. With that in mind let's talk about how you can plan on getting the recommended amount of calcium every day.

What are good sources of calcium?

Our bodies do not make calcium. This means we must get it from the foods we eat or the supplements we take. Milk, yogurt, buttermilk and cheese are some of the **best** sources of calcium. Raise your hand and tell me an example of a low-fat dairy product that is rich in



calcium. (Allow your participants to make suggestions and then **emphasize** the fact that low-fat dairy products are just as rich in calcium as their full fat versions). Low-fat and fat-free dairy products are just as rich in calcium as their full fat versions. For example, skim milk is fat free milk with the same amount of calcium as whole milk and plain low-fat yogurt has even more calcium than milk. (Refer to handout “Calcium Rich Foods” - Call out each food item listed. Pause after you call out each food choice and ask participants to raise their hands to indicate they **will** try that food this week. After reading all the foods on the list ask them if they raised their hand at least four times. If they eat all four foods on one day they will complete their daily calcium requirement of 1,200mg a day.)

Show participants the following foods that are good sources of calcium (you can use actual food boxes from local grocery stores, local newspaper clippings or Dairy Council food models):

1. Skim or 1% milk and/or buttermilk
2. Low fat yogurt
3. Low fat cheese, including ricotta cheese
4. Sardines
5. Salmon with bones (salmon with bones is a good source of both calcium and vitamin D)
6. Collards, mustard greens and/or turnip greens (tell participants that substance in some calcium-rich green vegetables may decrease calcium absorption, i.e. oxalate)

Ways you can add calcium to your menu

Now that you know what foods are high in calcium let's talk about some ways you can add them to your daily menu at breakfast, lunch and dinner. (Refer to handout “Calcium-Rich Tips”)

Get the Calcium Facts

(Ask the participants if they have any questions first and then go over these questions if they have not already been asked.)

"Could too many calcium rich foods cause me to have kidney stones?"

People who are at risk for, or who have had kidney stones, were once told to limit their calcium intake because kidney stones are made of calcium salts. Current research shows that calcium **from food sources** actually decreases kidney stone risk because of interaction with other factors in the food itself. If you have ever had kidney stones, avoid taking calcium supplements, which will be discussed in the next lesson. Calcium-rich foods are considered safe. Talk to your doctor if you are concerned.

"Can I get too much calcium in my diet?"

This is very unlikely, especially since older adults are at risk for not getting enough calcium in their diet. Up to 2,500 mg of calcium a day is a safe amount.



"When I drink milk or eat cheese it causes me to be constipated or have a gassy stomach."

If you experience constipation or gas from dairy foods, your body may be adjusting to the new foods you are eating. If this happens, try starting with a small amount and build gradually to an adequate daily amount. Also, try eating dairy foods with other foods at meal times to evenly spread out the amount you eat throughout the day. (*Refer concerned participants to the "Lactose Intolerance" handout.*)

Vitamin D

Now we are going to talk about how vitamin D helps your body absorb calcium. Without enough vitamin D the body will not have enough calcium. It is important to remember that vitamin D and calcium work together as a team - they depend on each other. Vitamin D comes from three sources: through sun exposure, from the diet and from some dietary supplements. However, as adults age, their skin usually does not make enough vitamin D to meet all of their needs. The reasons include getting too little sun exposure, using sunscreen, and a decrease in the ability of the skin to make vitamin D even when exposed to sunlight. Although vitamin D is often called the "sunshine vitamin," older adults should not rely on the sun alone to meet their vitamin D needs. Milk and dietary supplements are the most important sources.

Vitamin D sources

The major food sources of vitamin D are vitamin-D fortified dairy products, vitamin-D fortified cereals, and some fatty fish such as salmon and sardines. Egg yolks and margarine also have small amounts of vitamin D, but not enough to meet your daily needs (*the amount of vitamin D in 1 cup milk equals the amount in 4 eggs OR 6 tablespoons of margarine*). Experts recommend a daily intake of 1000 IU per day for older adults. One cup of vitamin-D fortified milk will give you 100 IU of vitamin D (*be sure to point out that vitamin D milk does not necessarily mean whole milk since vitamin D is found in fortified low fat milk as well*). That means you would need 2-1/2 quarts of milk to get a days worth of vitamin D. That's a lot of milk! There are other ways of making sure you get enough vitamin D every day. One of these ways we will talk about in our next lesson is from a supplement.

Am I getting enough calcium and vitamin D?

Note to the instructor: bring or recruit volunteers to help the participants complete this form. Some participants can fill it out by themselves or may have someone at home who can help them.

Here is a worksheet to help you figure out if you are getting enough calcium and vitamin D. If you do not drink at least 2 or 3 glasses of milk each day or do not take a dietary supplement with calcium or vitamin D, you are most likely not be getting enough of these nutrients each day.



In the next lessons, we'll learn more ways to increase the amount of calcium and vitamin D we consume from dairy foods, other naturally rich calcium foods, calcium-fortified foods, and dietary supplements.

Activity

Display food models (pictures of foods from a newspaper, Dairy Council food models, actual food boxes) and for volunteers to come to the front and identify one food that is rich in calcium and one food that is low in calcium. Continue taking volunteers until all of the foods have been grouped according to the amount of calcium they contain.

Let's take action by practicing balance exercises.

(Refer to the handout "Lesson on Exercise")

Lactose Intolerance

If participant(s) claim to have gas, cramps or diarrhea when eating dairy products talk to them about some ways they can decrease these symptoms by reviewing the "Lactose Intolerant" handout.

References

DeLuca, Hector F. "Overview of general physiologic features and functions of vitamin D." American Journal of Clinical Nutrition, Dec 2004; 80: 1689S - 1696S.

Dietary Guidelines for Americans 2005. Available online at <http://www.health.gov/dietaryguidelines/dga2005/document/>

CVS, www.cvs.com

Holick, Michael F. "Sunlight and vitamin D for bone health and prevention of autoimmune diseases, cancers, and cardiovascular disease." American Journal of Clinical Nutrition, Dec 2004; 80: 1678S - 1688S.

National Dairy Council, <http://nationaldairyCouncil.org>

National Institutes of Health Osteoporosis & Related Bone Diseases National Resource Center, <http://www.osteoporosis.org/>

Park, S. and Mary Ann Johnson, PhD. "Living in Low-Latitude Regions in the United States Does Not Prevent Poor Vitamin D Status." Nutrition Reviews 63 (2005): 203-209.

Prevention – Calcium and Vitamin D. National Osteoporosis Foundation. 2 May 2003
<<http://www.nof.org/prevention/calcium.htm>>.



United States Department of Health and Human Services, Office of the Surgeon General.
The 2004 Surgeon General's Report on Bone Health and Osteoporosis: What it Means to You.
<http://www.surgeongeneral.gov/library/bonehealth/docs/OsteoBrochure1mar05.pdf>

United States Department of Health and Human Services, Office of the Surgeon General.
Bone Health and Osteoporosis: A Report of the Surgeon General.
http://www.surgeongeneral.gov/library/bonehealth/docs/full_report.pdf

United States Department of Agriculture, Agricultural Research Service. What's In The Foods
You Eat? [http://199.133.10.140/codesearchwebapp/\(0cunra45jbfkaciaekovixbe\)/codesearch.aspx](http://199.133.10.140/codesearchwebapp/(0cunra45jbfkaciaekovixbe)/codesearch.aspx)

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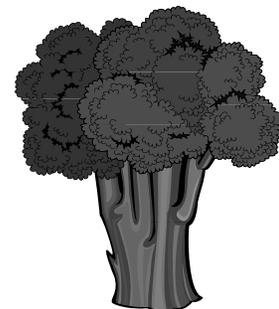
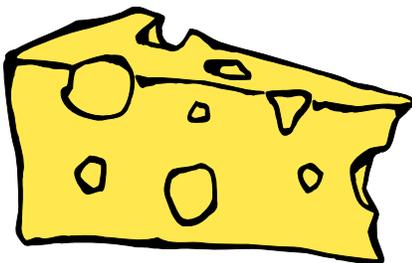
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How Can I Get Enough Calcium-Rich Foods?

Add calcium by eating a dairy food at each meal:

- Have cereal with milk for breakfast.
- Make hot cereal or soups with lowfat milk instead of water.
- Grate cheese over a salad or add a slice of lowfat cheese to a sandwich for lunch.
- Try lowfat frozen yogurt or low fat pudding for dessert or as a snack.
- Add non-fat powdered dry milk to pudding, oatmeal, grits, baked foods such as cookies, breads, and muffins, or to soups, gravy, casseroles, and mashed potatoes. Two to four tablespoons can be added to most recipes. You can also try adding 1/4 cup to a pound of ground beef before browning.
- Top pasta with tomato sauce and 1/2 cup ricotta cheese or some part-skim mozzarella cheese.
- Eat canned salmon with bones in place of tuna in sandwich spreads or on a bagel.
- Use plain yogurt as a substitute for sour cream or mayonnaise in recipes or on a baked potato.
- Eat broccoli, kale, okra and turnip greens regularly.





Calcium-Rich Foods

Take your pick! The following serving sizes equal 300 mg of calcium! Choose 4 foods a day for strong healthy bones!

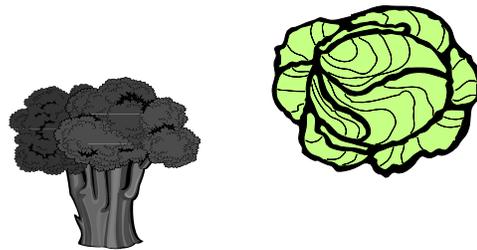
Dairy products (Choose low fat dairy products whenever possible):

- An 8 ounce glass of low fat milk or buttermilk
- 1 ½ ounces or 1 ½ slices of cheese
- 1 cup of low fat plain or fruited yogurt
- 2 cups of 1% cottage cheese
- 1/4 cup of non-fat dry milk powder



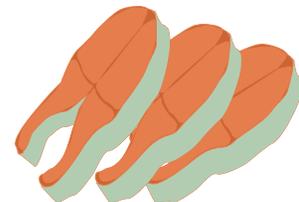
Vegetables:

- 1 ½ cups of cooked kale
- 1 ½ cups of cooked turnip greens
- 1 ½ cups of collard greens



Protein sources:

- 4 ounces of sardines or salmon with bones
- 1 cup of tofu made with calcium





Lactose intolerance - Script

Even if milk or other dairy foods gives you gas, cramps, or diarrhea, you can still eat dairy foods in these ways.

1. Drink less than 1 cup of milk at a time (start with ¼ cup serving size).
2. Drink milk with a meal or other foods.
3. Try eating dairy products in small amounts spread out over the day.
4. Eat yogurt with active cultures, which has less lactose than milk. Look for yogurt with the “made with live active cultures” logo on its container.
5. Include hard cheeses, like cheddar, instead of processed cheeses.
6. Drink lactose-free milk such as Lactaid® or Dairy Ease ®.

Have any of you tried lactase tablets such as Lactaid®, Dairy Ease ® or similar store brands? Here are some of these products (*show product and the summary in the Lactose Intolerance handout*).

Ask your pharmacist about lactase caplets or chews, which you can take when you consume milk or dairy products (*show participants samples of lactase tablets*). If you decide to use a lactase tablet, you should swallow or chew the pills with the first bite of dairy food. The number of tablets to take depends on the type of lactase tablet. Follow the instructions on the label. It costs about \$0.22 to \$0.32 per serving for lactase caplets or chews. (*Check local prices before lesson to confirm costs/update cost to reflect local prices.*)

If you still prefer to get your calcium from non-dairy foods, try to include more nondairy, calcium-containing foods such as collards, mustard greens, broccoli, sardines, salmon with bones, calcium-fortified orange juice or calcium-fortified cereals in your diet.



Lactose Intolerance

The chart below will help you to decide which choice is best for you:

Lactase Enzyme Caplets Original Strength	Swallow 3 Lactase Enzyme Caplets with the first bite of dairy food . \$5.99 for 60 caplets.
Lactase Enzyme Caplets Extra Strength	Swallow or chew 2 Lactase Enzyme Caplets Extra Strength with the first bite of dairy food . \$6.99 for 50 caplets.
Lactase Enzyme Ultra Strength	Swallow or chew 1 Lactase Enzyme Ultra Strength caplet with your first bite of dairy food . \$6.99 for 32 caplets.





Am I Getting Enough Calcium and Vitamin D? *Ask someone to help you fill this out.*

CALCIUM	Servings Per Day or Wk	Calcium Per Serving	Total Calcium	Eat More
Milk or pudding made with milk, 1 cup		300 mg		
Yogurt, 1 cup		400 mg		
Cheese, 1 ounces or slice		200 mg		
Leafy greens (not spinach), ½ cup		100 mg		
Calcium-fortified orange juice, 1 cup		300 mg		
Calcium-fortified cereal, with 100% of Daily Value, such as Total, 1 serving		1,000 mg		
Calcium-fortified cereals or other foods, with 10, 15, or 20% of Daily Value, 1 serving (<i>Brand name:</i>)		100 mg 150 mg 200 mg		
Calcium supplements (<i>Brand:</i>)		varies		
Calcium is in many foods			+300	+300
Your Total Calcium Intake. If less than 1,200 mg per day, then consume more dairy foods, calcium-fortified foods, other calcium-rich foods and/or calcium supplements.			Total	New Total
VITAMIN D	Servings Per Day or Wk	Vitamin D Per Serving	Total Vitamin D	Eat More
Milk or pudding made with milk, 1 cup		100 IU		
Cereal, 1 cup, with 10% of Daily Value		40 IU		
Fish or Shellfish, 3 ounces		300 IU		
Multi-vitamin mineral supplement, 100% or more of Daily Value (<i>Brand:</i>)		400 to 1000 IU		
Other supplements (<i>Brands:</i>)		varies		
Your Total Vitamin D Intake. If less than 1000 IU per day, then consume more milk or vitamin D-fortified foods. Nearly all older adults need a vitamin D supplement to get the vitamin D they need.			Total	New Total
SUPPLEMENT RECOMMENDATION:				

Do not exceed 2,500 mg calcium daily or 2,000 IU vitamin D daily.



Nutrition and Bone Health
Lesson 2: Take Calcium and Vitamin D Post-test

Date:	Name:
County:	Age:

Please circle your answers.

1. Within the past month, I have increased my activity to help keep my bones healthy.

No Yes

2. Within the past month, I have talked to my doctor about:

Osteoporosis No Yes

Physical activity No Yes

Bone mineral density test No Yes

3. I plan to eat more calcium-rich foods.

No Yes

4. I learned something new from this lesson.

No Yes

5. I already take or I am planning to take a vitamin D-containing supplement.

No Yes