

Dietary Prevention of Osteoporosis for Men on ADT

Androgen deprivation therapy (ADT) can have serious adverse effects on bone mineral density (BMD). The majority of patients on androgen deprivation therapy (ADT) are not aware of the role diet plays in preventing osteoporosis. Increasing dietary calcium and vitamin D can prevent loss of bone mineral density.

Androgen deprivation therapy (ADT) is the preferred mode of treatment for patients with recurrent prostate cancer (PC). However, ADT can have serious adverse effects on bone mineral density (BMD), leading to the development of osteoporosis.

Role of Diet in the Prevention of Osteoporosis

Diet plays an important role in maintaining BMD status. Maintaining adequate calcium and vitamin D intake is important in decreasing bone loss and thus reducing the risk of developing osteoporosis.

Vitamin D and calcium both have many functions in the body – one of which is to keep bones healthy. Calcium helps form and maintain strong bones whereas Vitamin D helps promote absorption of the calcium you eat. Eating foods high in calcium without getting enough vitamin D will probably not improve your bone health.

Recommended Intake for Calcium and Vitamin D

The Adequate Intake (AI) for calcium for men 50 years of age and older is 1200 milligrams (mg) per day. For men on hormone therapy, the recommendation for calcium is increased to **1500 milligrams per day**, due to the risk of bone loss. While milk, milk products and milk alternatives are the primary calcium contributors in our diet, other excellent calcium-rich foods include broccoli, almonds, tofu and bok choy. A good tool to use to see if you are meeting your daily requirement for calcium is the Calcium Calculator found on the BC Dairy Foundation website at www.bcdairyfoundation.ca. If your dietary intake is less than 1500mg per day you should consider making up the difference with supplements.

The current recommended intake for Vitamin D is 10mcg (400 IU) per day. For those at risk for poor vitamin D status, including those currently on ADT, **25mcg (1000 IU)** should be the goal. Vitamin D occurs naturally in very few foods. Fish like salmon, mackerel, tuna and sardines are good dietary sources. In Canada, all fluid milk (excluding buttermilk) is fortified with vitamin D, as are most margarines and soy beverages. In order to meet a daily intake of 25mcg, a supplement may be required.

Calcium and Vitamin D Supplements

The two main forms of calcium found in supplements are carbonate and citrate. Calcium carbonate is the most common because it is inexpensive and convenient. Calcium carbonate must be taken with meals as it requires stomach acid to be absorbed. Calcium citrate can be with food or on an empty stomach. Absorption of calcium supplements is best in doses of 500mg or less. Therefore, if you are taking 1000mg of calcium in supplement you should take 500mg twice a day instead of 1000mg of calcium at one time.

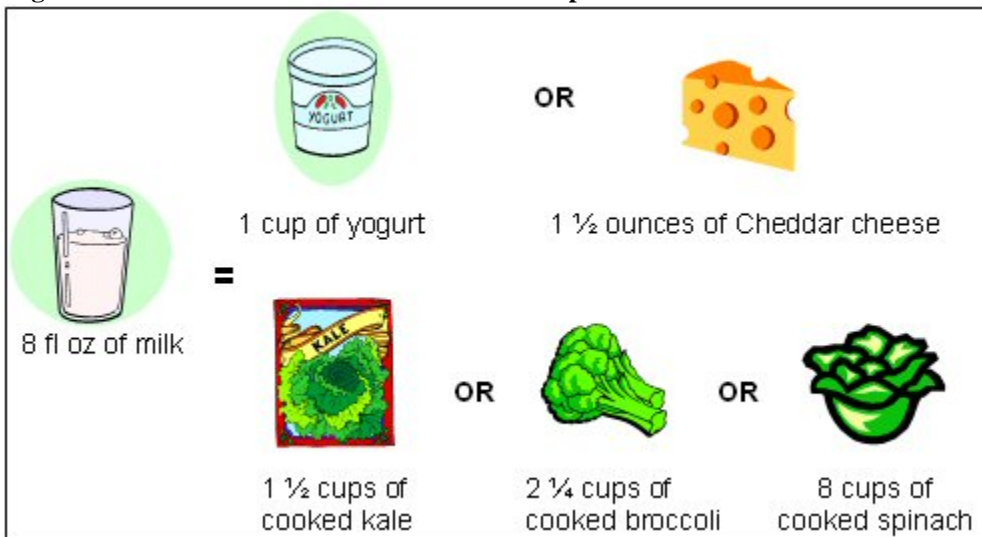
Vitamin D exists in several forms, the most common being Calciferol or Vitamin D3. Calciferol is the most active form and is best absorbed in the body. It is possible to get too much vitamin D, which could result in toxicity. This most commonly occurs from high intakes (greater than 50mcg (2000IU)) of vitamin D in supplement form per day. Sun exposure and diet will unlikely cause toxicity unless one is consuming large quantities of cod liver oil.

Food Sources of Calcium

Food item	Serving	Calcium content (mg)
Milk (skim, 1%, 2%, enriched soy)	1 cup (250 ml)	~ 300
Yogurt, low-fat	¾ cup (175 ml)	294
Hard cheese (cheddar, Swiss, gouda)	1.5 oz (50 g)	360 – 400
Sardines, canned in oil, with bones	2.5 oz (75g)	270
Tofu, firm, made w/calcium sulfate	½ cup (125 ml)	200
Orange juice, fortified with calcium	½ cup (125 ml)	185
Salmon, canned with bones	2.5 oz (75 g)	171
Spinach, cooked	½ cup (125 ml)	120
Almonds, dry roasted	¼ cup (35 g)	93
Bok choy, cooked	½ cup (125 ml)	84
Cottage cheese, 1%	½ cup (125 ml)	70
Orange	1 medium	60
Lentils & beans (kidney, garbanzo, lima)	¾ cup (175 ml)	25 – 60
Bread, whole grain/multigrain	1 slice	33
Broccoli, cooked	½ cup (125 ml)	32
Antacids (Tums®, Roloids®)	1 tablet	200 – 600

Source: Health Canada, Canadian Nutrient File, 2007b version; www.healthcanada.ca/cnf

Figure 1: Calcium Content of 8 fl oz of Milk Compared to Other Food Sources of Calcium



Source: http://dietary-supplements.iinfo.nih.gov/factsheets/Calcium_pf.asp

Tips to help you meet your calcium needs each day:

- Buy calcium-enriched milk or enrich your own by adding 1 Tbsp skim milk powder per cup of milk.
- Use low fat or fat-free milk instead of water in recipes such as pancakes, mashed potatoes, oatmeal, pudding and instant, hot breakfast cereals. You can also add skim milk powder to these items.
- Blend a fruit smoothie made with low fat or fat-free yogurt for a great breakfast.
- Sprinkle grated low fat or fat-free cheese on salad, soup or pasta.
- Choose low fat or fat-free milk instead of carbonated soft drinks.
- Serve raw fruits and vegetables with a low fat or fat-free yogurt based dip.
- Create a vegetable stir-fry and toss in diced calcium-set tofu.
- Enjoy a parfait with fruit and low fat or fat-free yogurt.
- Complement your diet with calcium-fortified foods such as certain cereals, orange juice and soy beverages.

Lactose Intolerant

- Choose non-dairy foods that are high in calcium such as almonds, tofu, broccoli, beans, oranges, spinach and enriched soy milk.
- Use lactase treated products or milk.
- Fermented (hard) cheese contains very little lactose and may be tolerated.
- Fermented dairy products such as yogurt are usually tolerated as they have lower levels of lactose.
- A calcium supplement may be a consideration.

Food Sources of Vitamin D

Food Item	Serving		Vitamin D content	
			IU	mcg
Salmon, cooked	2.5 oz	(75 g)	680	17.0
Salmon, canned with bones	2.5 oz	(75 g)	584	14.6
Cod liver oil	1 tsp	(5 ml)	428	10.7
Sardines, canned in tomato sauce	2.5 oz	(75 g)	360	9.0
Mackerel, cooked	2.5 oz	(75 g)	246	6.2
Tuna fish, canned	2.5 oz	(75 g)	143	3.6
Milk (skim, 1%)	1 cup	(250 ml)	104	2.6
Soy milk, enriched	1 cup	(250 ml)	88	2.2
Margarine	1 tbsp	(15 ml)	60	1.9
Orange juice, fortified with vitamin D	½ cup	(125 ml)	52	1.3
Eggs, cooked (vitamin D is found in the yolk)	2 eggs		52	1.3
Ready to eat fortified breakfast cereal	1 cup	(250 ml)	40	1.0
Salmon oil	1 tsp	(5 ml)	8.1	0.2

Source: Health Canada, Canadian Nutrient File, 2007b version; www.healthcanada.ca/cnf

Tips to help you meet your vitamin D needs each day:

- Drink 3-4 glasses of milk or enriched soy milk each day.
- Eat fish high in vitamin D such as salmon, cod, mackerel, tuna and sardines several times a week.
- Use low fat or fat-free milk instead of water in recipes such as pancakes, mashed potatoes, oatmeal, pudding and instant, hot breakfast cereals.
- Choose low fat or fat-free milk instead of carbonated soft drinks.
- Complement your diet with vitamin D-fortified foods such as certain cereals and orange juice.

The Prostate Education & Research Centre



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Visit The Prostate Centre on the World Wide Web:

www.prostatecentre.com