



STAY HEALTHY ONBOARD GUIDE

NOVEMBER 2023

Bone Health *Osteoporosis and Calcium*



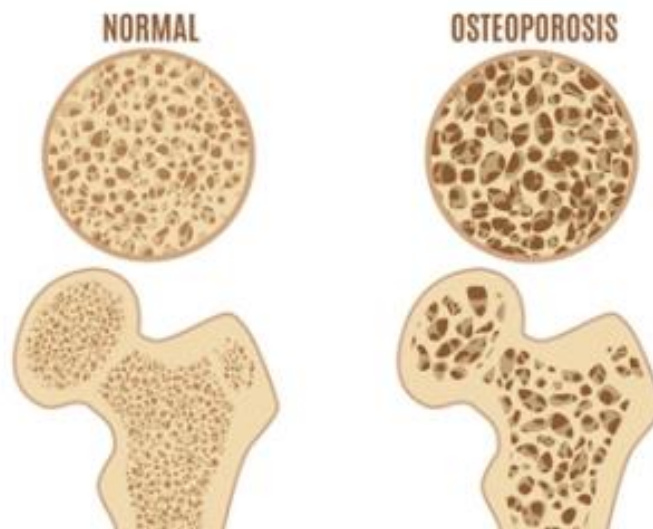
Introduction	3
Osteopenia	5
Osteoporosis	6
Steps for Managing Prevention	8
Calcium	10
Food Items with Calcium	13
Recipes High in Calcium	16
Oceanic's Suggestions	18

INTRODUCTION

Overview

Osteoporosis is a bone disease, a medical condition that leads to the gradual weakening of bones, making them fragile and prone to fractures.

Diagnosis often occurs after a bone breaks due to a fall or sudden impact, even though the condition develops slowly over several years.



Key Facts

- Globally, osteoporosis causes more than 8.9 million fractures yearly, resulting in a fracture every 3 seconds. (International Osteoporosis Foundation, IOF)
- Globally, 1 in 3 women and 1 in 5 men over age 50 will experience osteoporosis fractures. (IOF)
- Women tend to lose bones more quickly than men, especially after menopause, when the oestrogen levels are lower.
- A previous study indicated that osteoporosis is a health issue that might affect seafarers in the near future, especially those in the engine room. Factors such as insufficient calcium intake, long working shifts, exhausting physical activity on board, and limited sunlight exposure, contribute to a higher osteoporosis risk.
- Calcium intake is related with osteoporosis as multiple studies confirm that inadequate calcium intake can cause osteoporosis.

Bone Formation

Bone formation is the process in which new bone is produced.

This process starts in the first trimester in utero and is completed by late adolescence. During this period, the bone is continuously resorbed and formed. This process of resorbing and forming is called remodelling.

OSTEOPENIA

Osteopenia is the stage before osteoporosis. Osteopenia is defined as the state where the bone has lower density than the average density for age, but not low enough to be classified as osteoporosis. In simple words, osteopenia is having lower than normal bone density.

Bone mass density refers to the mineral quantity of the bones and the likelihood of bone breaking.

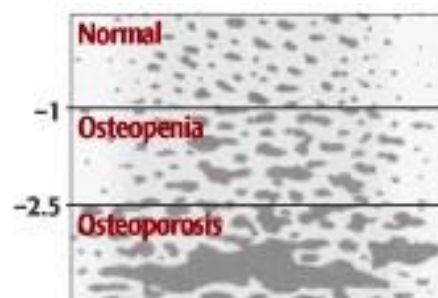
Osteopenia is reversible and does not necessarily lead to osteoporosis. It is peaking at 35 years old.

Osteopenia usually comes without pain or symptoms.

Risk Factors

Osteopenia risk factors include:

- Gender (females)
- Family history of low bone mass density
- Older than age 50
- Menopause in women
- Not getting enough exercise
- Diet low in calcium
- Vitamin D deficiency
- Tobacco use
- Increased alcohol or caffeine



People with lactose intolerance, are at a greater risk of developing osteopenia and/or osteoporosis, as their body cannot digest the sugar in milk, lactose, or the proteins in milk.

Treatment

The objective of managing osteopenia is to prevent its progression to osteoporosis.

Initially the treatment focuses on diet and exercise; a diet rich in calcium and vitamin D along with walking or running at least 30 minutes on most days are crucial.

OSTEOPOROSIS

Osteoporosis is a 'silent' disease as it typically does not include any signs or symptoms. This means that an individual with osteoporosis may not even know it until he breaks a bone.

Furthermore, symptoms may not appear, but height loss and curved back are two visible signs that may suggest that you have osteoporosis.



Risk Factors

People with the below unmodifiable and modifiable risk factors are at a greater risk to have osteoporosis:

Unmodifiable Risk Factors:

- Gender (females)
- Older than age 65
- Family history of osteoporosis
- Previous fracture
- Menopause in women
- Certain medications such as glucocorticoids for arthritis or asthma, steroid hormones, and anti-depressants
- Other diseases such as rheumatoid arthritis, Crohn's Disease, and Coeliac Disease

Modifiable Risk Factors:

- Excessive alcohol intake (more than 2 units alcohol/day)
- Tobacco use
- Low body mass index (being underweight)

- Poor diet low in calcium, vitamin D, and protein
- Vitamin D deficiency
- Eating disorders such as anorexia or bulimia nervosa
- Not getting enough exercise
- Frequent falls

The more risk factors you may have, the more the chance of developing the disease.

BMI Calculation

BMI = body weight (kg) / height (m)²

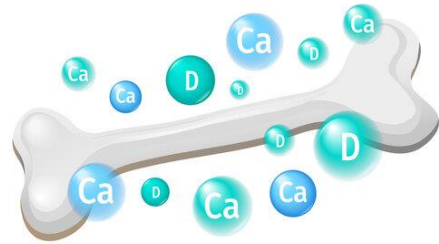
BMI	Body Weight Status
Lower than 18.5	Underweight
18.5-24.9	Healthy Weight
25.0-29.9	Overweight
Greater than 30	Obese

STEPS FOR MANAGING PREVENTION

Several steps can be taken to keep bones healthy.

❖ Follow a proper diet high in calcium, vitamin D, and protein!

A proper diet high in calcium and vitamin D is crucial. Calcium can be found abundant in several food items that will be further explained below.



Vitamin D main source is the sunlight. However, most people may have low vitamin D levels as they live in places with limited sunlight, or they have limited sun exposure. In such cases, vitamin D supplementation may be helpful. The Recommended Dietary Allowance (RDA) for adults 19 years and older is 600IU (15mcg) for both men and women.

Protein is essential for strong bones and muscles. Inadequate protein intake lessens muscle strength, increasing the susceptibility to falls and impeding the recovery process for individuals who have experienced a fracture. Protein rich foods include lean red meat, poultry, fish, eggs, dairy, legumes, soya products, grains, nuts, and seeds.

❖ Do regular physical activity!

Regular physical activity is very important. Individuals between the age of 19 and 64 should engage in a minimum of 2 hours and 30 minutes of moderate-intensity aerobic exercises per week, such as brisk walking on the treadmill if available on board or on deck around the ship.

To enhance bone density and reduce the risk of osteoporosis, it is especially important to incorporate weight-bearing and resistance exercises daily such as skipping, running, and weightlifting. Additionally, adults should include muscle-strengthening activities at least 2 days per week. This should involve targeting all major muscle groups in legs, hips, back, abdomen, chest, arms, and shoulders.

Adequate physical activity might be hard to achieved while on board, but using the gym equipment, resistant bands or simply the body weight whenever possible, would be very helpful.

❖ **Quit tobacco use!**

Tobacco use is associated with high osteoporosis risk.

❖ **Limit alcohol intake!**

Increased alcohol consumption is linked with high osteoporosis risk. It is advised that men should limit their intake to 2 drinks or less per day, and women to 1 or less per day.

Alcohol on board must be in line with the **Drug & Alcohol Policy** applicable to your vessel!

❖ **Get some sun!**



Between late March or early April and the end of September, sunlight stimulates the synthesis of vitamin D, facilitating the absorption of calcium by the body.

This natural process contributes to the fortification of teeth and bones, playing a preventive role against health conditions such as osteoporosis.

It is advisable to spend a brief period in the sun daily during this period.

In the autumn and winter months, obtaining vitamin D from your diet becomes essential as the sun's intensity is insufficient for the body to produce an adequate amount.

Vitamin D food sources include oily fish such as salmon, mackerel and sardines, egg yolks, red meat, and liver.



CALCIUM

Calcium is an essential mineral crucial for the formation and preservation of strong bones and the execution of various vital functions within the body. It stands as the most prevalent mineral in the body.

The majority of the body's calcium is stored in bones and teeth, providing them with the necessary structure and hardness.

Calcium plays a vital role in facilitating muscle movement, enabling nerve communication between the brain and all parts of the body. Additionally, it aids in the blood circulation through blood vessels and contributes to the release of hormones influencing numerous body functions.

The absorption of calcium is facilitated by vitamin D.

Daily Requirements

The amount of calcium needed depends on the age and gender. The average daily recommended amount for healthy adults is indicated below:

Table 1. Calcium Daily Requirements

Gender and Age	Recommended Amount (mg)
Birth to 6 months	200
Infants 7-12 months	260
Children 1-3 years	700
Children 4-8	1,000
Children 9-13	1,300
Teens 14-18 years	1,300
Adults 19-50 years	1,000
Adult men 51-70 years	1,000
Adult women 51-70 years	1,200
Adults 71 years and older	1,200

mg, milligrams.

(National Institutes of Health)

Calcium Food Sources

Calcium is found in several food items, indicated below:

- Dairy milks (cow, goat, sheep)
- Fortified plant-based milks (almond, soy, rice)
- Cheese
- Yogurt
- Calcium-fortified orange juice
- Winter squash
- Young green soybeans (edamame)
- Canned sardines, salmon with bones
- Almonds
- Leafy greens (collard, mustard, turnip, kale, back choy, spinach)

**Specific calcium content in different foods is indicated on Table 2.

VERY IMPORTANT!!! Oxalates and phytates are substances that when presented in the food, they bind calcium and decrease its bioavailability. For instance, spinach contains approximately 260mg calcium per 1 cup cooked. It is also high in oxalates, lowering the calcium bioavailability, meaning that only 5% (13mg) calcium can be used by the body. However, that does not mean that spinach should be avoided as it contains several other essential nutrients. Aim covering your calcium needs with consuming more milk and dairy.

Symptoms of Calcium Deficiency

If calcium intake is insufficient, then calcium will be released by the bones into the blood. Ideally, this insufficiency will not cause any signs or symptoms.

Hypocalcaemia is the condition of a serious calcium deficiency, which usually results from other diseases such as kidney failure, gastric bypass, or medications such as diuretics that interfere with calcium absorption.

Hypocalcaemia symptoms include:

- Muscle cramps or weakness
- Numbness or tingling in fingers

- Abnormal heart rate
- Poor appetite



FOOD ITEMS WITH CALCIUM

Food Item	Serving Size	Calcium (mg)
Milk		
Milk (skimmed, semi-skimmed, whole)	200ml	236-244
Sheep milk	200ml	380
Almond milk	200ml	90
Yogurt		
Flavoured yogurt	150g	197
Yogurt with fruit pieces	150g	169
Natural yogurt	150g	207
Cheese		
Hard cheese (cheddar, parmesan, Emmental, gruyere)	30g	240
Fresh cheese (cottage cheese, ricotta, mascarpone)	200g	138
Soft cheese (camembert, brie)	60g	240
Feta cheese	60g	270
Mozzarella	60g	242
Cream and Desserts		
Cream cheese	30g	180
Double whipped cream	30ml	21
Full cream	30ml	21
Vanilla custard made with milk	120g	111
Vanilla ice cream	100g	124
Vanilla pudding	120g	120
Rice pudding	200g	210
Pancake	80g	62
Cheesecake	200g	130
Waffle	80g	47
Meat, Fish, Eggs		
Egg	50g	27
Red meat	120g	7

Chicken	120g	17
Fish	120g	20
Canned tuna	120g	34
Canned sardines in oil	60g	240
Smoked salmon	60g	9
Shrimp	150g	45
Legumes		
Lentils	200g	40
Chickpeas	200g	99
White beans	200g	132
Red beans	200g	93
Green/French beans	900g	50
Grains		
Pasta	180g	26
White rice	180g	4
Potatoes	240g	14
White bread	40g (1 slice)	6
Wholemeal bread	40g (1 slice)	12
Muesli cereals	50g	21
Naan	60g	48
Fruits		
Orange	150g	60
Apple	120g	6
Banana	150g	12
Apricot	120g (3 pieces)	19
Vegetables		
Lettuce	50g	19
Kale	50g (raw)	32
Bok choy	50g (raw)	20
Broccoli	120g (raw)	112
Okra	120g (raw)	77
Rhubarb	120g (raw)	103
Carrots	120g (raw)	36
Tomatoes	120g (raw)	11

Nuts and Seeds		
Almonds	30g	75
Walnuts	30g	28
Hazelnuts	30g	56
Sesame seeds	15g	6
Tahini paste	30g	42

(International Osteoporosis Foundation)

RECIPES HIGH IN CALCIUM

Yogurt Parfait with Dried Fruits, Nuts, and Flaxseeds

Ingredients (10 servings):

100g flaxseeds
10g almonds with shell
50g dry apricots
50g raw unsalted cashew nuts
50g dried cranberries
50g dried cherries
50g dates
50g mixed dried fruits
50g dried figs
50g mixed nuts
10 cups long-life plain yogurt



Method:

1. Stir the dried fruits, flaxseeds, and nuts into the yogurt.
2. Sprinkle with some cinnamon to taste.

Milk Porridge

Ingredients (10 servings):

500g oats
2500ml milk
100g cooking salt



Method:

1. Put the oat in a saucepan, pour in the milk and sprinkle with a pinch of salt.
2. Bring the saucepan to the boil and simmer for 4-5 minutes, stirring from time to time and be careful that it will not stick to the bottom of the pan.
3. Add the mixture in a large bowl that can be used in the microwave.
4. Microwave on high for 5 minutes, stirring halfway through.
5. Leave to stand for 2 minutes and ready to be consumed!

Notes: Add some fruits or nuts to consume a complete and well-balanced meal.

Oven-baked Pasta with Aubergines

Ingredients (10 servings):

1000g eggplants
600g thick (ziti or penne) pasta
33g unsalted butter or margarine melted
144g crumbled soft Greek feta cheese
A dash of all spice powder
10g cooking salt
1g ground black pepper
6g fresh mint
5 pcs medium eggs
A dash of ground nutmeg
50g bread crumbs
1000ml bechamel



Method:

1. Cook the pasta in boiling water according to package instructions and drain.
2. Let it cool slightly, add the melted butter, crumbled feta cheese, pepper, all spice, and a pinch of salt, if necessary.
3. Lightly whisk the egg whites and fold into the pasta mixture and set aside.
4. Prepare the bechamel, let it cool, and stir in the egg yolks, cream, nutmeg, and grated feta cheese.
5. Butter an ovenproof 10x14in baking dish and sprinkle with the breadcrumbs.
6. Spread half the pasta mixture over the bottom and pour half the white sauce over it, evenly.
7. Cover with the remaining pasta mixture and pour the remaining sauce over the top.
8. Smooth the surface and bake in the oven at 350°F for about 40 minutes, or until the surface is golden brown.
9. Let stand 10 minutes before serving.

If a certain food is not available at your vessel, you might order.



Oceanic's Suggestions:

- ✓ Quit smoking!
- ✓ Follow a proper well-balanced diet!
- ✓ Exercise whenever possible!
- ✓ Get some sun whenever possible!
- ✓ Do not skip your daily intake of dairy!
- ✓ If lactose intolerant, choose other calcium sources!



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