

# Eat Well for Bone Health





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# Bone health

## Your skeleton and bones

Bone is a living tissue and undergoes a constant cycle of being broken down and being rebuilt in order to repair damaged or worn out bone. Many different nutrients are needed to build new and healthy bone cells and we get these from the food and meals we eat.

It's rather like a bank account, where you make "deposits" of nutrients for new healthy bone and "withdrawals" of bone that need replacing. As we get older, more bone is naturally lost than is replaced. There is a natural decline in bone strength.

## Osteoporosis

People with osteoporosis lose more bone at a faster rate than is normal. Osteoporosis causes bones to become fragile. Therefore they break easily. Even a minor bump or fall can cause a fracture. The disease affects both men and women. It is more commonly seen in older people but osteoporosis can affect all age groups, even the young.

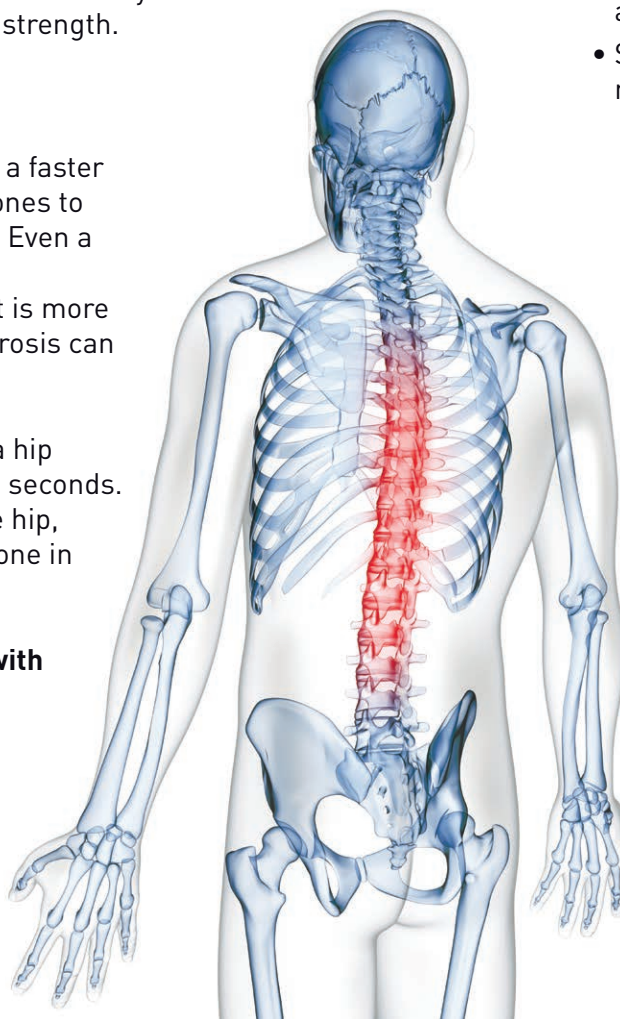
It is estimated that someone in the EU has a hip fracture as a result of osteoporosis every 30 seconds. The most common bones to fracture are the hip, spine and wrist. However it can affect any bone in the skeleton.

### The number of Irish people over 50 years with Osteoporosis

- 1 in 3 women.
- 1 in 5 men.

The incidence increases to

- 1 in 2 women over 65 years.



## What are common signs or symptoms of Osteoporosis?

- A broken bone from a trip or fall from a standing position.
- A fragility fracture which is a type of fracture that occurs as a result of normal activities such as a sneeze, cough, or turning over in bed.
- A loss of height of more than 2cm, due to the collapsing vertebrae (bones in spine).
- Developing a hunched back and protruding head, usually associated with loss of height.
- Sudden severe back pain, associated with loss of height. However most people experience no pain until they have a fracture.

## Who is at risk of developing Osteoporosis?

There are many reasons why you may have an increased risk of developing osteoporosis. Here are a list of common risk factors.

**Family History:** 80% of your bone strength is determined by genetics. If a parent or grandparent had osteoporosis or any of the above symptoms, then you may be at a higher risk yourself.

**Age:** Bone loss increases in later life. It's estimated that about half of those over the age of 75 will have osteoporosis. As we get older, our bones become more fragile and are more likely to break.

**Gender:** After the menopause, women experience acceleration in bone loss. The female hormone oestrogen has a protective effect on bones. At the menopause (normally around the age of 50) the ovaries almost stop producing this hormone reducing protection for our bones.



**Eating disorders:** People who have a history of eating disorders may have missed out on vital nutrients to nourish their bones at a vital stage of development.

**Gastrointestinal Disorders:** such as Coeliac disease, Crohn's disease, Ulcerative Colitis or Primary Biliary Cirrhosis.

**Rheumatoid Arthritis:** the disease itself and steroid treatments can increase the risk.

**Endocrine Disorders:** such as high levels of prolactin, cortisol or thyroid and parathyroid hormone problems, diabetes, Turner's Syndrome, Klinefelter's Syndrome etc.

**Chemotherapy or Radiation:** Any adult or child who has received or who will be receiving treatment should have a DEXA scan.

**Medications:** Some medications can increase the risk of osteoporosis e.g. corticosteroids, some anticonvulsants, post organ transplant therapy, diuretics, etc.

#### **Lifestyle Factors:**

- Excessive physiological stress.
- Low body weight. If you are unsure if you are underweight for your height, check with your doctor or a dietitian.
- Lack of regular weight bearing exercise.
- Low daily intake of calcium and /or vitamin D.
- Intolerance to dairy products or vegetarians / vegans who do not eat sufficient calcium, vitamin D and protein.
- Smoking.
- Excessive alcohol consumption.

## Preventing osteoporosis

Osteoporosis is the most common bone disease in the world, but it is preventable and treatable in the majority of people. There is nothing you can do about your age or your family history, but you can positively influence many lifestyle factors.

### **Making positive changes**

Changing what you eat and becoming more active can help reduce your risk of osteoporosis.

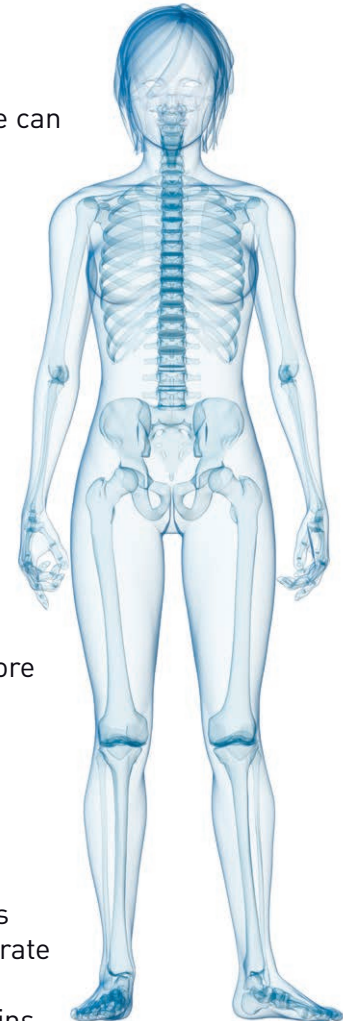
The dietary guidelines are similar to those recommended for everyone else! So you don't need to eat any special or expensive foods, but you may identify some improvements or changes to your nutrition plan. **You can list these on page 27 of this booklet.**

Let's have a look at some ways to be sure your intake of certain critical nutrients are optimal for bone health.

### **Fast Facts**

Drinking more than the recommended intake (more than two units per day) may increase the risk of suffering a fragility fracture. See page 24.

If you enjoy drinking coffee or other caffeine-containing drinks you need to ensure that you are getting sufficient calcium. Caffeine is a stimulant, found naturally in coffee, cocoa and tea. Caffeine is also added to soft drinks and energy drinks. Moderate caffeine consumption — about 3 cups of coffee a day — won't be harmful as long as your diet contains adequate calcium. Pregnant women should consume less than 2 cups (<200mg) of coffee per day (FSAI, 2019).



# 1 Include enough calcium rich foods

## Why is calcium important for health?

Calcium is required for healthy blood vessels to contract and dilate; muscle function; nerve transmission; hormonal secretion. Less than 1% of our total body calcium is needed to support these crucial functions. The remaining 99% of the body's calcium is stored in the bones and teeth where it supports their structure and function. Calcium's most notable role is in helping to reduce the risk of osteoporosis.

## What foods provide Calcium?

You can get enough calcium by eating a variety of foods, including the following:

- Milk, yoghurt, and cheese contain calcium that is easily absorbed and utilised.
- Fish with soft bones that you eat, such as tinned sardines and salmon.
- Green vegetables such as spinach and kale provide some calcium, however some plant sources contain oxalic acid and phytic acid which interfere with absorption.
- Calcium is added to some breakfast cereals, fruit juices, soya and rice drinks, and tofu.
- Most grains (found in breads, pastas, and unfortified cereals), while not rich in calcium, add to our calcium intake because we eat these foods frequently.



## Are you getting enough calcium?

This table shows the percentage of people not consuming adequate calcium.

	Male (%)	Female (%)
Children (5-12 years) *	28	37
Teenagers (13-17 years) **	23	42
Adults (18-64 years) ***	----	16
Older adults (>65 years) ****	----	13

\*National Children's Food Survey (2003-2004). Aged 5-12 years

\*\*The National Teen's Food Survey (2005-2006). Aged 13-17 years

\*\*\*National Adult Nutrition Survey (2008-2010). Aged 18-64 years

\*\*\*\*National Adult Nutrition Survey (2008-2010). Aged ≥64 years

## What is your Recommended Daily Calcium Intake?

Population Group	Servings of Calcium Rich Foods (FSAI, 2011)
Children (5-12 years)	3 servings
Teenagers (13-18)	5 servings
Adults (18+)	3 servings
Pregnant and lactating women	3 servings

## Lactose Intolerance

If you are sensitive to lactose you may not need to eliminate dairy consumption completely: lactose-free milks, yoghurts with live cultures, and some hard cheeses are normally tolerated. Another alternative is to take lactase tablets or drops along with dairy foods. People who are lactose intolerant should consult with their doctor to discuss the best way of ensuring adequate calcium intake, either through diet, or if necessary, through the use of supplements.

## Vegan Diets

Vegan diets do not contain any food products of animal origin. Vegans do not eat meat, poultry, fish, dairy or eggs. This restrictive diet requires careful planning to ensure it meets nutrient needs. Particular attention should be given to ensure that calcium, vitamin D, iron and vitamin B12 needs are met (FSAI 2019). Supplementation is usually necessary. Discuss with your health care team.

## What does a serving look like?

- 1/3 pint (200ml) milk
- 1 carton (125ml) yoghurt
- 1oz (25g) cheese (small matchbox size)

**Note: Low fat servings are generally recommended**

## Why choose lower fat cheese, milk and yoghurt?

- Choosing lower fat dairy foods can help you to reduce your calorie and saturated fat intake.
- Lower fat dairy foods still contain protein for growth and repair of healthy muscle.
- The nutrients they provide are essential for healthy bones, blood pressure and metabolism.

**Note: Check yoghurt labels to make sure there is no additional sugar added to lower fat version.**



## How you can meet your daily calcium requirement?

• 200mls milk in cereal for breakfast	240mg
• 1 low fat yoghurt at 11am	203mg
• 1oz cheddar in sandwich at lunch	210mg
• 100mls milk in tea/coffee	120mg
<b>Total</b>	<b>773mg (97% RDA)</b>

**Note: Low fat servings are generally recommended**

## Are supplements necessary?

There may be inadequate amounts of Calcium and Vitamin D3 in the diet, and supplementation is necessary when dietary intake of Calcium and especially vitamin D3 is inadequate (Irish Osteoporosis Society).

## Easy ways to boost your Calcium intake

- Mash natural yoghurt into sweet potato.
- Add milk or natural yoghurt to soups and sauces.
- Mix fresh berries or banana with yoghurt and top with a tablespoon of granola.
- Mix hot/cold milk to a high fibre breakfast cereal for supper.
- Make custard with milk instead of using cream with dessert.
- Add grated cheese to a baked potato or frittata for lunch.
- Chop small chunks of brie or feta into a salad and top with seeds
- Make a vegetable bake topped with mozzarella.
- Have a frothy cappuccino or hot chocolate as an occasional treat!

### A list of food sources of Calcium to choose from:

Food/Drink	Portion Size	Calcium (mg)
Full fat milk	200ml	236
Low fat milk	200ml	240
Soya milk (calcium enriched)	200ml	178
Goat's milk	200ml	200
Low fat yoghurt	125g	203
Low fat cheddar cheese	25g/1oz	210
Cottage cheese	75g/3oz	95
Baked beans	200g	106
Dried apricots	40g	37
Brazil nuts	30g	51
Salmon (tinned)	100g	93
Tofu (cooked)	100g	510
Boiled broccoli	80g	32

## 2 Include enough vitamin D rich foods

Vitamin D is a fat-soluble vitamin that is found in certain foods. It is both a nutrient and a hormone our bodies can make through the action of the sunlight on our skin. That's why it is sometimes referred to as the 'sunshine vitamin'.

However Ireland is very northerly in latitude, and in the months between November and March there is an insufficiency of both the quality and quantity of sunlight necessary to produce adequate vitamin D by the body.

Even on sunny days in the winter, the sun's rays are not the right type for the production of vitamin D. Moreover, with most people working indoors and using sunscreen when outside, vitamin D from sunlight exposure has decreased.

### Who is most at risk?

Darker skinned people living in Ireland are particularly at risk as they require over ten times more sunlight to produce enough vitamin D.

Elderly people who don't get sufficient skin exposure to sun along with a poor dietary intake, those who cover themselves for religious or cultural reasons, those with malabsorption conditions and those with kidney disease are particularly at risk of being deficient in vitamin D.

Certain medications may interfere with the body's conversion of vitamin D. Therefore the elderly and people who are confined to indoors may also benefit from a vitamin D supplement.

## Why is vitamin D important for health?

The body needs vitamin D to absorb calcium. Without it, we can absorb no more than 15% of the calcium we consume. When this happens, the body must take calcium from its stores in the skeleton, which can weaken the existing bone and prevent the formation of strong, new bone, potentially resulting in osteoporosis.

Recent research has also looked at vitamin D's role in a variety of diseases other than bone health. Many studies have highlighted an association between having a low vitamin D status and cardiovascular diseases, diabetes, some cancers, cognitive decline, depression and autoimmune diseases. These studies suggest that the role of vitamin D far exceeds its previous remit of good bone health.

## Vitamin D Recommended Daily Amounts (RDAs)

The RDA for adults is 0-10µg. However, a significant proportion of 18-64 year olds have low vitamin D intakes, with 72% of men and 78% of women having average daily vitamin D intakes of less than 5µg (IUNA, 2011).

## Dietary Sources of vitamin D

Very few foods are naturally good sources of vitamin D. Oily fish including salmon and mackerel are the best sources. Egg contains a small amount naturally. The rest are fortified foods. Vitamin D is added to some milks and to some brands of other dairy products, orange juice, soyamilk and fortified cereals. Check the food label to see if vitamin D has been added to a particular product.

Consider a blood test to determine your levels and a supplement if dietary intake is poor. If there is inadequate Calcium and Vitamin D3 in your diet, supplementation is necessary especially when vitamin D3 is inadequate (Irish Osteoporosis Society).



## How to get enough vitamin D daily?

• 100ml fortified Milk	2µg
• Serving of fortified breakfast cereal	1.5µg
• 1 egg	1µg
• Small tin of tuna	4.5µg
<b>Total</b>	<b>9µg (90% RDA)</b>

## Tips to boost vitamin D intake

- Try including a Fishy Friday in your week and enjoy oily fish regularly e.g. salmon, trout, mackerel, herrings, fresh tuna and sardines.
- Choose tinned fish for lunch.
- Choose a fortified breakfast cereal with a fortified milk.
- Include a couple of egg omelettes or scrambled egg lunches each week.
- Spend 15-20 minutes outside in sunshine 2-3 times each week without sunscreen (if appropriate and not at peak time). But remember in Ireland we can only really make vitamin D in the Spring and Summer months, so focus more on increasing your dietary sources of vitamin D.
- Discuss a blood test and supplementation with your doctor if you can't meet your intake through diet alone.



### Food sources of vitamin D:

Food	Portion Size	Vitamin D ( $\mu\text{g}$ )
Salmon, steamed	150g fillet	15
Mackerel, smoked	150g fillet	13
Sardines, tinned in tomato sauce	100g tin	5
Tuna, tinned in brine	150g, small tin	4.5
Low fat fortified milk	200ml	4.0
Branflakes	30g, small bowl	1.3
Egg, boiled	1	2



## 3 Eat more plant protein and less processed meat

### Eat MORE

- Chickpeas in casseroles
- Hummus (made from chickpeas)
- Kidney beans in chilli
- Butter beans in soup
- Cannelini beans in salad
- Lentils in soups and salad
- Frozen soya beans as a dinner vegetable

### Why?

- Peas, beans and lentils contain lots of fibre which keep the digestive system healthy, they are good for the heart.
- They are naturally low in fat.
- Protein under-nutrition can lead to reduced muscle mass and strength in older people, which is a risk factor for falls.

**Note:** Plant proteins can help boost your protein intake. As well as enjoying oily fish, white fish, shellfish and chicken, include up to three portions of red meat (lean cuts of beef, lamb and pork) per week. These proteins are good sources of iron, zinc and selenium.





### Watch protein portion sizes

Two servings of protein-rich foods will meet the daily requirements of most adults.

The following are the examples of serving sizes for protein:

#### **A serving is the size of**

- 1 chicken fillet
- 1 salmon cutlet
- 2 small pork chops with fat removed
- 1 piece of steak (size of palm of your hand)
- 1 and a half cups of beans or pulses
- 2 eggs (up to 7 in a week if your cholesterol is normal or less than 5 eggs if you have a high cholesterol)

### Additional bone nutrients

Fruits and vegetables are excellent sources of magnesium, potassium, and vitamins C, K and A. All play a role in maintaining bone health.

#### **Vitamin K**

Found in leafy green vegetables, spinach, cabbage and kale, liver and dried fruit.

**TIP:** Snack on 4 prunes, a good source of vitamin K

#### **Magnesium**

Found in green vegetables, beans, lentils, nuts, seeds and fish.

**TIP:** A serving (30g) of almonds has up to 40% of your daily needs

#### **Zinc**

Found in lean red meat, poultry, whole grain cereals, peas, beans and lentils.

**TIP:** Roasted and seasoned chickpeas are a good plant snack

#### **Carotenoids precursors to vitamin A**

Found in many vegetables, including in leafy green vegetables, carrots and red peppers.

**TIP:** 50g of raw carrots meet your daily needs.



# 4 Choose unrefined high-fibre carbohydrates

Carbohydrate is your body's primary source of energy. Your body breaks carbohydrate down into a sugar called glucose. Glucose is essential for your brain and your nervous system and is the preferred fuel for your working muscles during exercise. 1 gram of carbohydrate produces 4 kcal (calories) of energy.

Not all carbohydrates are the same therefore we need to watch the type and quantity we eat. Certain carbohydrates help us to control our blood sugar levels better than others.

## Sugar is a type of carbohydrate.

Sugar is found in many foods including sweets, biscuits, cakes and fruit. However, there is a big difference between a piece of fruit and some biscuits that contain the same amount of sugar! So make your snacks count nutritionally.

It's best to reduce your consumption of table sugar, soft drinks, juices, sweets, and stick to foods that contain a little natural sugar, but also other essential nutrients (see comparison of an apple and biscuits below).

A medium apple	3 ginger nut biscuits
11g sugar	11g sugar
2g fibre	Very little fibre
no fat	4g fat
other vitamins and nutrients	little or no vitamins and minerals



## Why do we need unrefined high-fibre carbohydrates?

- Essential for proper brain and nervous system function
- Preferred fuel for working muscles
- The fibre it contains feeds good gut bacteria and increases the mood enhancing hormone serotonin

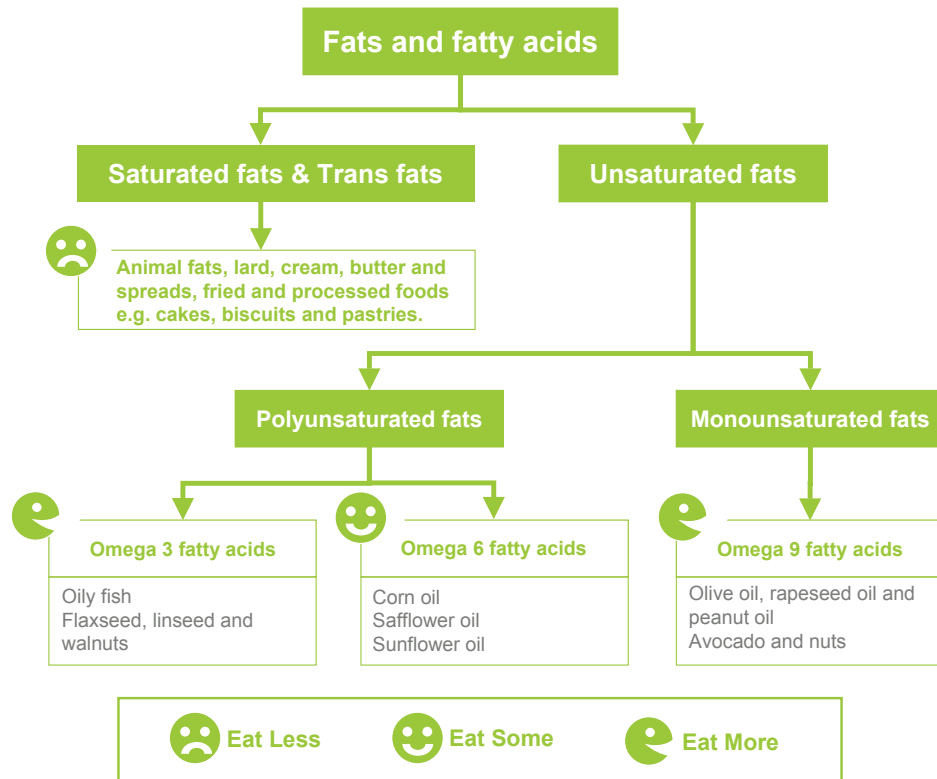
## Eat MORE nutrient dense carbs

- Porridge, unsweetened oat based muesli, high fibre breakfast cereals
- Sourdough bread, wholegrain bread, rye bread
- Pasta, wholewheat or plain
- Brown rice, wild rice and basmati rice
- All pulses and legumes such as beans, peas and lentils
- Fresh fruit. Two servings a day is usually enough
- Nuts, seeds. Stick to a small handful as a snack
- Rye or wholegrain crackers or crispbread

## Eat LESS highly refined carbs

- Table sugar
- Foods with added sugar e.g. sweets, biscuits, cakes, bakery products, etc.
- Refined breakfast cereals, sugar coated or very processed
- Sliced pan breads – brown or white
- Sports drinks, soft fizzy drinks, energy drinks and juice drinks
- Fast food, very processed food

# 5 Avoid trans fats and certain saturated fats



## Eat LESS

Trans fats and certain saturated fats found in fried and processed foods e.g. cakes, biscuits and pastries.

## Eat MORE (Omega 3 fatty acids)

- Oily fish\* like salmon, mackerel, sardines, trout
- Flaxseed or Linseed
- Walnuts
- Camelina oil

## Eat MODERATELY (Omega 6 fatty acids)

- Corn oil
- Safflower oil
- Sunflower oil

## Eat MORE (Omega 9 fatty acids)

- Olive, rapeseed and peanut oils
- Avocado (half an avocado is a portion)
- Nuts (a small handful of mixed nuts is a portion)



\* Note: Official advice on oily fish has changed. Although fresh tuna is a good source of protein and Vitamin D, it no longer counts as an oily fish. This is because current data show that levels of omega 3 fatty acids in fresh tuna are no greater to those found in most white fish. Advice on canned tuna remains the same; it does not count as an oily fish.

# 6 Don't add salt

## Eat MORE

- Garlic
- Herbs
- Spices
- Black pepper
- Lemon juice
- Balsamic vinegar





## 7 Eat more natural foods

Aim to eat 5 to 7 servings of fruit and vegetables a day. That is two to three fruits and the rest vegetables (always include one green vegetable and a mix of other colours).

It isn't only the vitamins and minerals that are protective. Flavonoid-rich plant foods such as plums and berries are associated with bone benefits too.

### A serving of fruit and vegetables

- 1 medium sized fresh fruit (e.g. apple, orange, banana)
- 2 small sized fresh fruit (e.g. plums, kiwi, mandarin)
- 3 dessertspoons of fresh fruit salad
- 1 small glass of fruit juice (No more than 150ml)
- 1 small bowl of vegetable soup
- 3-4 dessert spoons of cooked vegetables or salad



### Inject your diet with colour

It's also good to eat a wide variety of fruit and vegetables to get all the different vitamins, minerals and phytonutrients your body needs.

## 8 Watch the quality & quantity of snacks

Try to eat 3 meals each day and only the occasional snack if you need it. Choose protein and calcium rich snacks or nutritious snacks such as a yoghurt, handful of nuts or mixed roasted seeds, a mini dark chocolate bar, wasabi peas or roasted edamame beans.

### Snack Attack?

Choose the scone instead of the Danish Pastry, 3 times a week and over 1 year, you could save yourself putting on 1½ stone of weight.



Large Danish: **673 Calories – 32g Fat**



Fruit Scone: **174 Calories – 7g Fat**

## 9 Enjoy alcohol in moderation

**Excessive consumption of alcohol increases the risk of bone loss and fractures.**

**The recommended intake of alcohol is**

- Men – **17 standard drinks per week**
- Women – **11 standard drinks per week**

1 'standard drink' = half pint beer = glass wine (125 ml) = pub measure spirits.

Enjoy these units by spreading them throughout the week and have two to three drink-free days.

**Note: A glass of wine or spirit poured at home is usually much bigger than a standard drink size.**

### Alcohol and hidden calories

- 1 glass red wine **85kcal**
- 1 glass sweet white wine **118kcal**
- 1 pint Lager **167kcal**
- 1 pint Cider **208kcal**
- 1 pint Stout **210kcal**

### Drink more water and watch the calories in other non-alcoholic drinks

- Up to 8 glasses per day water **0kcal**
- 60ml espresso **1kcal**
- 200ml grapefruit juice unsweetened **66kcal**

- 200ml of orange juice unsweetened **72kcal**
- 200ml apple juice unsweetened **76kcal**
- 330ml cola **131kcal**
- 472ml cappuccino **140kcal**
- 472ml latte **144kcal**
- 360ml hot chocolate **186kcal**
- 472ml mocha **208kcal**

## 10 Get Active for Bone Health

There are so many hidden benefits from exercise. It helps keep your bones, joints and muscles strong and healthy. It will also help you to stay a healthy weight for your height.

Exercise is essential for the body because it:

- Reduces your blood pressure
- Reduces bad 'LDL' cholesterol
- Burns calories
- Protects against muscle / bone loss
- Improves mood and mental wellness



# SAMPLE OF A DAY WITH ADEQUATE CALCIUM AND VITAMIN D

## BREAKFAST

Porridge with 200mls low fat milk and sliced banana.

## SNACK

Natural yoghurt and slices of fresh peach

## LUNCH

2 egg omelette with 25g grated reduced fat cheddar cheese, slice wholegrain bread and green side salad

## SNACK

30g unsalted cashews and 2 satsumas

## DINNER

Steamed salmon, brown rice, carrots and broccoli

1450 kcals, 1063mg calcium and 10.65ug vitamin D

# SUMMARY: THREE THINGS I WANT TO CONCENTRATE ON AND IMPROVE ON...

## MY GOOD HABITS

Make a list here of the good habits which you want to adopt

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

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