Cooking for bone health

An interactive cooking session that includes instruction on how to prepare simple and nutritious meals that support healthy bones.

Why is bone health important?

Bones play many roles in the body — providing structure, protecting organs, anchoring muscles and storing calcium and other minerals.
A number of factors affect bone health including:

- Amount of calcium in your diet (& vitamin D levels)
- Physical activity
- Tobacco & alcohol use
- Gender, size & age
- Race and family history
- Hormone levels
- Eating disorders & other conditions
- Certain medications

Calcium is essential for building and maintaining bone

- Almost about 99% of the body’s calcium is found in the bones. Calcium combines with other minerals to form hard crystals that give your bones strength and structure.
- A small amount of calcium is dissolved in the blood; this calcium is essential for the healthy functioning of the heart, muscles, blood and nerves.

Less than half of all Australian adults get their daily recommended intake of calcium
Bones act like a calcium bank

- If you do not take in enough calcium from your diet the body will withdraw calcium from your ‘bone bank’ for use in these other parts of the body.
- If your body withdraws more calcium than it deposits over a long period, your bone density (bone strength) will gradually decline and you may be at risk of developing osteoporosis.

<table>
<thead>
<tr>
<th>Growing children</th>
<th>Recommended:</th>
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</thead>
<tbody>
<tr>
<td>Peak Bone Mass – the point of which our bones are at their highest density - is achieved by our early twenties. Nearly 40% of Peak Bone Mass is acquired during puberty. Adequate calcium intake is therefore essential for children and teenagers.</td>
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<tr>
<td>Children 1 – 3 years</td>
<td>500 mg per day</td>
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<tr>
<td>4 – 8 years</td>
<td>700 mg per day</td>
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<tr>
<td>Girls &amp; Boys 9 – 11 years</td>
<td>1,000 mg per day</td>
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<tr>
<td>Teenagers 12 – 18 years</td>
<td>1,300 mg per day</td>
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<table>
<thead>
<tr>
<th>Adulthood</th>
<th>Recommended:</th>
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<tbody>
<tr>
<td>Adequate calcium intake is vital to maintain bone strength.</td>
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<tr>
<td>Men &amp; Women 19 years +</td>
<td>1,000 mg per day</td>
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<table>
<thead>
<tr>
<th>Older Adults</th>
<th>Recommended:</th>
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<tbody>
<tr>
<td>Calcium is absorbed less effectively from the intestine and more can be lost through the kidneys so calcium intake needs to be maintained at a higher level.</td>
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<tr>
<td>Women over 50 years</td>
<td>1,300 mg per day</td>
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<tr>
<td>Men over 70 years</td>
<td>1,300 mg per day</td>
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</table>
The best way to get the recommended level of calcium intake for your age is to eat a diet rich in calcium.

Calcium content in food varies significantly, so it is important to consume ‘calcium rich’ foods.

Include the recommended

3 – 5 serves of calcium rich food daily
(number of serves depends on level of calcium)

See the list of calcium content in different foods
Tips for increasing calcium intake

• Try canned salmon or sardines which contain bones rich in calcium
• Use yoghurt in soups or salads
• Add milk or skim milk powder to soups or casseroles
• Try soy based products and tofu that contain calcium
• Include broccoli, mustard cabbage, bok choy, silverbeet, cucumber, celery, chick peas in your regular diet
• Eat more almonds, dried figs and dried apricots
• Products fortified with calcium (eg some breakfast cereals) can help improve your calcium intake

Calcium - do we absorb everything?

It is normal for a small amount of calcium to be lost and excreted.

Other factors can lead to an abnormally low level of calcium absorption and should be discussed with your doctor, for example:
  – Low vitamin D levels
  – Excessive caffeine and alcohol
  – Diets high in phytates or oxalates
Phytates
(eg: some cereals and brans) can reduce calcium absorbed from other foods eaten at the same time

•

Oxalates
(eg: spinach, rhubarb) only reduce the calcium absorbed from the food in which they are present

A supplement may be required and is recommended in doses of 500 – 600 mg /day

• The most common supplements are calcium carbonate, calcium citrate or hydroxapatite.
• Supplements may take the form of oral tablets (swallowed), effervescent tablets, chewable tablets or soluble powder.
• Calcium supplements are usually well tolerated and are sometimes combined with vitamin D supplements as required.
Calcium and osteoporosis

- For people diagnosed with osteoporosis calcium alone is not sufficient to prevent fractures.
- Specific Osteoporosis treatment will be advised by a doctor. Often it includes calcium supplementation combined with vitamin D, to ensure proper management of your bone health and monitoring using bone density scans.

What is osteoporosis?

- Osteoporosis affects over 1 million Australians. Bones become fragile and brittle which increases risk of fracture.
- Osteoporosis occurs when bones lose minerals, such as calcium, more quickly than the body can replace them, leading to a loss of bone thickness.
Any bone can be affected by osteoporosis

- Common sites are the hip, spine, wrist, upper arm, ribs or forearm.
- Fractures in the spine due to osteoporosis can result in losing height or changes in posture (and in more serious cases it can result in a Dowager's hump in the back).

Fractures can lead to:

chronic pain, disability, loss of independence and even premature death.
Bone structure

Normal  Thinning  Osteoporotic

The silent disease

Osteoporosis usually has no symptoms until a fracture occurs.

It is also important for anyone over 50 who experiences a fracture from a minor bump or fall to be investigated to check if the fracture was caused by osteoporosis.
Men & Osteoporosis

Currently 23% of people with osteoporosis (almost a quarter) are men.

- **Specific factors include:**
  - low testosterone levels
  - some treatments for prostate cancer

Men with testosterone deficiency or low testosterone levels can improve their bone density with testosterone replacement.

Women

- Greater risk of developing osteoporosis because of the rapid decline in oestrogen levels during menopause.
- When oestrogen levels decrease, the bones lose calcium and other minerals at a much faster rate.
- As a result bone loss of approximately 2% per year occurs for several years after menopause.
Your family history

• Bone health may be strongly inherited. Consider your family history of osteoporosis.

• It is important to note if anyone in your family (particularly parents or siblings) had diagnosed osteoporosis, sustained fractures from minor falls or rapidly lost height as these can indicate low bone density.

Your medical history

• Certain conditions and medications can increase impact on your bone health
  – Corticosteroids – commonly used for asthma, rheumatoid arthritis and other inflammatory conditions
  – Low hormone levels
    • in women: delayed puberty, early menopause
    • in men: low testosterone
  – Thyroid conditions – over active thyroid or parathyroid
  – Conditions leading to malabsorption eg: celiac disease, inflammatory bowel disease
  – Some chronic diseases eg: rheumatoid arthritis, chronic liver or kidney disease
  – Some medicines for breast cancer, prostate cancer, epilepsy and some antipsychotics
Lifestyle factors:

• Smoking
• Excessive alcohol intake
• Weight - thin body build or excessive weight (recent studies suggest that hormones associated with obesity may impact bones)
• Low levels of physical activity

Your calcium and vitamin D levels:

• Low calcium intake
  – Adults require 1,000 mg per day (preferably through diet) and this increases to 1,300 mg per day in women over 50 and men over 70.

• Low vitamin D levels
  – A lack of sun exposure can mean you are not getting enough vitamin D, which your body needs to absorb calcium.
Vitamin D

Vitamin D plays an essential role in bone health by:

– improving the absorption of bone building calcium from the intestine
– supporting growth and maintenance of the skeleton
– regulating levels of calcium in the blood

Vitamin D and Sunshine

• The main source is from exposure to sunlight.
• Vitamin D is produced when our skin is exposed to ultraviolet B (UVB) light from the sun. The amount of sun exposure required to produce adequate levels of vitamin D is relatively low.
• Sun exposure times required will vary based on the season, location in Australia, skin type and area of skin exposed.
Vitamin D deficiency

• Common in Australia with over 30% of adults having a mild, moderate or even severe deficiency.
• Low vitamin D levels can lead to bone and joint pain
• Increases the risk of falls and bone fracture in older people
• Result in rickets (when very serious)

Groups at risk of vitamin D deficiency

• Elderly and housebound or in residential care
• Naturally dark skinned (*darker skin reduces the penetration of UV light*)
• Avoiding the sun for skin protection or due to medical advice for other medical reasons
• Working indoors (*may include office, factory, night shift workers*)
• Covering your body for cultural or religious reasons
• Affected by other medical conditions that can impact on your ability to absorb / process vitamin D
  • Babies of vitamin D deficient mothers
Recommended Vitamin D levels

As a general guide, Osteoporosis Australia recommends most people should have a vitamin D level of at least 50 nmol/L at the end of winter, which means people may have levels 10 – 20 nmol/L (of 60 – 70 nmol/L) during summer.

Your doctor will determine if you require a test, based on your general level of sun exposure, medical history and review of risk factors.

Vitamin D levels are likely to change throughout the year with concentrations being highest in late summer and lowest at the end of winter.

Vitamin D supplements

• For people with low vitamin D levels (which may be in the range of mild or moderate to severe) a supplement may be required. Most vitamin D supplements are ‘D3’ and the dose on the product is shown in International Units (IU).

Vitamin D supplements are available as tablets, capsules, drops or liquid. Your doctor will advise you on the appropriate dose for your needs.
**Vitamin D and food**

Food cannot provide an adequate amount of vitamin D and most people are reliant on sun exposure to reach recommended levels.

A limited number of foods contain small amounts of vitamin D such as oily fish like mackerel and herring, liver, eggs and some fortified products.

<table>
<thead>
<tr>
<th>Skin Type</th>
<th>Season</th>
<th>Skin Exposed</th>
<th>Recommended time of day</th>
<th>Sun Exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moderately Fair</td>
<td>Winter</td>
<td>Arms or equivalent</td>
<td>Midday</td>
<td>7 - 30 minutes*</td>
</tr>
<tr>
<td>Darker skin</td>
<td>Winter</td>
<td>Arms or equivalent</td>
<td>Midday</td>
<td>20 min - 3hrs*</td>
</tr>
</tbody>
</table>

*depends on location within Australia and type of skin

<table>
<thead>
<tr>
<th>People obtaining some sun exposure but not at recommended level</th>
<th>Under 70 years at least 600 IU per day</th>
<th>Over 70 years at least 800 IU per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sun avoiders or people at risk of vitamin D deficiency</td>
<td>Higher doses may be required</td>
<td></td>
</tr>
<tr>
<td>1,000 IU - 2,000 IU per day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate to severe vitamin D deficiency</td>
<td>3,000 - 5,000 IU per day for 6-12 weeks to raise the level of vitamin D level quickly, followed by a maintenance dose of 1,000 - 2,000 IU per day</td>
<td>As advised by a doctor.</td>
</tr>
</tbody>
</table>

Note: It may take 3 - 5 months for a full improvement in vitamin D levels to be seen, so it is important to take vitamin D supplements as advised.
Falls

• Falls are a common cause of fracture. For people with osteoporosis, even a minor fall can cause a fracture.
• Half of all falls occur around the home and approx one third of people over 65 fall each year.
• It is estimated around 6% of falls result in a fracture so prevention is a major factor in maintaining bone health.

Falls are most commonly caused by:

Poor muscle strength
Poor vision
Problems with balance
(weak muscles, low blood pressure, inner ear problems, some medicines, poor nutrition)
Home hazards that cause tripping
Exercise and bone density

Regular physical activity and exercise plays an important role in maintaining or improving bone density for healthy bones.

Exercise also increases the size, strength and capacity of our muscles.

However, exercise must be regular and ongoing to have a proper benefit.

Exercise throughout life

The specific goals of exercising for bone health change throughout life:

- building maximum bone strength in childhood and adolescence,
- optimising & maintaining muscle & bone strength in young and mid-adulthood,
- and reducing bone loss in older age.

For the elderly, the focus of exercise is to increase or maintain muscle mass and strength, and address risk factors for falls, particularly any difficulty in balance and walking ability.
Weight-bearing

Our bones become stronger when a certain amount of impact or extra strain is placed on them. This means there are specific types of exercises that are better for bone.

Certain exercises like swimming and cycling may be good for general health but have little benefit to bone.
The right kind of exercise

• **Weight bearing exercise** (exercise done while on your feet so you bear your own weight)
  
  *eg: brisk walking, jogging, skipping, basketball / netball, tennis, dancing, impact aerobics, stair walking*

• **Progressive resistance training** (becomes more challenging over time)
  
  *eg: lifting weights - hand / ankle weights or gym equipment*

The ability of an exercise to build bone, it’s **osteogenic capacity**, depends on the specific way that stress is applied to the bone during the exercise.

<table>
<thead>
<tr>
<th>The impact of selected exercises on bone health</th>
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</thead>
<tbody>
<tr>
<td>Highly osteogenic</td>
</tr>
<tr>
<td>Basketball/Netball</td>
</tr>
<tr>
<td>Impact aerobics</td>
</tr>
<tr>
<td>Dancing/Gymnastics</td>
</tr>
<tr>
<td>Tennis</td>
</tr>
<tr>
<td>Jump rope</td>
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</tbody>
</table>

*While certain exercises may have low to no osteogenic benefits, this does not imply that these exercises do not offer a wide range of other health benefits.*
Recipes

Smoothies
Dip & crackers
Mushroom soup
Marinated chicken & salad
Bread & Butter Pudding with spiced pear