

Physiology of Osteoporosis and Physical Activity

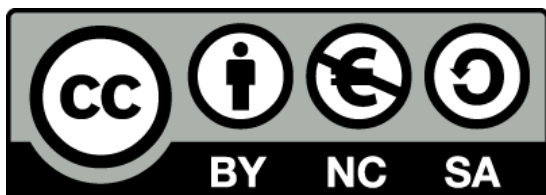
BBringing STEM into Active aglNg – BRAIN

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Partner name: WSEI University



Open Educational Resources



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Bone health through life

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Bone is a living tissue from which substances are constantly being removed and replaced.

Healthy bone is strong and does not break easily.

Bone acts as a reserve for calcium in the body.



Bone health through life

Bone is continuously being remodelled - old bone tissue is replaced by new.

- Strong bones that contain plenty of calcium are less likely to become weak and break in old age.





Healthy bones

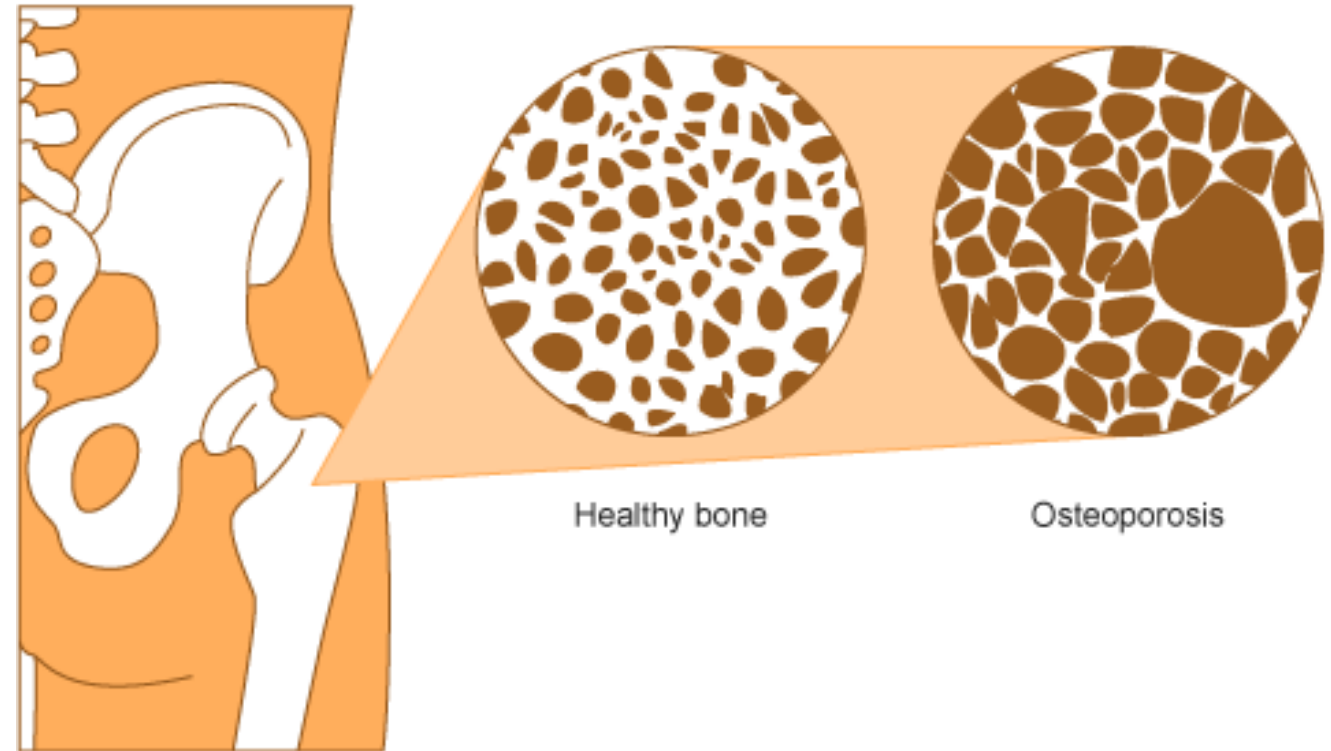
Bone strength is affected by:

- diet – calcium, vitamin D and vitamin K
- physical activity - regular exercise (especially weight bearing exercise)
- body weight - heavier people have stronger bones
- hormones - irregular or loss of menstrual periods can cause bone loss, e.g. during menopause

What is Osteoporosis?

Osteoporosis is a condition that causes bones to become thin, weak and fragile, such that even a minor bump or accident can cause a broken bone (known as a minimal trauma fracture).

Osteopenia is a condition when bone mineral density is lower than normal but not low enough to be classified as osteoporosis. Older people and post-menopausal women are at greater risk of having these conditions.



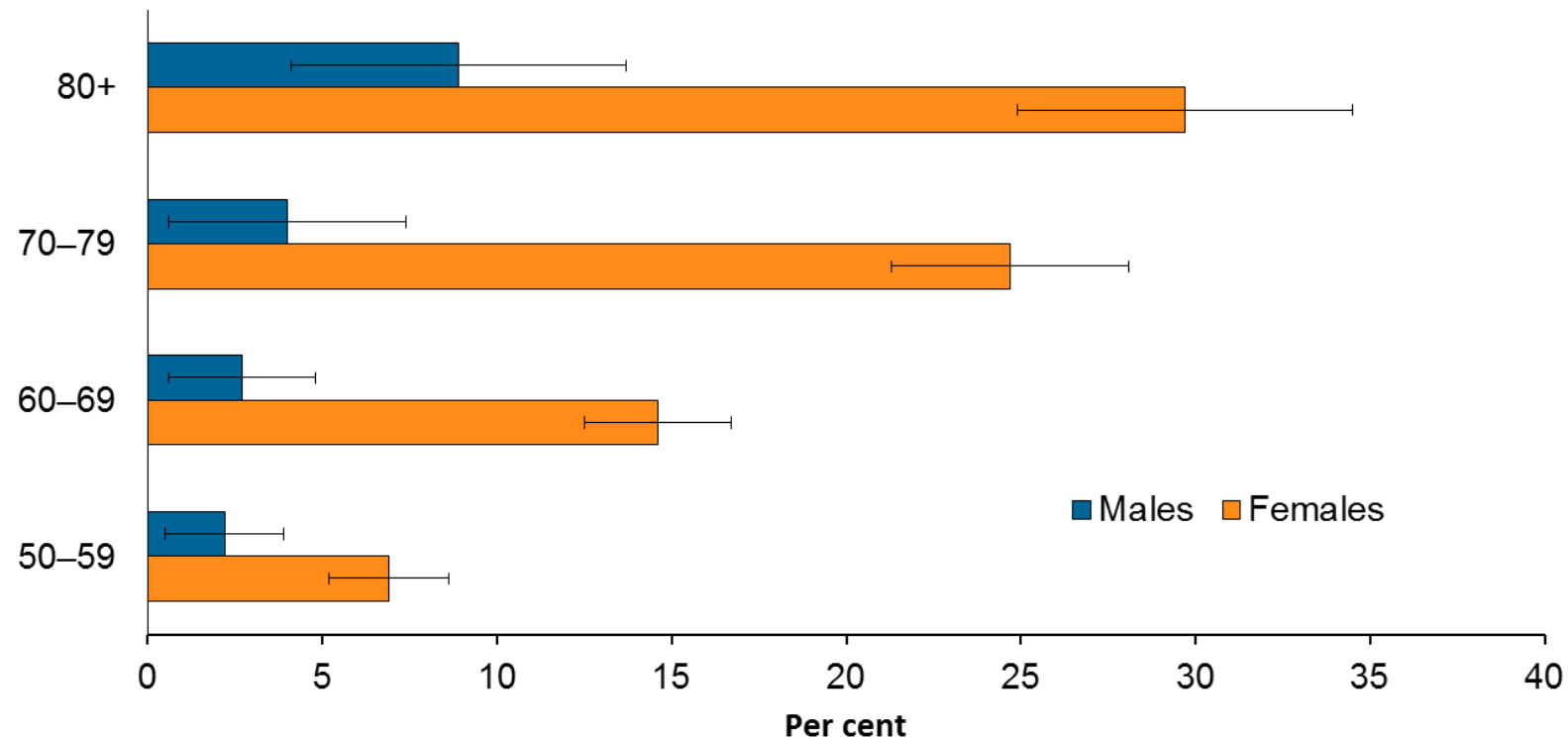
The following graphics are from the AIHW web snapshot *Osteoporosis*
<http://aihw.gov.au/osteoporosis/>



Prevalence of osteoporosis and osteopenia

Prevalence of osteoporosis and osteopenia, people aged 50 and over, 2011–12

Age group



Source: AIHW analysis of unpublished ABS Australian Health Survey, 2011–12 (National Health Survey Component).

What causes osteoporosis?

- Osteoporosis results from a loss of bone mass (measured as bone density) and from a change in bone structure.
- Many factors will raise your risk of developing osteoporosis and breaking a bone.
- Recognizing your risk factors is important so you can take steps to prevent this condition or treat it before it becomes worse.

Normal bone



Bone with
Osteoporosis





Common risk factors for osteoporosis

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- ☐ Female
- ☐ Postmenopausal
- ☐ Family history of osteoporosis
- ☐ Lack of exercise
- ☐ Small body frame
- ☐ Low calcium intake
- ☐ Vitamin D deficiency
- ☐ Smoking
- ☐ Age (starting in the mid-30-s but more likely with advancing age)
- ☐ Rheumatoid arthritis, hyperthyroidism
- ☐ Medications – corticosteroids, excess thyroid hormone, some diuretics ,and anticonvulsants





Exercise and bone health

- Lack of physical activity results in low bone mass
- Bone loading increases bone mass
- Static weight bearing exercises can reduce any decline in bone mass and improve bone mass in the over 70s
- High impact exercise in early years increases bone mass
- Balance and strengthening exercises will decrease falls risk (Otago / Tai Chi)





Exercise in osteoporosis

- Physical activity targeting muscles and balance is the cornerstone of each rehabilitation program for osteoporosis and fracture prevention.
- It is clear that physical activity is vital in adults because it reduces the rate of bone loss and decelerates bone loss associated with aging.

How to improve our physical activity?

- **Play online and exercise for your health – use BRAIN Project app and / or:**
- <https://www.algaecal.com/exercises>
- <https://www.youtube.com/watch?v=bKHj7Ec1Msl>



Do you want to know more?

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- **Videos:**
- <https://www.youtube.com/watch?v=7u5TWOKu8Yc>
- <https://www.youtube.com/watch?v=jdMet-J9jEo>
- <https://www.youtube.com/watch?v=tBSJHAVuQLA>

Much more?

- **Reading:** <https://www.msmanuals.com/home/bone,-joint,-and-muscle-disorders/osteoporosis/osteoporosis>
- <https://www.longdom.org/open-access/factors-affecting-bone-mass-and-physical-activity-93106.html>
- <https://bjsm.bmj.com/content/56/15/837>



***THANK YOU FOR YOUR
ATTENTION***