

Department of  
Orthopaedic Surgery

# Fragility Fracture Prevention Begins With You



# What is Osteoporosis?

- **Osteoporosis** or porous bones is a condition where bones becomes brittle and fragile. The bones can be so fragile that it can cause a fracture after a simple fall or a slightest bump.



Osteoporotic bone

Normal bone

- The common sites for fractures to occur are the **hip**, **spine** and **wrist**.
- Osteoporosis is a **silent disease**. Most people do not realise that they suffer from osteoporosis until other signs develop such as:
  - Curved spine or Dowager's hump
  - Loss of height
  - Fracture of wrist, hip and other areas

# What Is a Fracture?

- A fracture is a break in the bone.

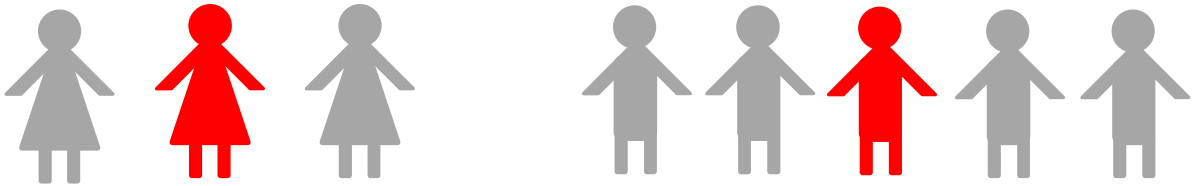


- **What Is a Fragility Fracture?**
  - A fragility fracture is a type of fracture that results from a force that would not ordinarily cause a fracture. For example, falling from a standing height.
- **What Causes Fragility Fracture?**
  - The common cause of fragility fracture is **Osteoporosis**.
  - Other rare causes include bone cyst, cancer and other bone disorders.

# Are You at Risk of Having a Fracture?

## Some Facts About Fracture:

- Fractures are common:



One in three women and one in five men over the age of 50 are at risk of fracture.

- Fractures are also **expensive to treat** and can **affect your quality of life**. Up to 30% of fracture patients will require a walking aid.
- One fracture at any site may **double the risk** of a **future fracture**. The second fracture often occurs within six to eight months.
- 50% of hip fracture patients have possibly suffered from a prior fracture.
- Usually a fracture patient above 50 years of age requires further testing and treatment.



# How Can We Protect Our Bones?

- The journey for strong bones begins with you!



- Start practicing these tips:



1. Have a balanced diet with adequate calcium and Vitamin D

2. Exercise regularly

3. Limit alcohol intake

4. Stop smoking

# Importance of Calcium in Our Bodies

- Calcium plays an important role in our body.

Calcium is a mineral required for various body functions especially for strong bones. Adequate calcium intake is important to keep our bones healthy and strong to help reduce the risk of osteoporosis.

- Calcium plays an important role in the healthy function of our bones, nerves and heart.
- Hence, it is important to have an adequate daily intake of calcium.



# Maximise Your Bone Health with Calcium!

- If you are lactose intolerant, avoid dairy products as they can cause bloating or diarrhoea. Instead, aim to meet your calcium requirements with calcium fortified soy products, fish with edible bones.
- Aim for 8-10 ★ stars\* a day from a variety of food:



1 glass (250ml) of low-fat  
\*high calcium milk / soya milk



\*high calcium milk powder



4 scoops (30g)

★★★★★  
Calcium Stars  
(per item)



2 tablespoons (40g) of  
non-fried dried ikan bilis



1 piece (70g) of low  
sodium sardine

★★★  
Calcium Stars  
(per item)



¾ cup (100g)  
cooked kailan



1 slice (20g)  
\*low fat cheese



1 small tub (100-150g)  
\*low fat yoghurt

★★  
Calcium Stars  
(per item)



1 square piece  
(100g) taukwa



2 tablespoons (20g)  
of roasted  
sesame seeds



¾ cup (100g)  
cooked chye sim / spinach

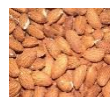
★★  
Calcium Stars  
(per item)



1 ½ cups (200g) of  
cooked broccoli



½ pack (150g)  
Of tofu



¼ cup (30g)  
of almonds

★  
Calcium Stars  
(per item)

# Importance of Vitamin D

- Vitamin D promotes calcium absorption in the intestines and helps maintain calcium balance in your bones. It also regulates the amount of calcium in the blood.
- Although there are dietary sources such as cheese and egg yolk, sunlight is also a natural and a good source of Vitamin D. When exposed to sunlight, our skin produces Vitamin D. Health Promotion Board recommends sunlight exposure for 5 to 30 minutes, twice a week, ideally between 10am - 3pm.
- Examples of dietary sources that contain Vitamin D:



Fortified margarine



Fortified milk/yoghurt/cheese



Egg Yolk



Cereals



Oily fishes  
e.g. salmon/cod



# Daily Requirement of Calcium and Vitamin D

- The National Osteoporosis Foundation (United Kingdom) recommends the following daily intake :

Calcium Requirements		
	<i>Age Group</i>	<i>Requirement</i>
Women	Less than 50 years	1000 mg
	More than 50 years	1200 mg
Men	Less than 70 years	1000 mg
	More than 70 years	1200 mg

Vitamin D Requirements	
<i>Age Group</i>	<i>Requirement</i>
Less than 50 years	400 - 800 international units (IU)
More than 50 years	800 - 1200 international units (IU)



# Importance of Protein

- We need protein in our diet every day. Protein helps build and repair tissues in the body, fight infections and stay healthy.
- Having adequate protein can prevent and slow the progression of sarcopenia / loss of muscle mass. Please check with your Dietitian if you are unsure how much protein is needed.
- Examples of protein-rich food:



Chicken/ Pork/  
Mutton/ Beef



Fish



Prawns



Egg



Nuts/ Seeds/  
Peanut Butter



Tofu/ Taukwa/ Beans/ Lentils

# Sarcopenia

- Sarcopenia is a condition where one has low muscle strength, low muscle mass and low muscle performance. This increases the chances of fractures at the wrist, spine and hips.
- Prevention is better than cure. Further evaluation and early treatment can help to prevent problems in the future. You can always ask your doctor more about sarcopenia. It can be as easy as testing your grip strength to screen for sarcopenia.

**Low muscle strength**

## Sarcopenia

**Skeletal  
muscle decline**

**Poor physical  
performance**

Sarcopenia can lead to:

- 7 times increase in likelihood of falls
- 5 to 10 times increase in risk of spine fractures
- Double the risk of hip fractures



# Exercises to Improve Your Bone Health

- Exercise is proven to be helpful in promoting strong and healthy bones. It helps in increasing muscle strength, improve flexibility and balance, builds up your endurance and coordination which helps prevents falls.
- Your doctor will assess your suitability to embark on an exercise programme. Once cleared by your doctor, you should start exercising!
- To ensure an effective exercise, your exercise routine will target the following three aspects:



Strength



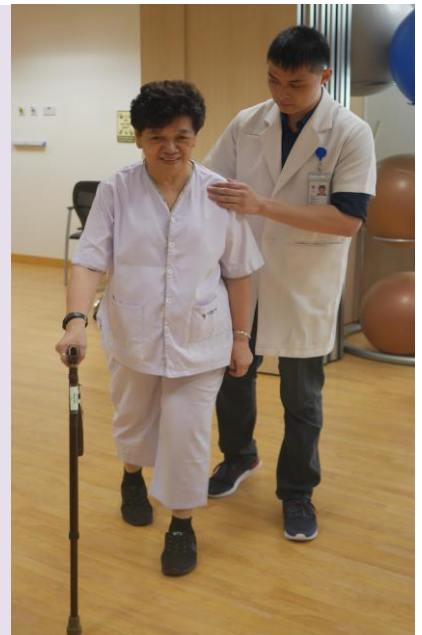
Balance



Flexibility

## Exercise precautions:

1. Always have a stable surface nearby to hold on whilst you are exercising
2. Start slow and build up your strength slowly
3. Sit down to exercise if it is too difficult to stand
4. Stop! If you experience any pain, chest discomfort, or dizziness during exercise
5. Consult your doctor or physiotherapist if you are unwell during exercise or are unsure of the exercises



# Strengthening Exercises

- These exercises help strengthen your muscles so that you can move safely.
- Perform these exercises at least 2 to 3 times a week.

## Bridging



1. Lie down on a firm bed, bend both knees so that your feet are on the bed
2. Lift up your buttock
3. Hold for 5 seconds, repeat 10 times

## Sit to Stand



1. Sit on a firm chair, with both feet on the ground
2. Stand up slowly and steady yourself in standing
3. Sit down again. Repeat 10 times.  
*\*\* Slowly reduce the support from your hands when standing if it's too easy.*

## Hamstring Curl



1. Stand and hold onto a sturdy chair in front of you
2. Lift up your feet behind you as you bend your knees
3. Hold for 5 seconds, repeat 10 times  
*\*\*You can add ankle weights if it's too easy.*

## Heel Raise



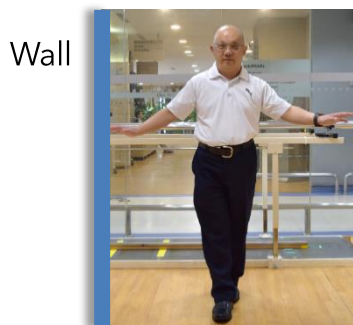
1. Stand and hold onto a sturdy chair in front of you
2. Lift up your heels to stand on your toes
3. Hold for 5 seconds, repeat 10 times



# Balancing Exercises

- These exercises help improve your balance and hence reduce the chances of falling.
- Perform these exercises at least 3 times a week.

## Heel to Toe Standing / Walking



1. Stand close to a wall / table
2. Place one foot in front of the other, with the heel of your front foot touching the toes of your back foot
3. Hold for 10 seconds, repeat 10 times

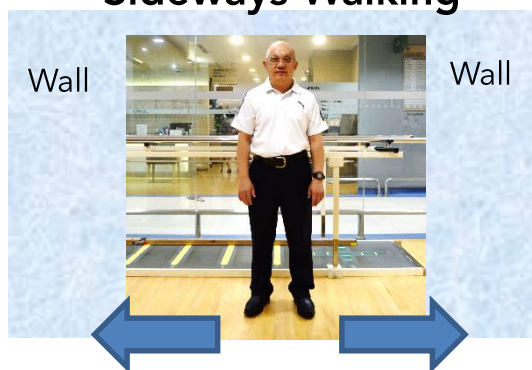
*\*\* You can progress to heel to toe walking too!*

## Backwards Walking



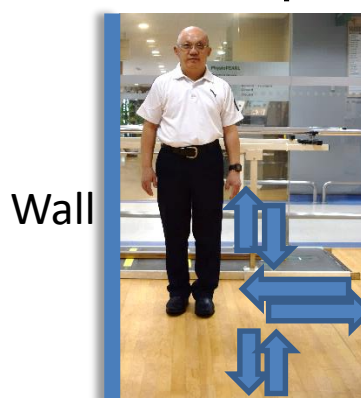
1. Stand close to a wall / table
2. Walk backwards at least 5 to 10 steps
3. Turn around and walk backwards again to the starting point
4. Repeat 10 times.

## Sideways Walking



1. Stand close to a wall / table
2. Walk sideways at least 5 to 10 steps, then walk sideways back to the starting point.
3. Repeat 10 times

## Toe Tap



1. Stand close to a wall / table
2. Tap one foot forwards, then out to the side, and then behind you
3. Repeat with the other leg
4. Repeat a total of 10 times each side

# Flexibility Exercises

- These exercises help maintain movement and flexibility in your muscles and joints.
- Perform these exercises at least 2 to 3 times a week.

## Hamstring Stretch



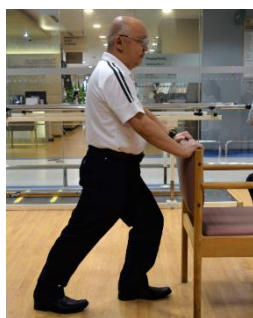
1. Sit on the edge of your bed or a chair.
2. Straighten one leg on the bed or on the floor
3. Keep your back straight and reach your fingers to your knee. You should feel a stretch at the back of your knee
4. Hold for 30 seconds, repeat 5 times

## Quadriceps Stretch



1. Stand with a stable chair in front of you
2. Lift up one foot behind you by bending your knee
3. Reach for your foot. You should feel a stretch on the front of your thighs.
4. Hold for 30 seconds, repeat 5 times

## Calf Stretch



1. Stand with a stable chair in front of you
2. Take a step back with 1 foot
3. Keep the back knee straight, and front knee bent. You should feel a stretch at the calf of the back foot.
4. Hold for 30 seconds, repeat 5 times

## Stay Active!

- You can still keep yourself active by doing low impact exercises like walking, swimming or seated cycling.
- Perform these general exercises for at least 15 to 30 minutes, five days a week!

# Smoking and Alcohol

- Smoking and drinking alcohol have harmful effects on your bones.
- Smoking can cause early menopause in women and bone loss.
- Drinking alcohol excessively can have damaging effects on your bones. It can affect the bone formation and the body's ability to absorb calcium.



# Fall Prevention and Home Safety

- Preventing falls and injuries at home starts with making the home a safer place.
- If you need help to carry out your daily activities (e.g. dressing, using the toilet and showering), ensure that your carer/ caregiver is with you at all times.
- Here are some safety tips you can follow when carrying out your daily activities:

## 1. Getting Out Of Bed

Before standing up from bed, ensure that:

- Both your feet are on the floor
- You do not feel giddy
- Install a bed rail if you require additional support to stand up



**Tip:** Get a thicker / thinner mattress if your current bed is too low / high for you. A suitable height for your bed should at least be your knee height.

# Fall Prevention and Home Safety

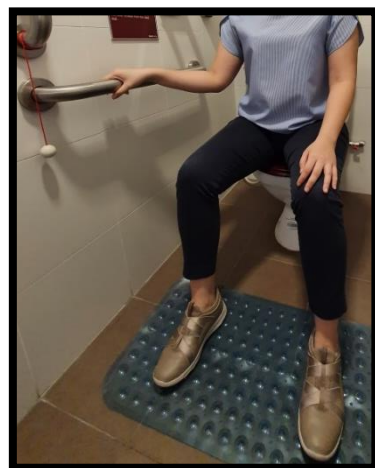
## 2. Wearing Clothes

- Sit on a comfortable surface (sturdy chair or bed) to complete dressing
- Ensure you are not stepping on the pants sleeve when standing up
- If you are standing to wear your clothes, hold onto grab bars or very sturdy furniture for additional support.



## 3. Taking a Shower or Using the Toilet

- Sit on a comfortable and sturdy chair if you need
- Hold onto grab bars for additional support when in standing or standing up
- Always keep the floor dry after use
- Use non-slip mat or apply slip-resistant floor treatment
- Ensure sufficient lighting inside the toilet
- Ensure essential items, for example toiletries, toilet paper and clothes, are within comfortable reach.





# Fall Prevention and Home Safety

## 4. Home Environment

- Ensure sufficient space for walking
- Remove rugs, wires and clutter from walkways
- Ensure sufficient lighting
- Sit on a chair / sofa that is easy for you to stand up.



**Tip:** Chairs with armrests provide additional support when you are standing up.

## 5. Others

- **Call Bell:** Consider getting a call bell (*ring bell or electronic bell*) if you need to get attention from your carer at home
- **Fall sensor pad** (*placed under the mattress or seat cushion*): An alarm sounds off if you get up from the bed or chair, alerting your carer
- **Motion sensor light:** Spaces will light up when the motion sensor detects movement, ensuring sufficient lighting
- **Housing Developmental Board Enhancement for Active Seniors (HDB EASE):** If you stay in a HDB flat and wish to install grab bars, slip-resistant treatment and ramps at home, visit [www.hdb.gov.sg/EASE-Application](http://www.hdb.gov.sg/EASE-Application) or call 1800-225-5423 for more details.



# Osteoporosis Audit and Research

Information on your osteoporosis management will be recorded for continuous improvement of our service.

All information recorded will be treated with strict medical confidentiality.

No information will be used for osteoporosis research without local ethics board approval.

# Acknowledgements

## Contributors

Dr Anand Pillai  
Consultant

Fadzleen Johari  
Nurse Clinician

Dr Ivan Chua Tjun  
Senior Consultant

Dr Michael Yam Gui Jie  
Associate Consultant

Rachel Tan Chuen Xi  
Dietician

Vanessa Ho Yi Ki  
Senior Physiotherapist

Chuah Peixin  
Occupational Therapist

## Department

Department of  
Orthopaedic Surgery

Nursing Speciality

Department of  
Orthopaedic Surgery

Department of  
Orthopaedic Surgery

Nutrition and Dietetics

Physiotherapy

Occupational Therapy

**Clinics B1A, B1B and B1C**  
TTSH Medical Centre, Level B1

**Contact:**  
6357 7000 (Central Hotline)



Scan the QR Code with your smart phone to  
access the information online or visit  
<http://bit.ly/TTSHHealth-Library>

Was this information helpful?  
Please feel free to email us if you have  
any feedback regarding what you have  
just read at  
[patienteducation@ttsh.com.sg](mailto:patienteducation@ttsh.com.sg)



© Tan Tock Seng Hospital, Singapore [year]. All rights reserved. All information correct as of [month] [year]. No part of this document may be reproduced, copied, reverse compiled, adapted, distributed, commercially exploited, displayed or stored in a database, retrieval system or transmitted in any form without prior permission of Tan Tock Seng Hospital. All information and material found in this document are for purposes of information only and are not meant to substitute any advice provided by your own physician or other medical professionals.