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Exercise and physiotherapy to promote bone health

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Honesty Everyone counts Accountable Respectful Teamwork

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Aims

1. A positive approach to reduce the risk of vertebral fracture through ‘spine care’
2. The importance of including exercise and physical activity to reduce falls and resulting fractures
3. The types and amount of exercise and physical activity needed to promote bone strength

ROS Survey 2018

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- Inconsistent info & advice about safety & effectiveness of exercise -> confusion & anxiety
- People with osteoporosis/spinal fractures reduce their exercise and physical activity
- **37% stop exercising or exercise less** than they did before diagnosis/found out they were at risk/had a vertebral fracture
- **FEAR** is the biggest reason for this

Strong, Steady and Straight: Physical Activity and Exercise for Osteoporosis

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An Expert Consensus Statement on Physical Activity and Exercise for Osteoporosis (Feb 2019)

- **Strength and Balance** exercise for bone health and osteoporosis
- **Preventing fractures** but other important benefits too: helping with **symptoms of vertebral fractures, back pain and spinal curvature**
- New ROS **exercise information resources for patients**

The importance of including exercise and physical activity to reduce falls and resulting fractures

- Physical activity & exercise have an important role in
  - the management of osteoporosis
  - Promoting bone strength
  - Reducing falls risk
  - & the management of vertebral fracture symptoms
- Broad approach
  - Positive lifestyle changes
  - Pharmacological treatment where appropriate

- People with osteoporosis should be encouraged to do *more* rather than *less*
- Need a positive and encouraging approach
- Focus on ‘how to’ messages, rather than ‘don’t do’
- Even a minimal increase in activity should be encouraged to provide some benefit

- **Specific levels** & **types** of physical activity & exercise are likely to be most effective

Physical activity and exercise themes – Strong, Steady and Straight

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Strong

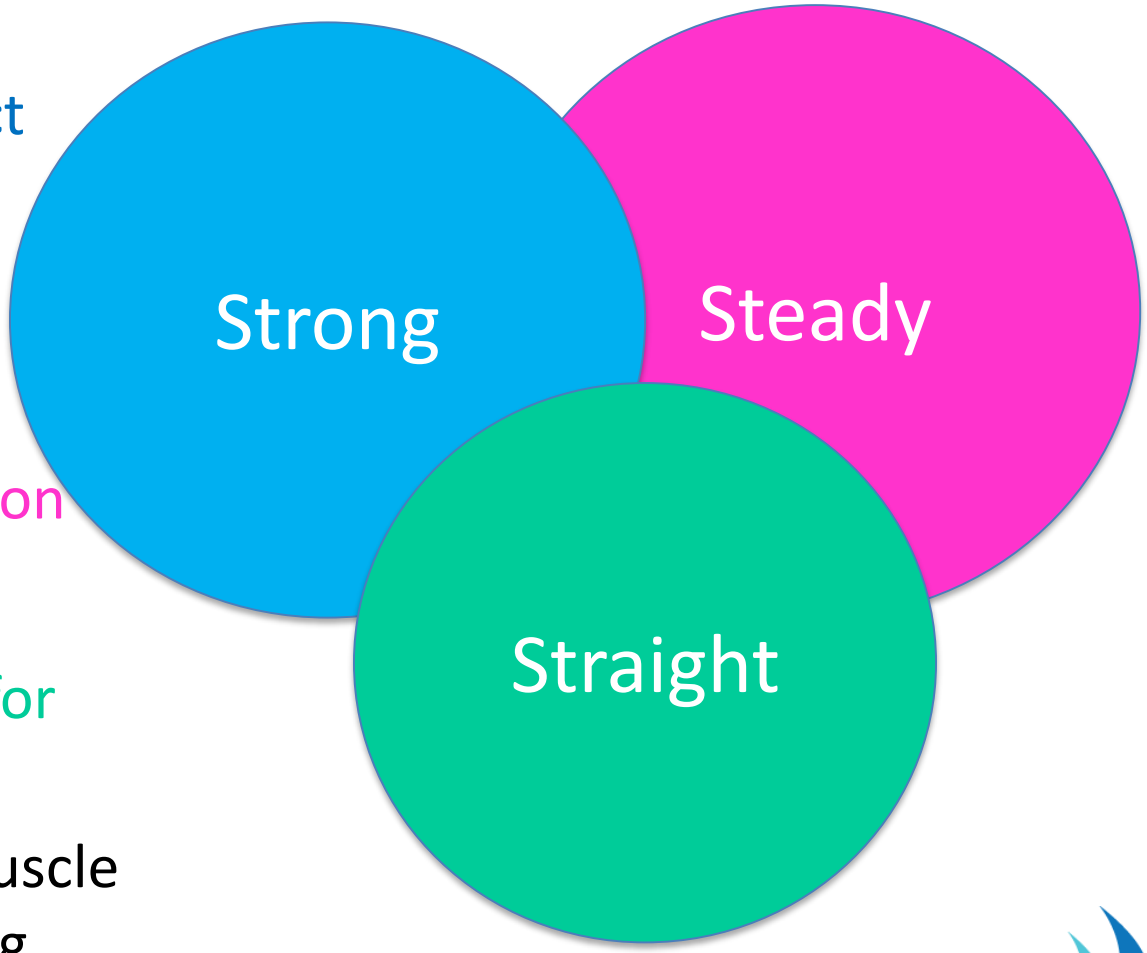
- Weight-bearing/impact
- Muscle resistance

Steady

- Balance & muscle strength for falls prevention

Straight

- Back muscle strength for posture and pain



*Improve balance and muscle strength **before** increasing physical activity levels

A positive approach to reduce the risk of vertebral fracture through 'spine care'

- Evidence indicates that physical activity & exercise is not associated with significant harm, including vertebral fracture
- Benefits of physical activity & exercise outweigh potential risks
- Avoid restricting physical activity and exercise unnecessarily according to BMD or # risk thresholds
  - May discourage exercise/activities that promote bone & other health benefits
- People with painful vertebral fractures need clear & prompt guidance on how to adapt movements involved in day-to-day living
  - Incl. how exs. can help with posture & pain

Straight

A ‘spine caring’ approach

- Correct technique for moving & lifting including the ‘hip hinge’

2-3 days a week

- Exs to strengthen back muscles to help with posture with a focus on endurance by exercising at low intensity

- Up to 10 repetitions, held for 3-5 seconds
- Daily exs to relieve back pain
- Consider physio referral for painful fractures or mobility problems

‘Spine Caring’ Approach

- Spine in line
  - natural curves
- Safe lifting
  - Rather than “don’t lift”
- Always move in a smooth, controlled way
  - Rotation (twisting) should be safe if performed smoothly & comfortably
- Engage abdominals during movements
- Use the hip hinge to bend safely
  - Feet hip width apart & hands on thighs
  - Tighten tummy & keep back straight from hips to shoulders
  - Stick bottom out behind & bend at hips (hinge at hips & bend knees slightly)
  - Keep chest & head up

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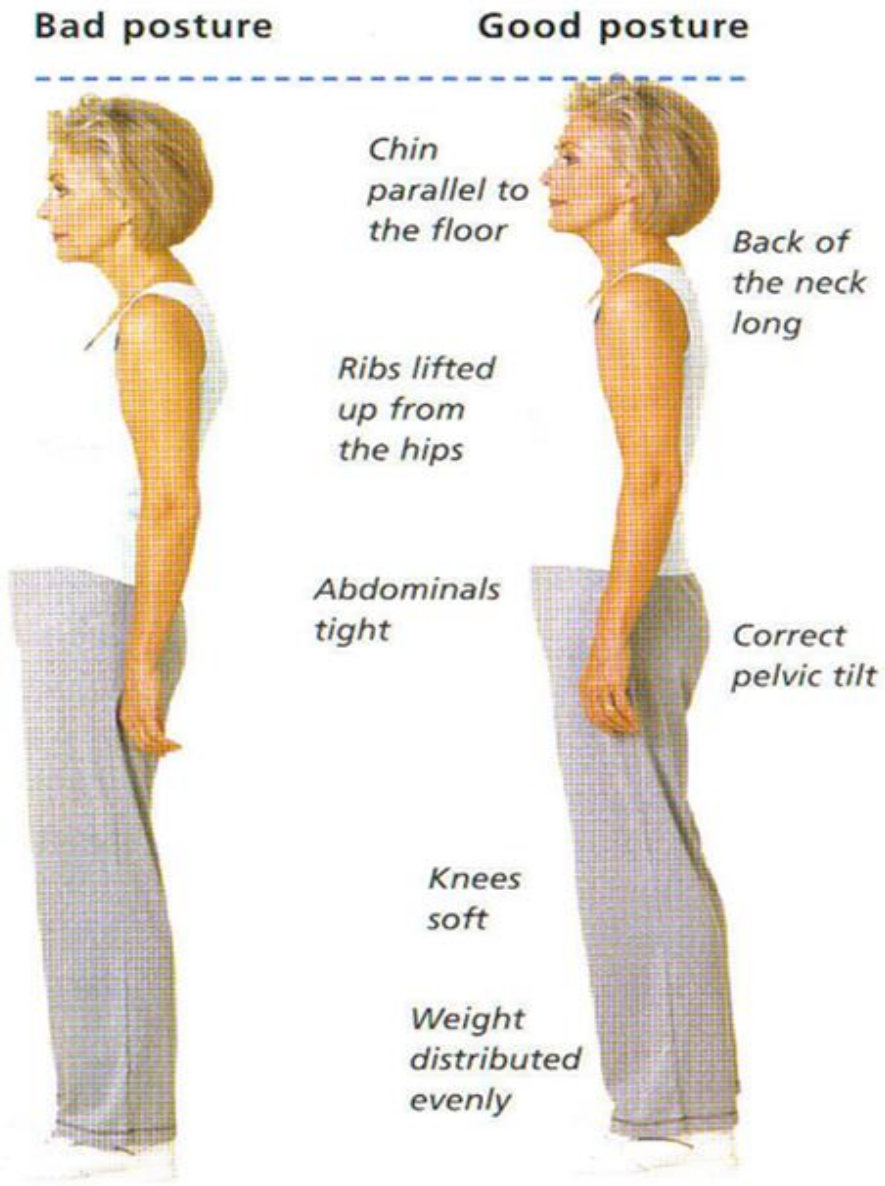
Posture



Bad and good posture *When you adjust your posture so that your vertebrae sit properly, you feel and look taller and slimmer. The dotted line shows how much height you gain by correcting your posture.*

Shoulder circles & Chin tucks

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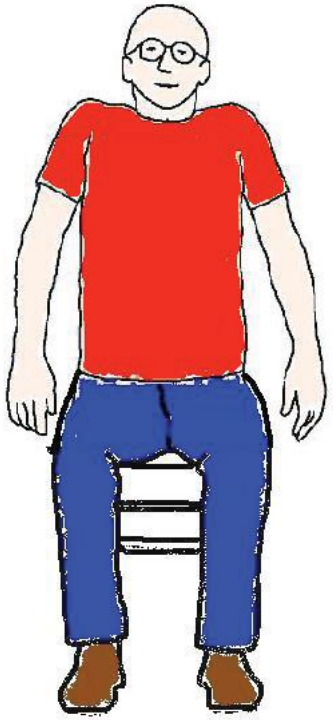

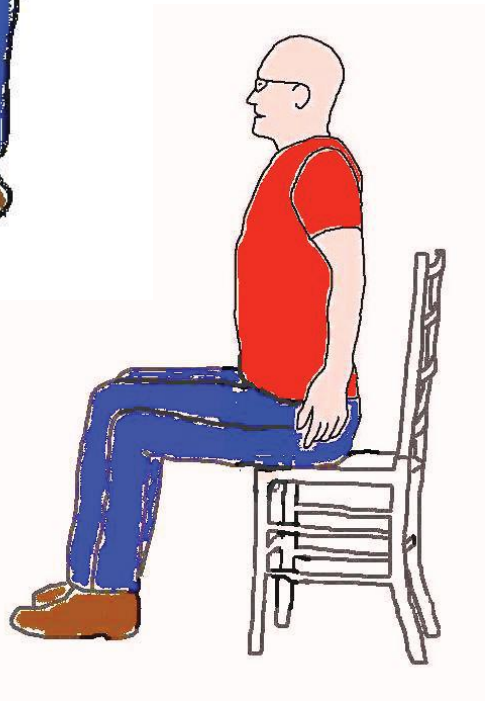

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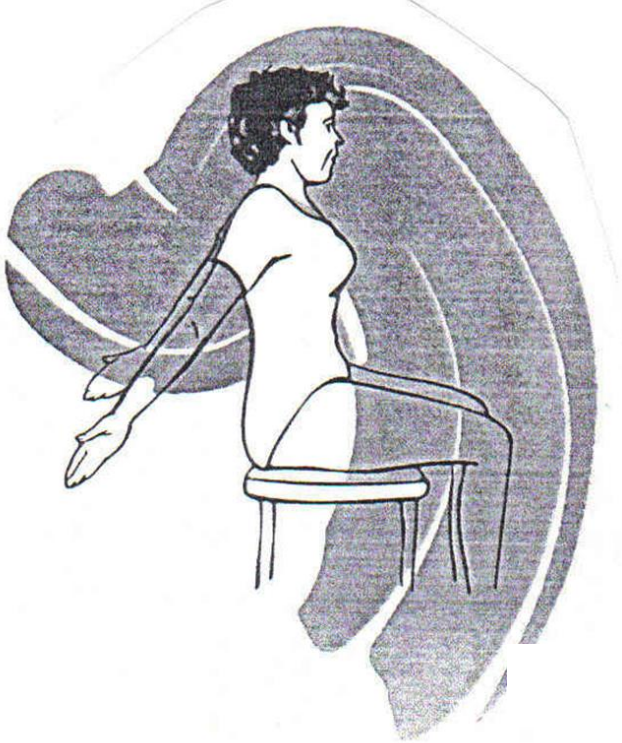
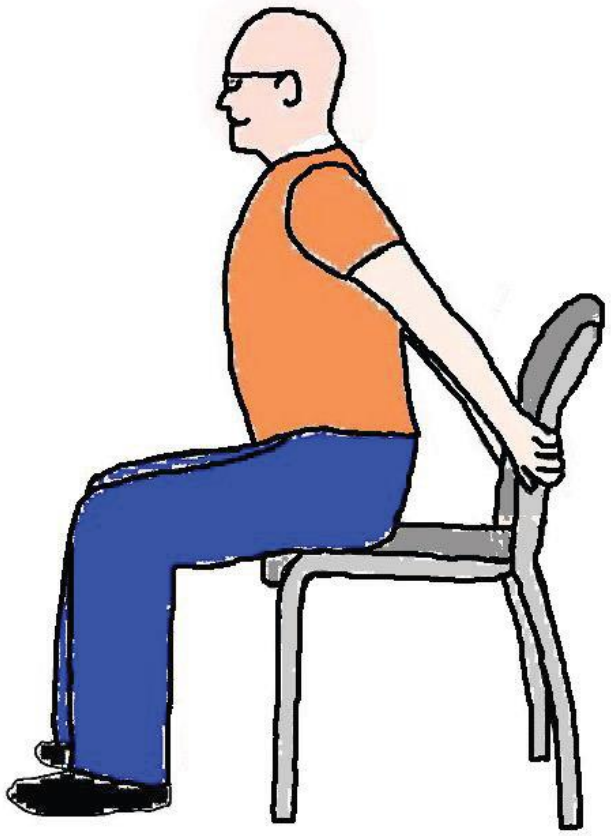
Chest stretch/mobiliser





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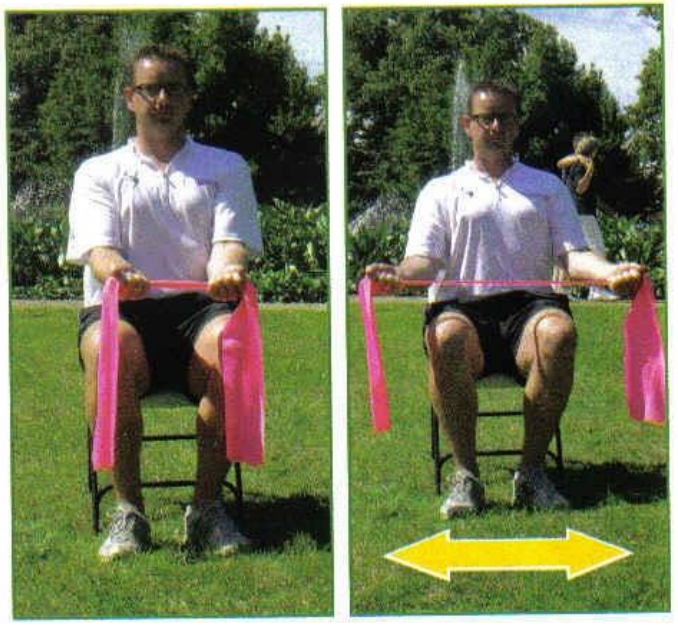
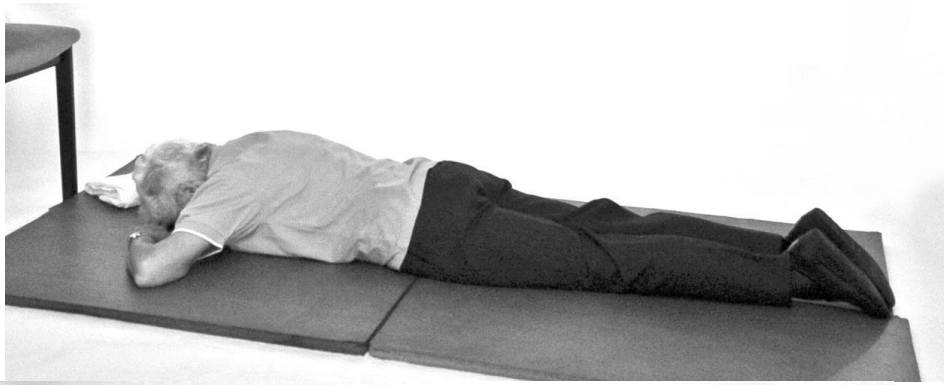
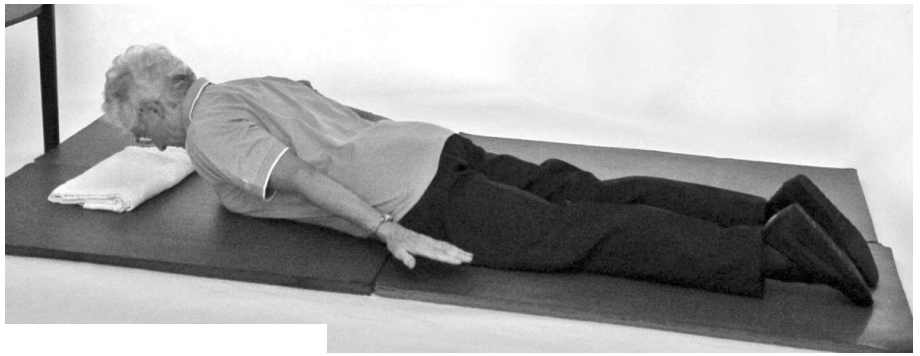
Trunk extension

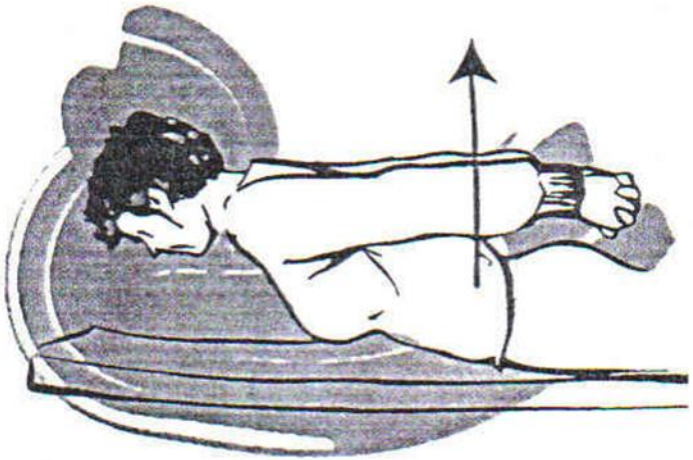


Upper Back Strengthener

Strength:Trunk extension (Back lift)







Bridge

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Pelvic Floor Strengtheners

Pelvic floor and Breathing exercises can help with symptoms exacerbated by severe spinal kyphosis

Exercise 1

- Try to **hold for 10 seconds.**
- Rest for 4 seconds, then repeat**.**
- **Perform this 10 times.**

Exercise 2

- Perform **10 quick contractions** by drawing up the pelvic floor as fast as possible, holding for just one second then releasing.

UK Chief Medical Officer physical activity guidelines (2011)

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To maintain or improve physical & mental health, adults & older adults should aim to:

- accumulate **150 minutes a week (20 minutes a day)** of moderate-intensity physical activity (i.e. that makes the person feel warmer and slightly out of breath)
- Engage in muscle strengthening activities **at least 2 days a week**
- Avoid prolonged periods of sitting

Older adults at risk of falls should engage in **balance training activities on at least 2 days a week**

All patients with osteoporosis

- If frail, falling or unsteady: prioritise **STEADY.**
  - Progress to STRONG and STRAIGHT

- If back pain or other vertebral fracture symptoms: prioritise **STRAIGHT**.
  - Progress to STRONG and STEADY

- If steady, with no back problems: prioritise **STRONG**
  - with balance exercises, posture and lifting advice

Steady

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If unsteady, over 65 and not taking regular exercise

- Do some challenging balance exs 2-3 days per week
- If repeated faller refer to falls service/physio (for MFFRA)
- Posture training & back exs to improve kyphosis may reduce falls risk

Seven Evidence Based Activities

1. Targeted Resistance Training
2. Flexibility Training
3. Dynamic Endurance Training
4. Dynamic Balance Training
5. Sustained, three dimensional Tai Chi
6. Backward Chaining
7. Functional floor activities

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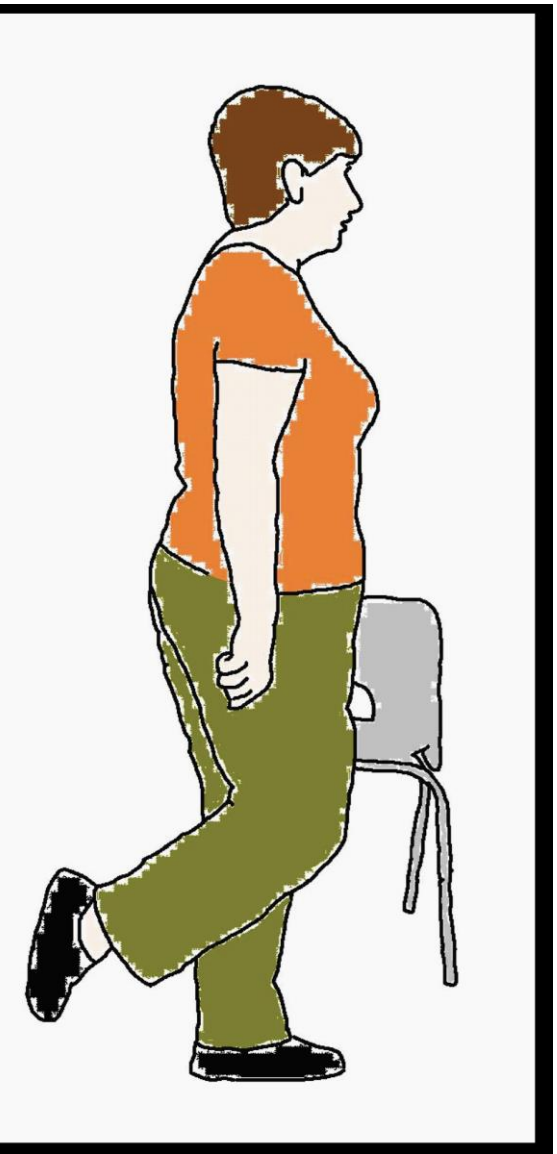
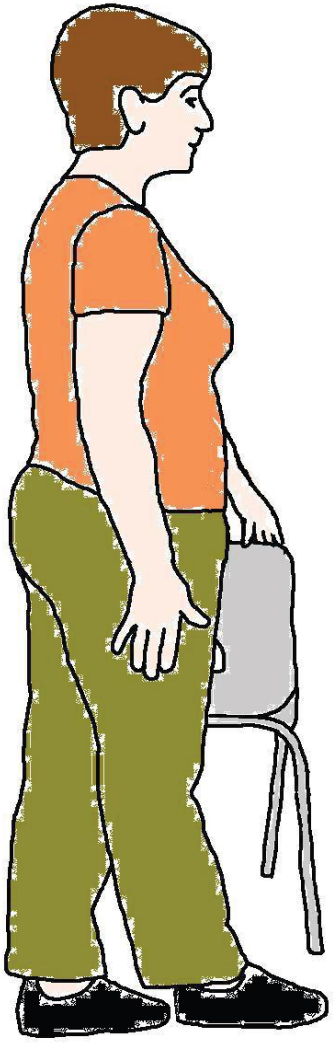
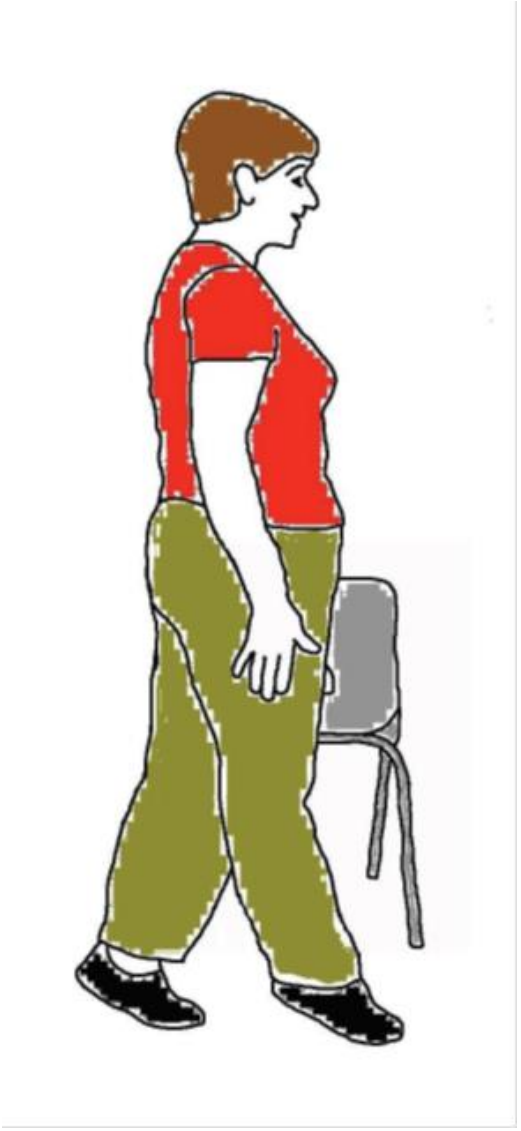
Balance: One leg stand



Age	Range	Men	Women
50-59	-	38 secs	36 secs
60-69	20-34 secs (27)	29 secs	25 secs
70-79	12-22 secs (17)	18 secs	11 secs
80-99	1- 16 secs (8.5)	6 secs	7 secs

Balance: Heel-toe stand & walk
Toe walking





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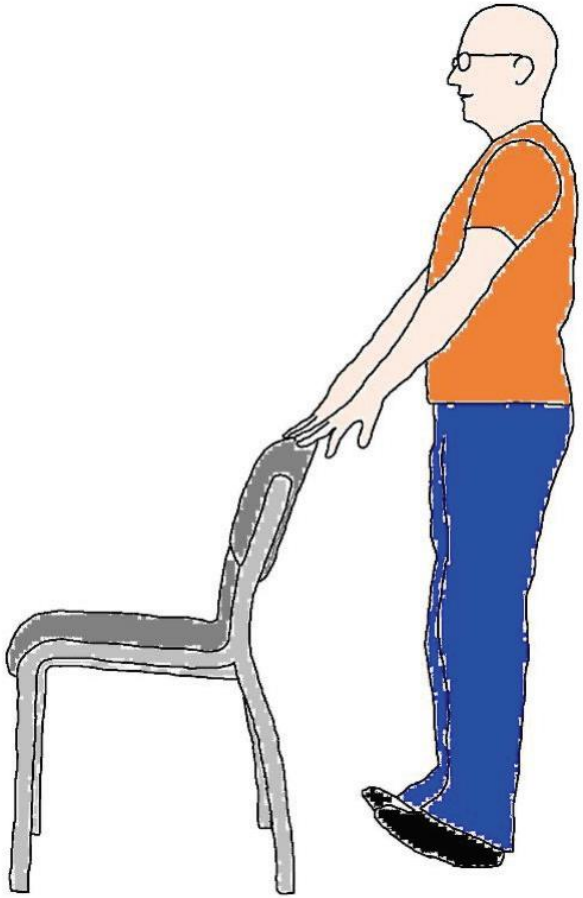
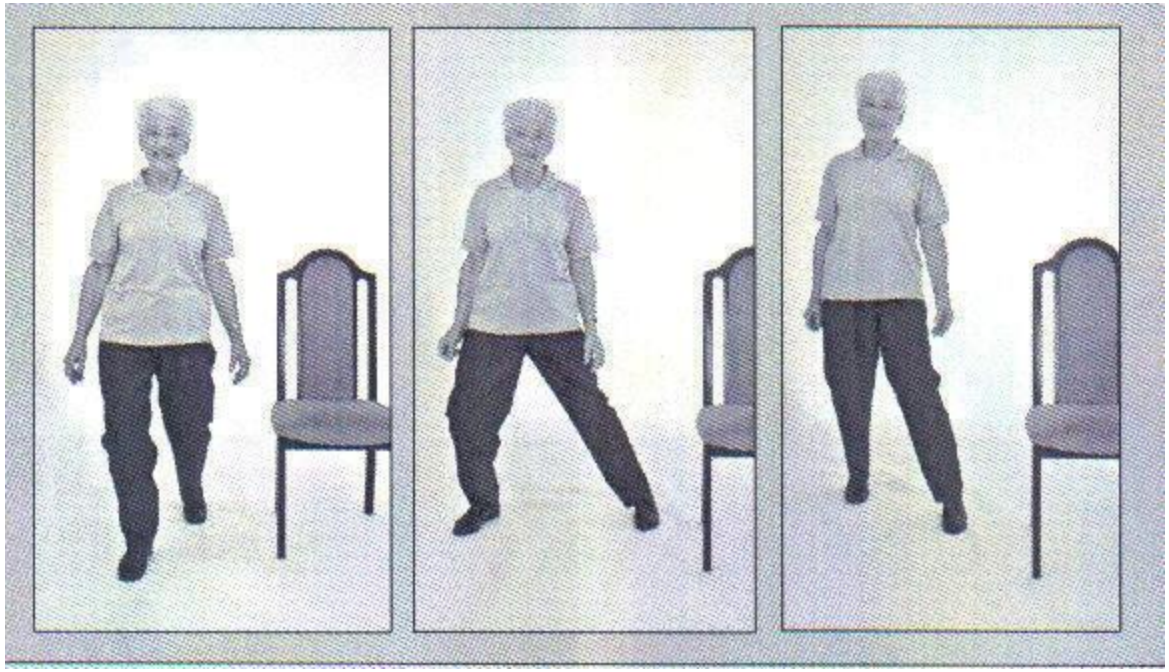
Balance: Toe raises & Compensatory stepping exercises





STRONG

Weight-bearing/impact exercises &
Muscle strengthening

Weight-bearing/impact exercises

- Most days of the week
- Build up to 50 moderate impacts (low level jumping, jogging, dancing, hopping)

- If frail, less mobile, has vertebral or multiple low trauma #s – up to 20 mins of lower impact activity (e.g. brisk walking or walking)

Moderate impact:
Jumping

Lower impact:
Brisk marching

Muscle strengthening

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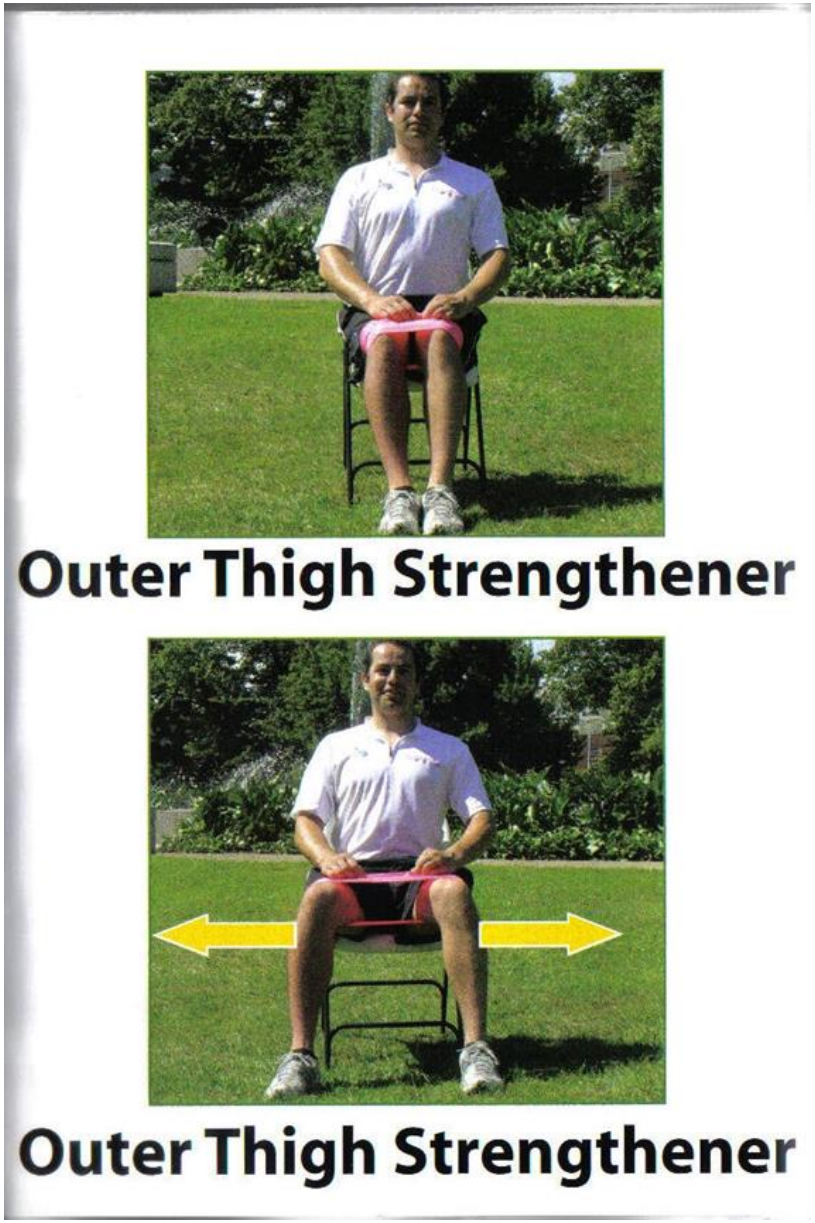
- With increasing resistance
- **2-3 days per week**
- Activities or exs to feel a push or pull on the muscles
- Recommend increasing intensity to work muscles harder using weights or resistance bands
- Build up to 3 sets of exs of 8-12 reps of max weight that can be lifted safely
- Exs to strengthen back muscles will promote bone strength in the spine

The types and amount of exercise and physical activity needed to promote bone strength

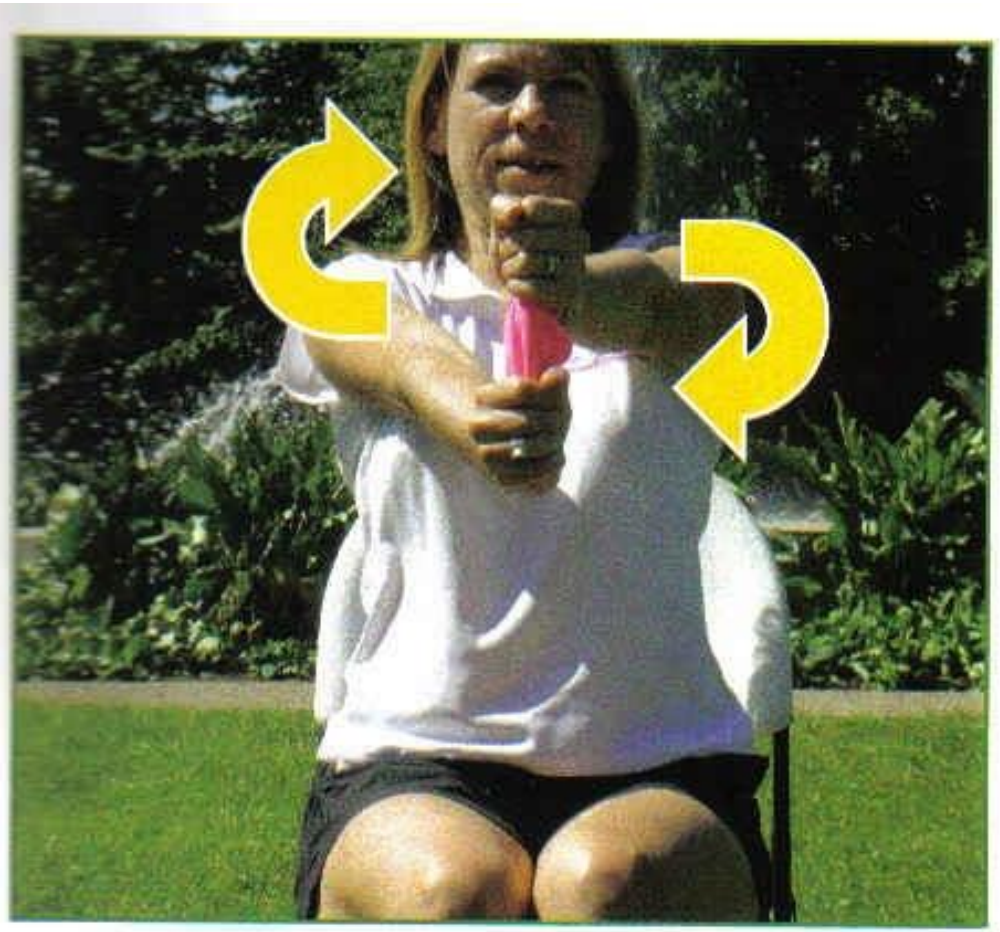
Site specific targeted strengtheners:

- Back/spine
- Outer hip
- Wrist
- Front of thighs
- Calf muscles

Strength: Hip abductors

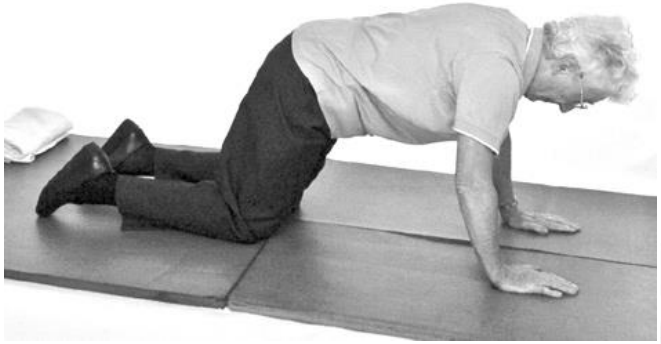


Wrist strengtheners

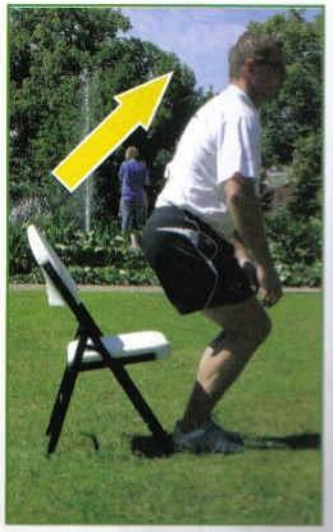


Twister

All fours/wrist loading

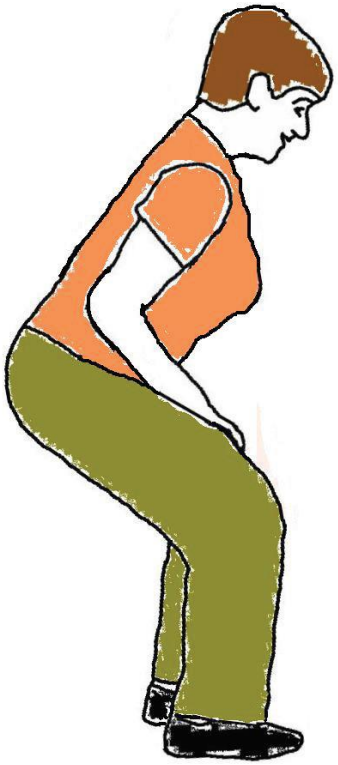


Sit to stand for quads



Age	Men	Women
50-59	20 stands	19 stands
60-64	14-19 (17)	12-17 (16)
65-69	12-18	11-17
70-74	12-17 (15)	10-15 (13)
75-79	11-17	10-15
80-84	10-15(13)	9-14 (12)
85-89	8-14	8-13
90-94	7-12	4-11

Knee bends & Lunges



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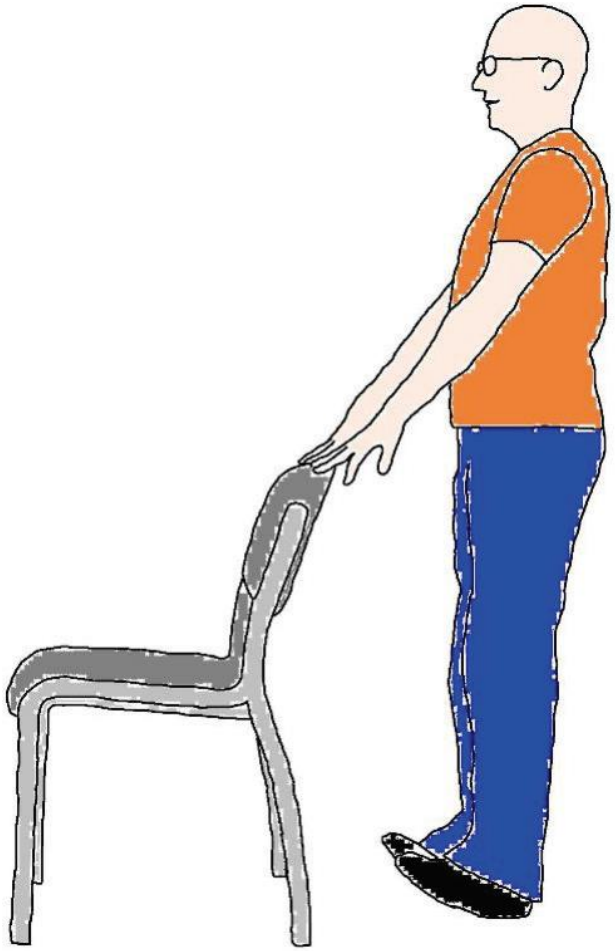
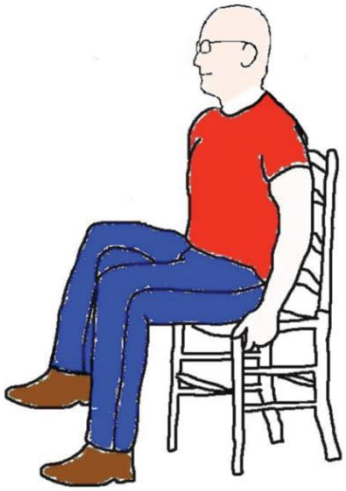
Strength: Calf raises & Toe raises

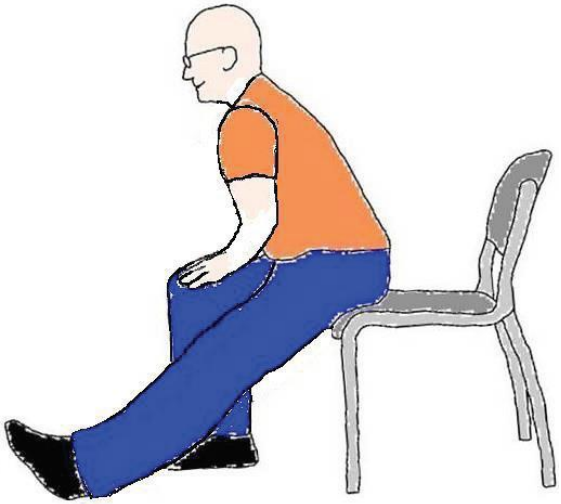


Don’t forget:

- Preparation
- Warm up &
- Cool down

- No time to include these here today!





Effective Duration of Exercise Provision/Benefit

• **Strength, power**, **static balance,** gait	• 8-12 wks
• **Dynamic balance**, endurance	• 12-24 wks
• **Bone strength (hip,spine,wrist)**	• **36+ wks**
• Dizziness & postural hypotension	• 24+ wks
• Transfer skills	• 24+ skills
• Mood, depression, anxiety, self-esteem	• 12+ wks
• **Falls**	• **15-52 wks**

Summary (types & amounts)

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STRAIGHT

- 2-3 days per week
- Up to 10 reps
- 3-5 second hold
- Daily if exs for back pain

STEADY

- 2-3 days per week
- Adequate balance challenge

STRONG

- **Weight bearing**
  - Most days
  - Up to 50 moderate impacts

  OR
  - 20 mins lower impact
- **Muscle strength**
  - 2-3 days per week
  - Up to 3 sets of 10-12 reps
  - Maximum safe weight /resistance
  - Targeted sites

Revisiting the Aims

1. A positive approach to reduce the risk of vertebral fracture through ‘spine care’
2. The importance of including exercise and physical activity to reduce falls and resulting fractures
3. The types and amount of exercise and physical activity needed to promote bone strength

Illustration Acknowledgements

- The Royal Osteoporosis Society
- LaterLife Training exercise booklets
- AGILE (physiotherapists working with older people) Physiotherapy Guidelines for the Management of Osteoporosis; The Chartered Society of Physiotherapy (1999) produced in conjunction with the National Osteoporosis Society
- Saints/Foundation/Active Options (Southampton) “Activity for Life”
- Exercise for Strong Bones; Joan Bassey & Susie Dinan (2001)

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Thank you

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