

Fall prevention: how to stay stable and safe as we age

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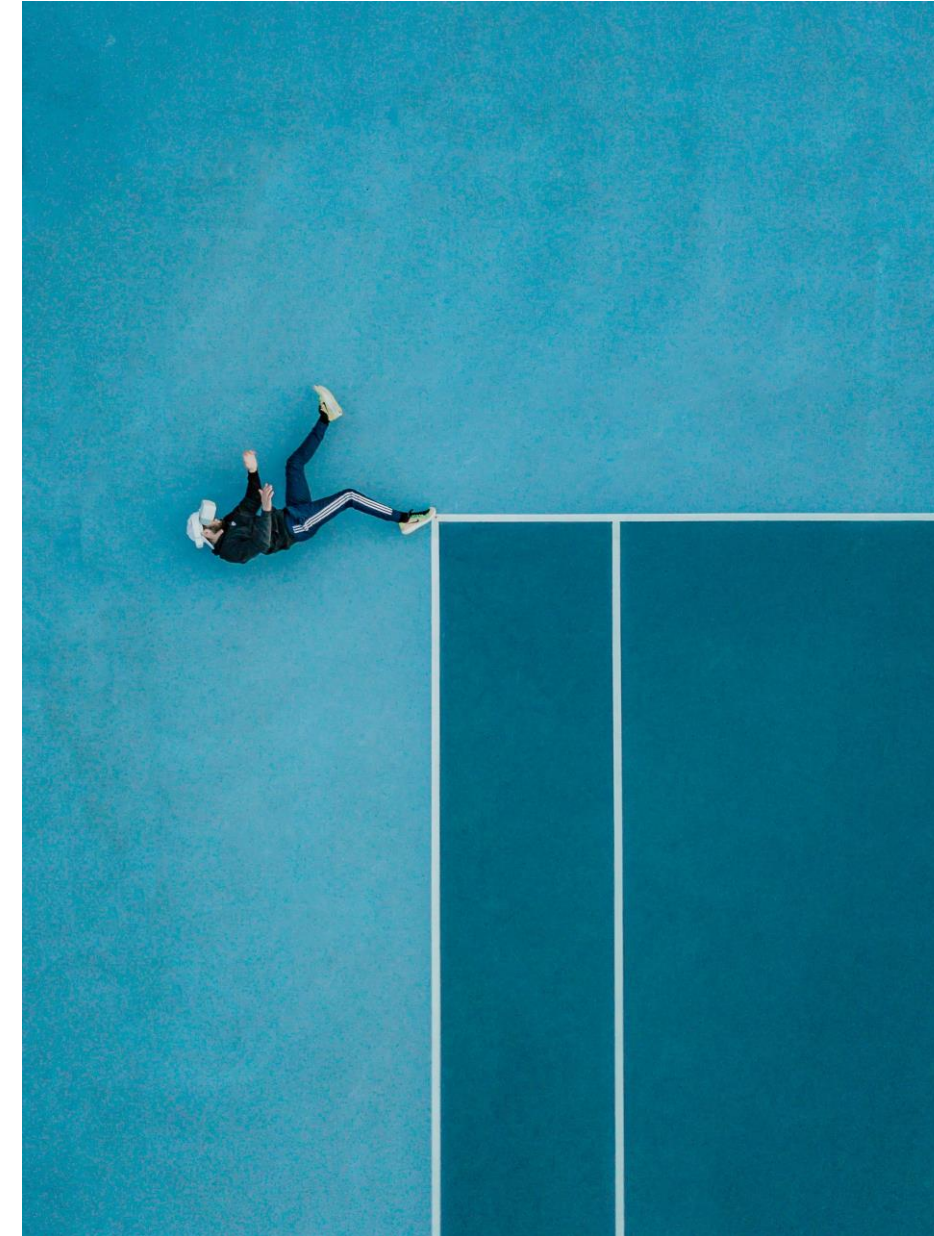
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McMaster Institute for Research on Aging

April 2025



Outline

- Importance of falls in older people
- Common causes and risk factors for falls
- What you can do to prevent falls
- What's new in research on fall prevention



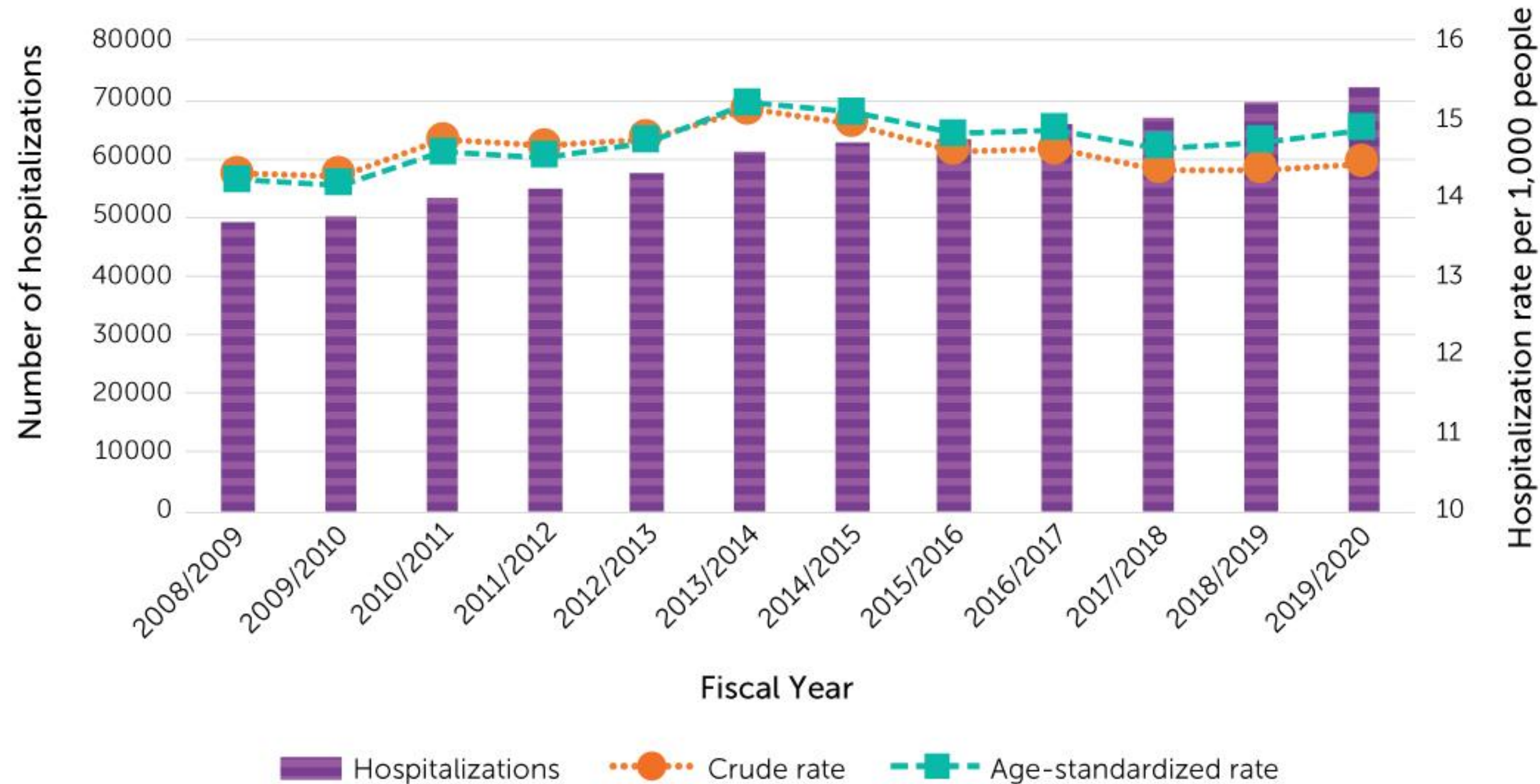


Burden of falls

About 30% of people over the age of 65 fall each year

- Leading cause of injury and death from injury in older adults
- Associated with the longest hospital stays
- Over 1/3rd of older adults are admitted to long-term care after a hospitalization for a fall

Falls are increasing in Canada and globally



Public Health Agency of Canada Surveillance Report on Falls In Older Adults 2022

The good news...

- Risk factor identification with tailored intervention can reduce both the rate and risk of falls by 25-40%



"Comic" from <https://twitter.com/NgaireHobbins>

Key Message #1: Falls with aging are a common and growing problem, but many falls can be prevented.

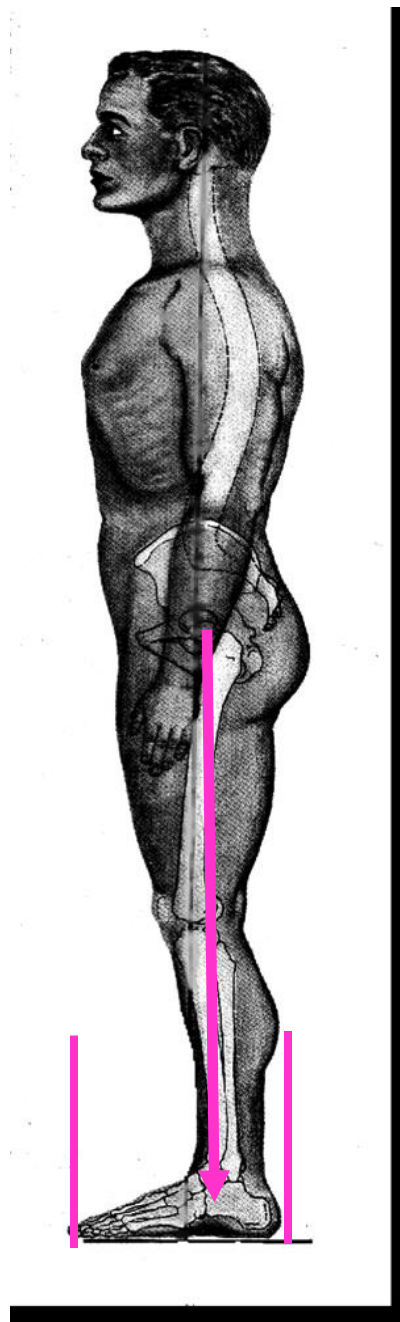
How do falls occur?

- World Health Organization Definition of a Fall: “An unexpected event in which an individual comes to rest on the ground, floor, or lower level”
- Most falls occur while walking or standing from a loss of balance

How did it happen? (n=891 falls from 954 older adults)	Number (percent)
1. Fell while standing or walking	499 (56%)
2. Fell on stairs or steps	168 (19%)
3. Fell on ice or snow	81 (9%)
5. Fell while exercising	39 (4%)
6. Fell from furniture (bed or chair)	27 (3%)
7. Fell from a height of greater than 1 meter or 3 feet (ladder, tree, roof)	9 (1%)
8. Fell while getting out of bathtub or shower	3 (0.3%)
9. Other	65 (7%)

MacM3 Unpublished Data

What is balance?



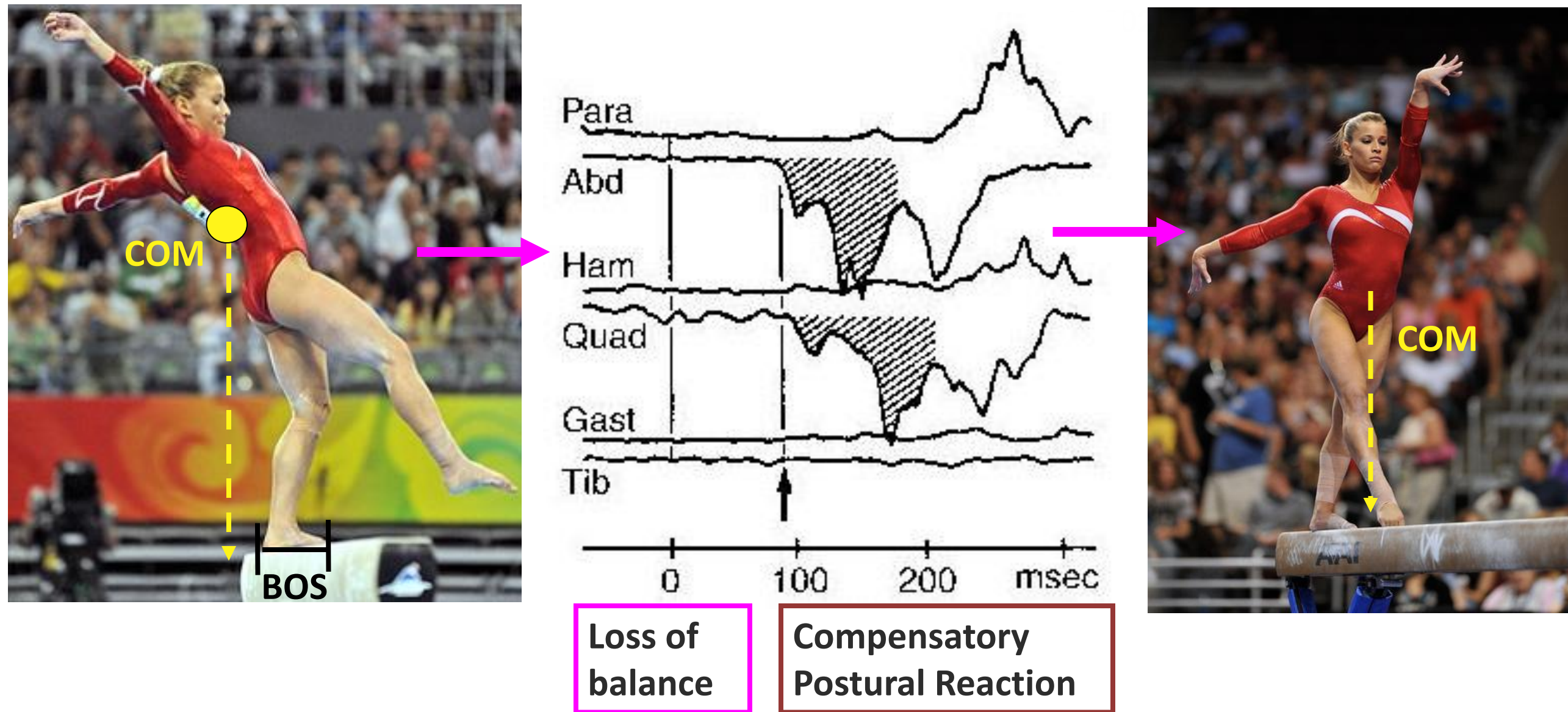
COM: Point at the center of the total body mass

BOS: Area of the body that is in contact with the support surface

Shumway-Cook & Woollacott Motor Control 2012

Slide courtesy of K. Sibley

Balance reactions– critical for fall avoidance



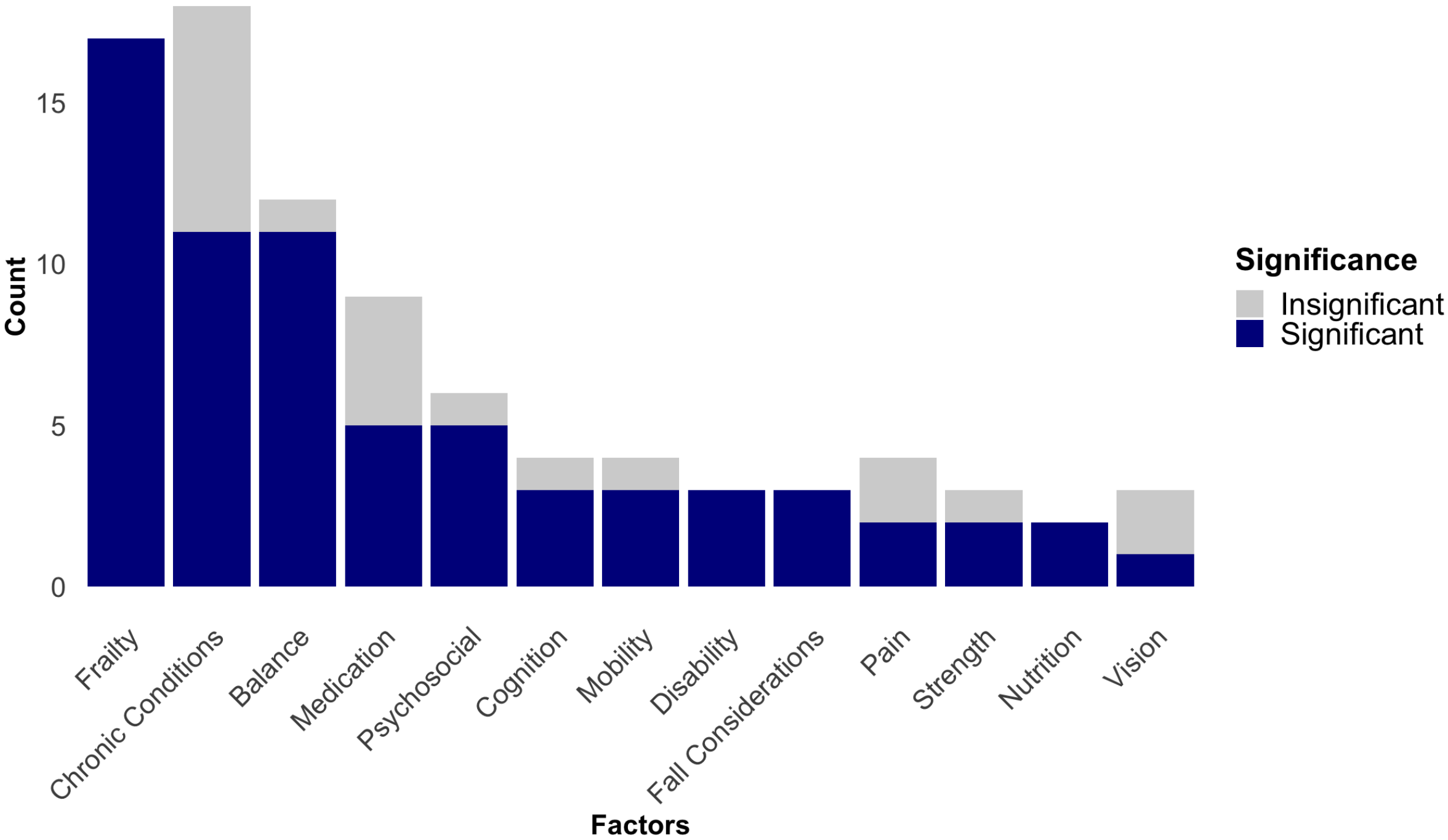
Shumway-Cook & Woollacott Motor Control 2012
Slide courtesy of K. Sibley

Key Message #2: Most falls happen when standing or walking. Balance is critical to avoid falls.

Fall risk factors in community-dwelling older adults

- Health conditions: arthritis, diabetes, heart disease, COPD, depression, dementia, stroke, Parkinson's Disease, frailty, incontinence
- Sensory: Vision and hearing loss, peripheral neuropathy, dizziness, vertigo
- Physical: Problems with balance and walking, muscle weakness
- Age, female gender, fear of falling, history of falls

What does the evidence say?



From 53 reviews on 355 studies, the top predictors were:

- Frailty
- Balance
- Chronic conditions

Saunders et al. GSA 2024

3 key questions to assess your risk:

1. Have you fallen in the past year?
2. Do you feel unsteady when standing or walking?
3. Do you have worries about falling?



Key Message #3: The top risk factors for falls are history of a previous fall, chronic conditions, being frail, and having poor balance.

What you can do to prevent falls



Exercise to improve your balance and strength



Make your environment safer



Ask a healthcare provider to review your medications



Have your eyes and feet checked



Exercise is medicine!

- Balance and functional strengthening exercises can reduce falls by 24–34%
- Tai Chi may also reduce falls



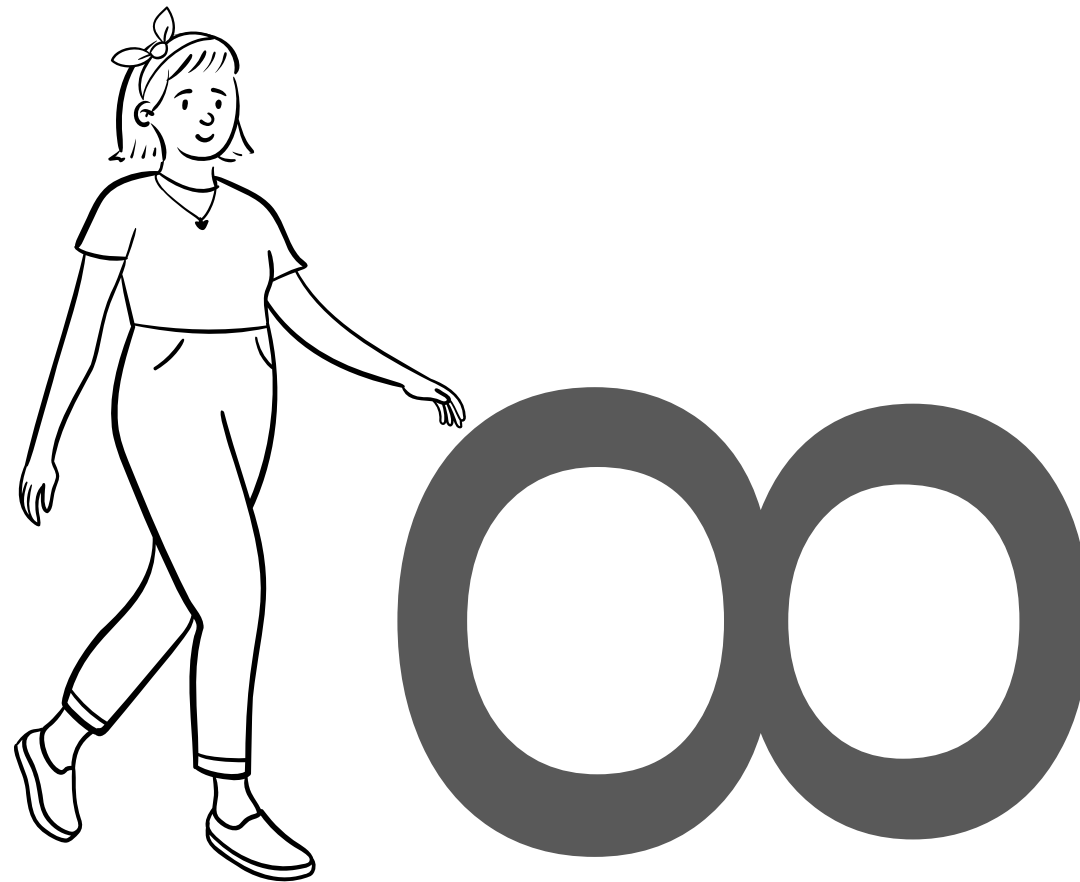
Balance and functional exercise ideas



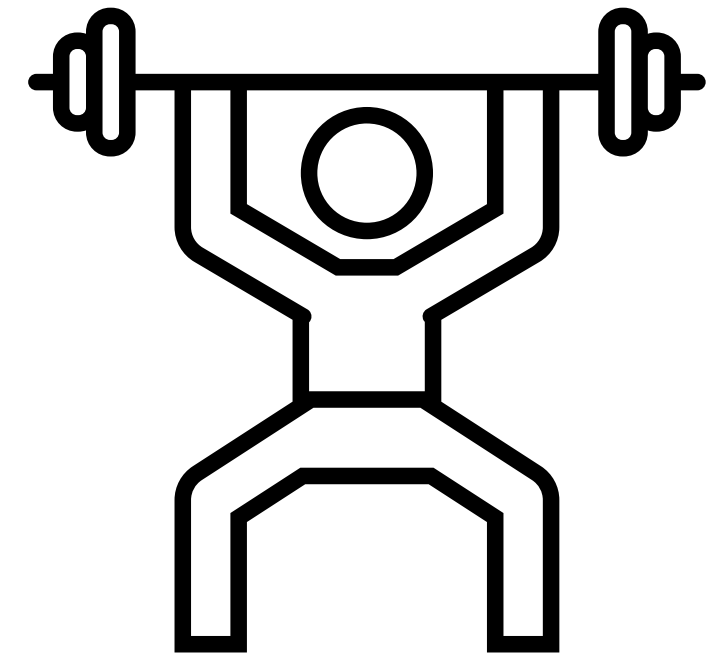
Sit-to-stands



Standing balance



Walking tasks:
Sideways, backwards,
figure of 8



Functional strength:
squats & heel raises

General guidelines for exercise



Speak to a physiotherapist or healthcare provider



Aim for 3 times a week



Do each exercise 10 times. Then repeat (do 2 sets).



Progress your exercises:

Decreasing support
Increasing speed
Increasing resistance

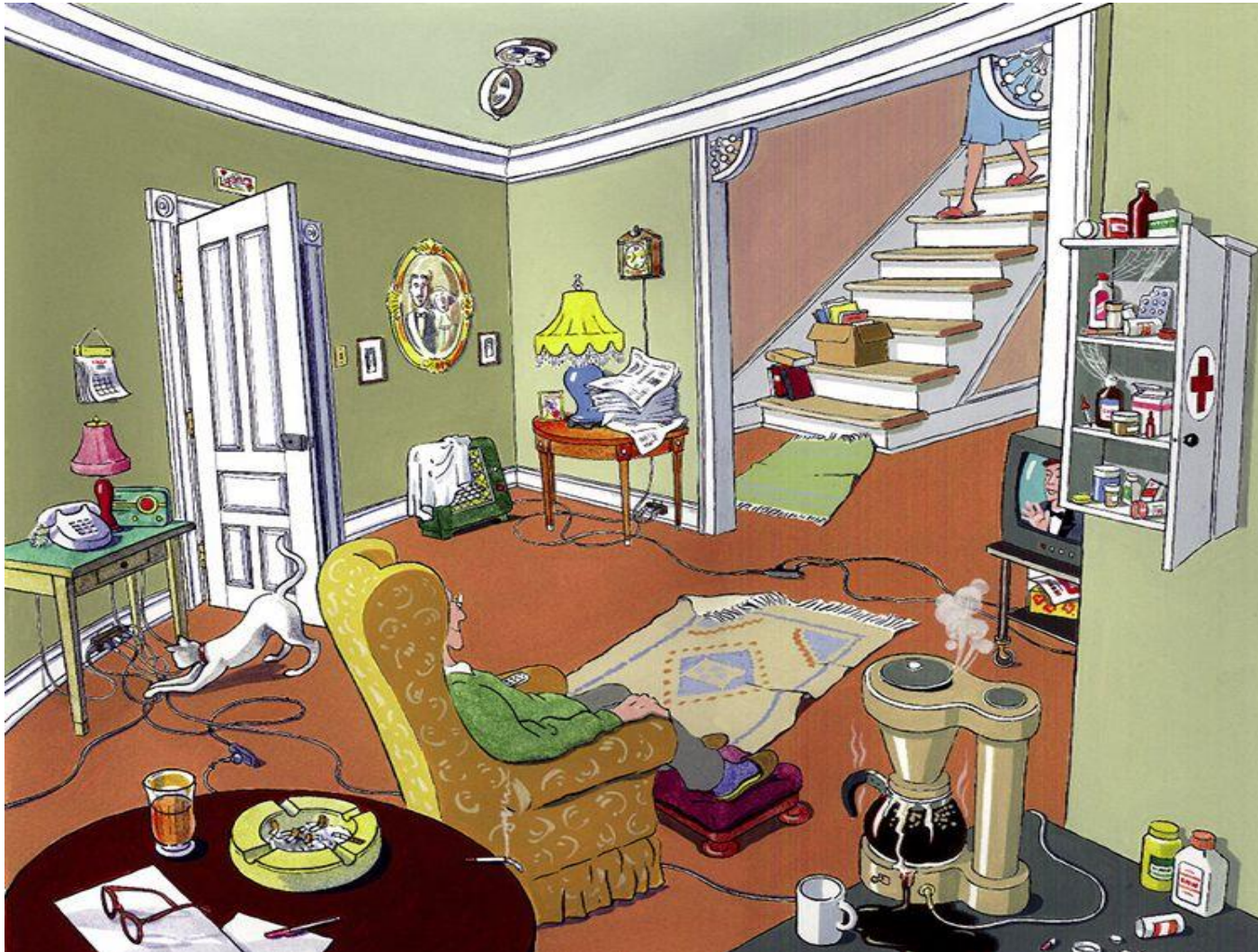


Make it part of an active lifestyle → 150min/week



Key Message #4: Exercise that challenges balance can significantly reduce your risk of falls.

Make your environment safer



- Remove tripping hazards
- Install bars & non-slip mats
- Improve lighting



- Wear shoes with firm soles
- Take your time in icy weather!
- Use handrails
- Be mindful of curbs, steps, ramps

Review your medications

- Many older adults are prescribed multiple medications
- Some medications or combinations of medication can make you sleepy, dizzy or affect your vision and sense of balance
- **Ask your doctor or pharmacist to review all your medications, even over-the-counter ones**
- Tools are available for your physician to help deprescribe medications if you feel you might be on too many (e.g., Start-Stopp)

Have your eyes and feet checked

- Visual acuity, contrast, and depth perception all decrease with age
- We may also lose sensory perception in our limbs and feet with aging and certain health conditions
- Poor vision and decreased sensation in your feet can increase your risk of falling

- ✓ Once a year, go for an eye check to update your eyeglasses, and check for conditions like cataracts and glaucoma
- ✓ Ask your doctor or health care provider to check your feet once a year

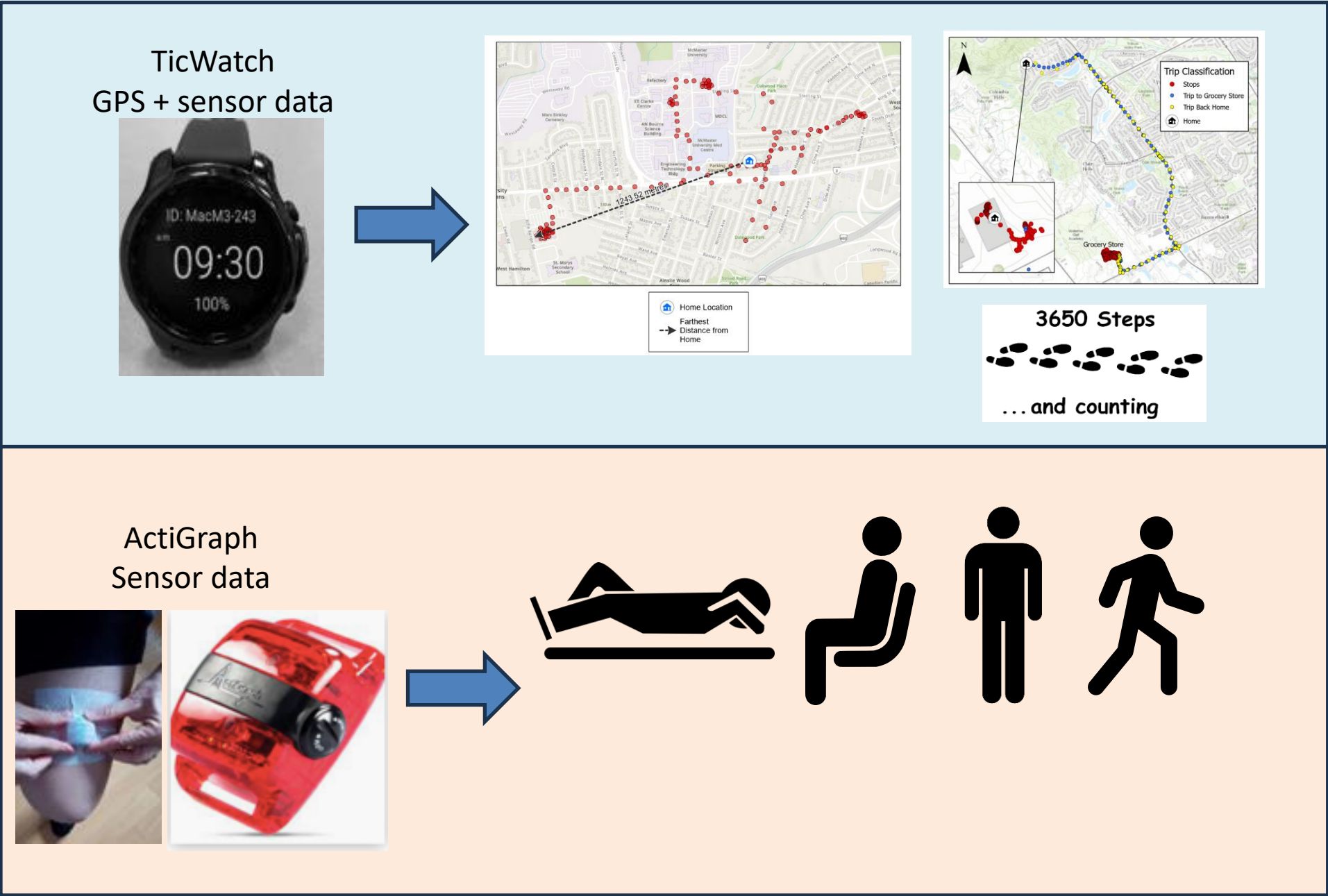
Key Message #5: Other interventions that can reduce falls are minimizing environmental hazards, reviewing your medications, and having your eyes and feet checked regularly.

New and ongoing areas of research

- Protection aids (hip protectors, special garments)
- Eye wear and hearing aids for correction and signaling
- Perturbation and fall recovery training
- Smart home monitoring and alarm technology



Leveraging wearable technology (MacM3)



Canada's technology and aging network



Institute for
Research on Aging

LABARGE CENTRE FOR MOBILITY IN AGING

Conclusion– 5 key messages

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3. The top risk factors for falls are history of a previous fall, chronic conditions, being frail, and having poor balance.

Conclusion– 5 key messages

1. Falls with aging are a common and growing problem, but many falls can be prevented.
2. Most falls happen when standing or walking. Balance is critical to avoid falls.
3. The top risk factors for falls are history of a previous fall, chronic conditions, being frail, and having poor balance.
4. Exercise that challenges balance can reduce your risk of falls.

Conclusion– 5 key messages

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2. Most falls happen when standing or walking. Balance is critical to avoid falls.
3. The top risk factors for falls are history of a previous fall, chronic conditions, being frail, and having poor balance.
4. Exercise that challenges balance can reduce your risk of falls.
5. Other interventions that can reduce falls are minimizing environmental hazards, reviewing your medications, and having your eyes and feet checked regularly.

Let's Get Moving!

- Selected exercises from the Otago Exercise Program
 - Available online: <https://hfam.ca/wp-content/uploads/2020/04/Otago-Exercise-Program.pdf>
 - A muscle strengthening and balance retraining program developed and tested by the New Zealand Falls Prevention Research Group
 - Suggested to complete the exercises three times each week (it doesn't have to be all at once!)

Campbell AJ and Robertson MC. Otago Exercise Programme to prevent falls in older adults - A home-based, individually tailored strength and balance retraining programme. Wellington: ACC Thinksafe. Mar 2003.

Warm Up

Head Movements

- Stand up tall and look ahead.
- Slowly turn your head as far as you can to the right.
- Slowly turn your head as far as you can to the left.
- Repeat five times to each side.



Neck Movements

- Stand up tall and look ahead.
- Place one hand on your chin.
- Guide your head straight back (tuck your chin in).
- Repeat five times.



Trunk Movements

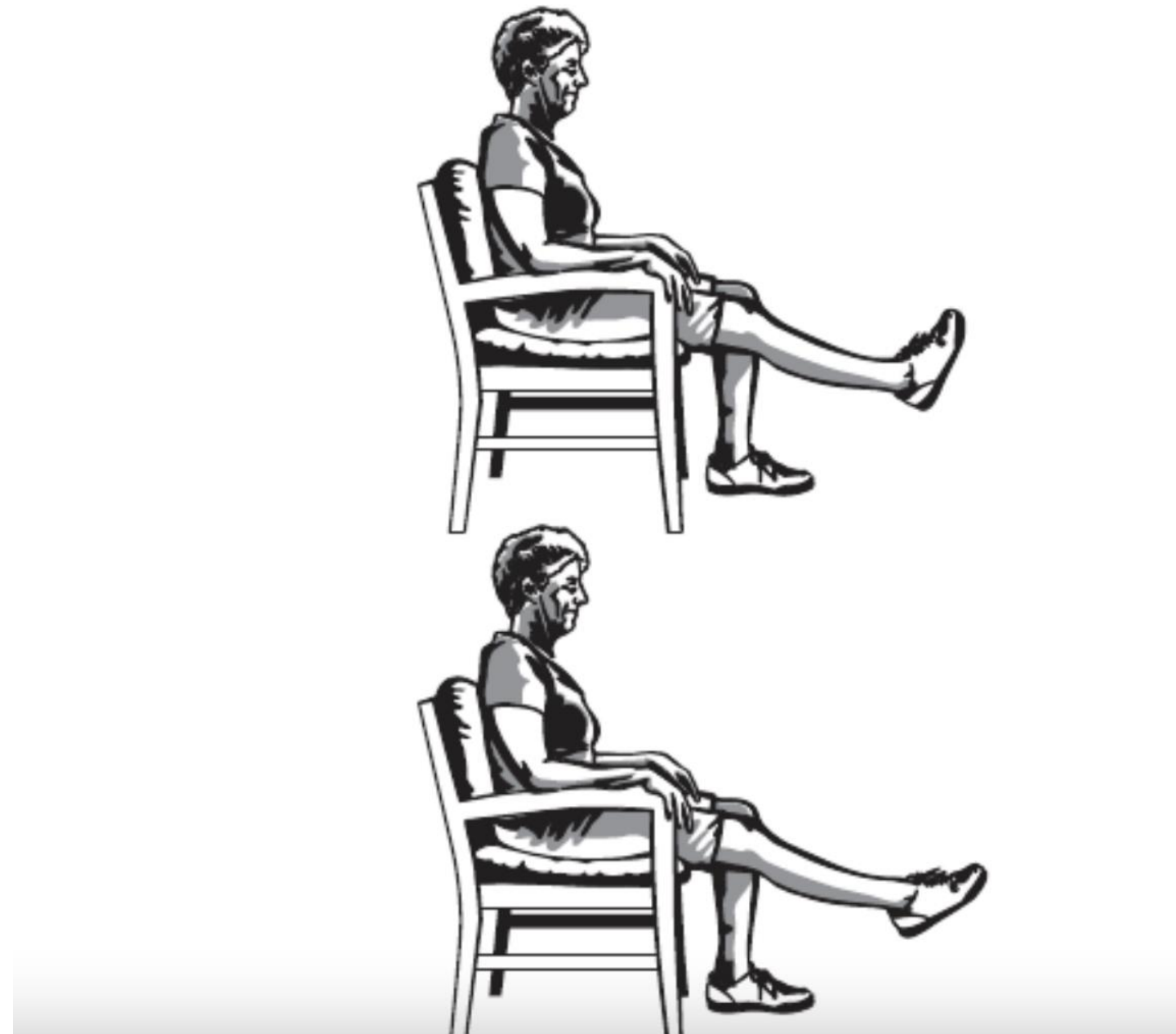
- Stand up tall and place your hands on your hips.
- Do not move your hips.
- Turn as far as you can to the right, comfortably.
- Turn as far as you can to the left, comfortably.
- Repeat five times to each side.



Strength Exercises

Ankle Movements

- Either stand or sit.
- Pull the foot towards you, then point the foot down.
- Repeat 10 times for each foot.



Side Hip Strengthening Exercise

- Strap the weight onto your ankle.
- Stand up tall beside a table and hold onto it.
- Keep the exercising leg straight and the foot facing straight ahead.
- Lift the leg out to the side and return.
- Repeat 10 times.
- Strap the weight onto your other ankle.
- Turn around.
- Repeat this exercise 10 times.
- Progress to 2 sets of 10 repetitions.



Calf Raises – Hold Support

- Stand up tall facing a table.
- Hold onto the table and look ahead.
- Your feet should be shoulder-width apart.
- Come up onto your toes.
- Lower your heels to the ground.
- Repeat this exercise 10 times.
- Progress to 2 sets of 10 repetitions.



Knee Bends – No Support

- Stand up tall near a table and look ahead.
- Place your feet shoulder-width apart.
- Squat down half way, bending your knees.
- The knees go over the toes.
- When you feel your heels start to lift, straighten up.
- Repeat 10 times.
- Progress to 2 sets of 10 repetitions.



Narrow Base of Support

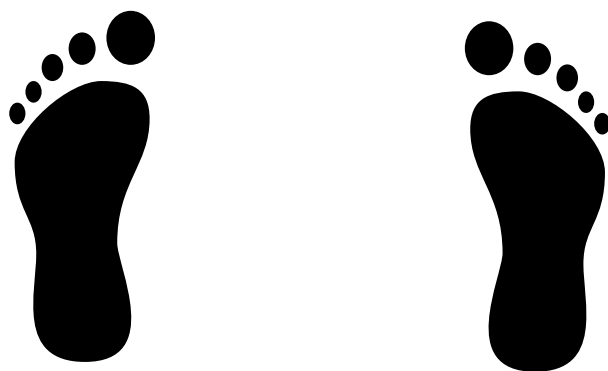
Wide Stance

Narrow Stance

Semi-Tandem Stance

Tandem Stance

Single Leg Stance



EASIER

HARDER



Sensory Input

Balance Exercises

One Leg Stand – No Support

- Position yourself near a table.
- Stand on one leg.
- Try to hold this position for 10 seconds.
- Stand on the other leg.
- Try to hold this position for 10 seconds.



Stand To Sit – No Hands

- Sit on a chair that is not too low.
- Place your feet behind your knees.
- Lean forward over your knees.
- Stand up without using your hands.
- Repeat 10 times.
- Progress to 2 sets of 10 repetitions.



Additional Activity Resources

- Otago Exercise Program
 - Available online: <https://hfam.ca/wp-content/uploads/2020/04/Otago-Exercise-Program.pdf>
- Staying active and on your feet Booklet
 - Available in multiple languages (Arabic, Chinese, Greek, Italian, Vietnamese)
 - Available online: <https://cdn.activeandhealthy.nsw.gov.au/assets/Uploads/Staying-Active-A4-Oct2018-web.pdf>
- Safe exercise at home Booklet
 - Available in multiple languages (Portuguese, Bosnian)
 - Available online:
https://www.safeexerciseathome.org.au/files/ugd/be2cac_2a69da6d8e28430ea059ef510c5c4c86.pdf



THANK YOU!

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