

Get Moving For Better Bone Health: Safe & Effective Exercises for Osteoporosis

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OBJECTIVES

Following this session, participants will be able to:

- Describe how physical activity and exercise can benefit people with or at risk of osteoporosis and fracture
- Identify exercises to improve/maintain bone density, improve posture and body mechanics, improve balance to help prevent falls, improve function, and maximize recovery from a fracture
- Identify possible modifications for current popular exercise methods to improve safety

Overview of Osteoporosis

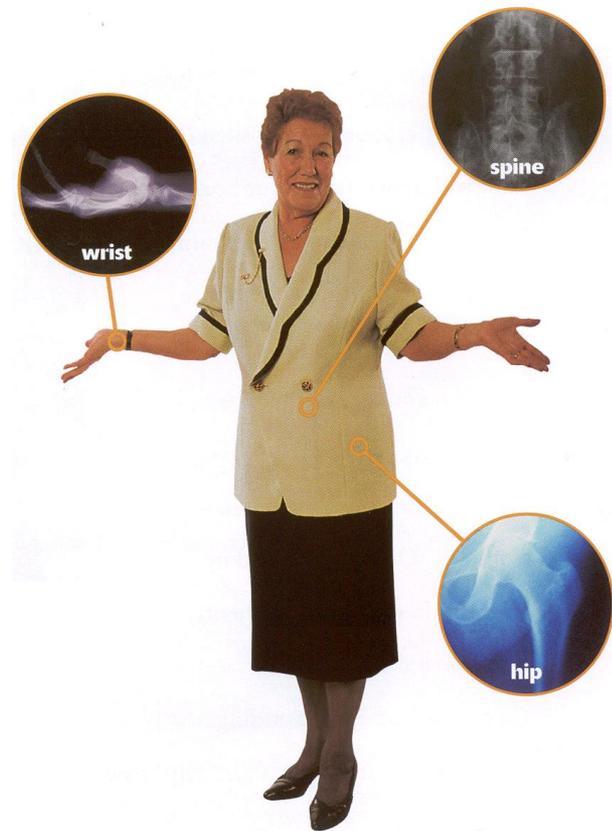
- Affects 53 million Americans
 - 10 million have osteoporosis
 - 43 million have low bone mass

(Clinician's Guide to the Prevention and Treatment of Osteoporosis, NOF, 2014)
 - More than 2 million men have osteoporosis
- Osteoporosis is responsible for > 2 million fractures each year; estimated to cost \$19 billion per year
- Predictions for 2025: 3 million fractures and \$25.3 billion

Osteoporosis Can Cause Any Bone to Break

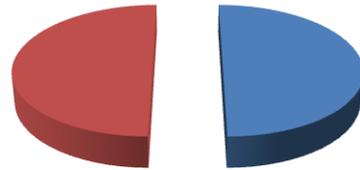
■ The 3 most common sites for fractures:

- Spine
- Wrist
- Hip

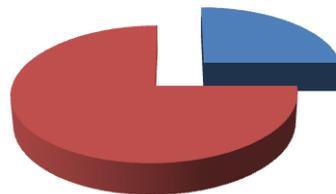


The Risk of Breaking a Bone- A Serious Healthcare Threat

- 1 out of 2 women aged ≥ 50 yrs



- 1 out of 4 White men aged ≥ 50 yrs

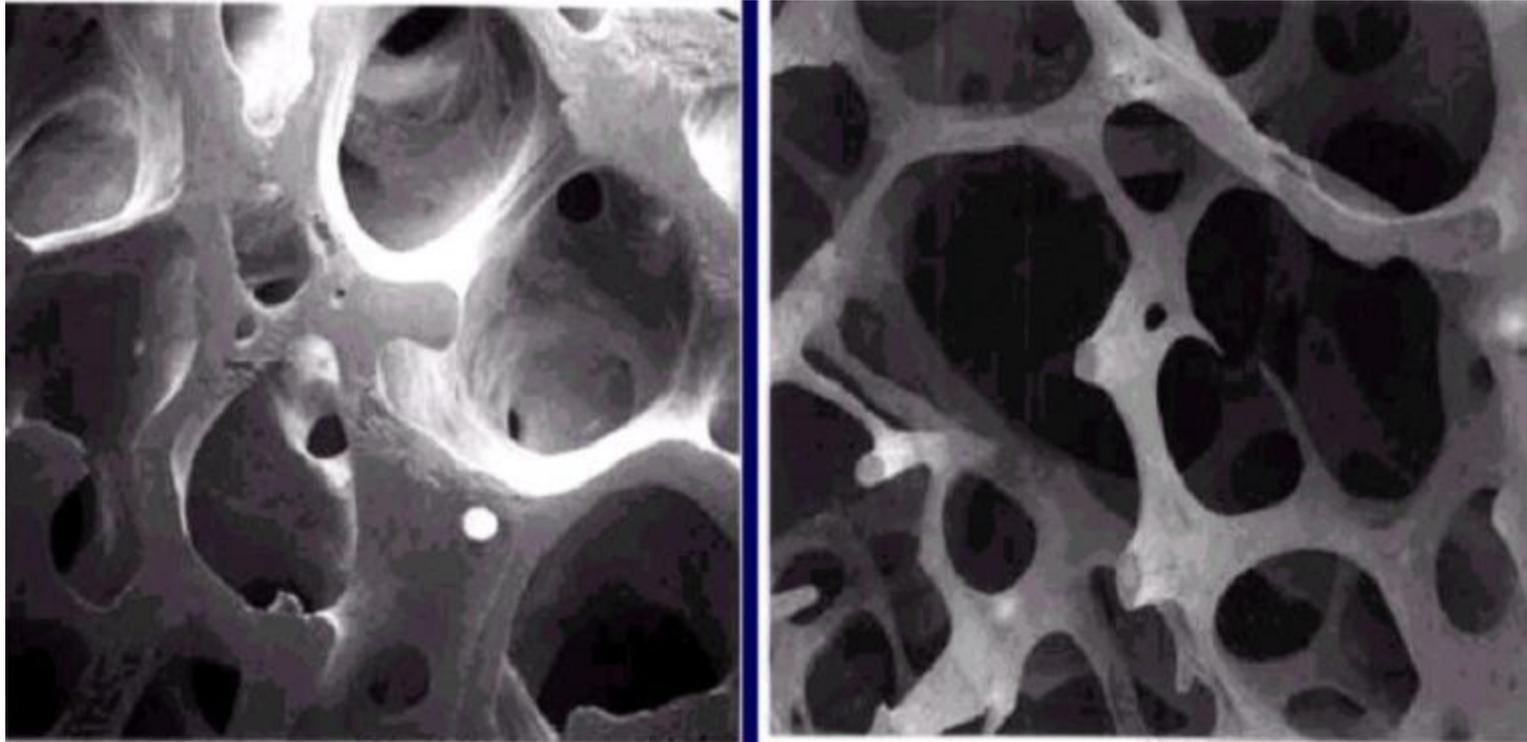


- Men suffer fewer fractures, but have twice the 1-yr mortality compared to women

(Clinician's Guide to the Prevention and Treatment of Osteoporosis, NOF, 2014)

Osteoporosis is a Silent Disease

- You can't see or feel your bones getting thinner



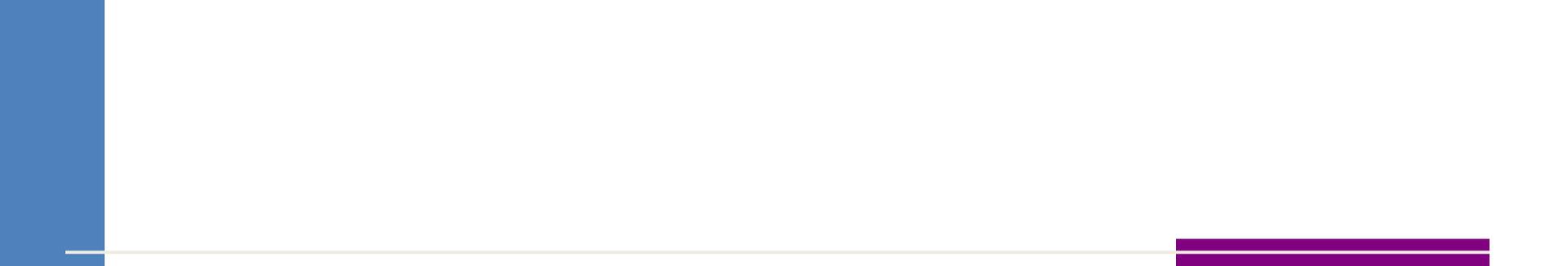
A Minor Fracture?



Don't overlook the potential meaning of a "minor" fracture. For middle-aged women, it could be a symptom of bone loss caused by the onset of osteoporosis – a condition that affects one out of two women by age fifty. Osteoporosis can be treated – and in some cases, bone loss can even be reversed. For the latest on fractures and osteoporosis, visit orthoinfo.org and nof.org.


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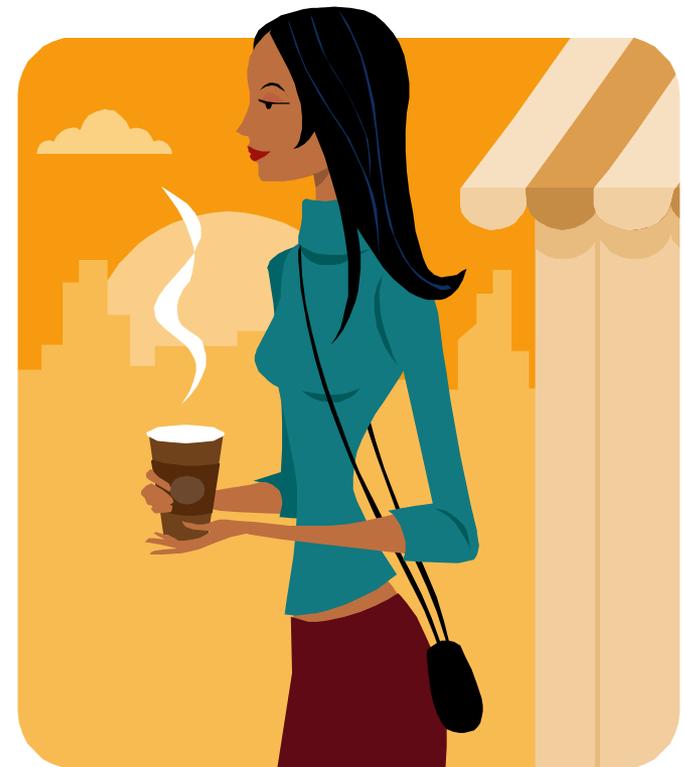


What can you do?

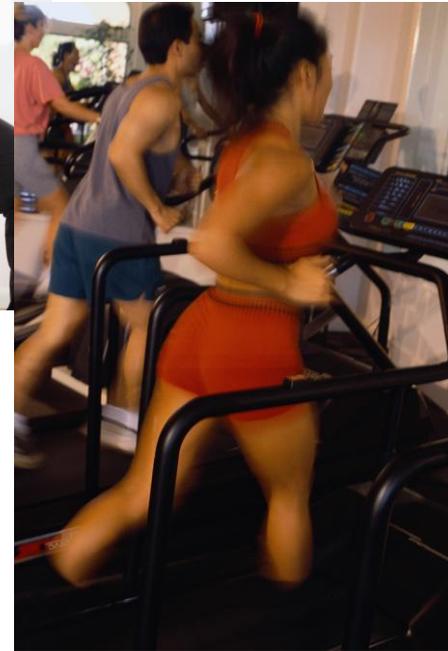
Lifestyle Changes to Reduce Fractures

- Calcium
- Vitamin D
- **Exercise**
- Don't smoke
- Don't drink too much
- Medications if indicated

(Clinician's Guide to the Prevention and Treatment of Osteoporosis, NOF, 2014)



Exercise and Physical Activity for Bone Health



What Types of Exercise Improve Bone Health?

Several types of exercises are important for bone health, including those that:

- Make bones stronger
- Improve posture and body mechanics
- Improve balance to help prevent falls
- Help you function better during your day





EXERCISE AND BONE DENSITY/STRENGTH

What Types of Exercise Make Bones Stronger?

Two types of exercises that improve bone strength are:

- **Weight-bearing exercises** which make you work against gravity while being upright, such as fast walking.
- **Muscle-strengthening exercises** which make you move your body, a weight or some other resistance against gravity, such as lifting weights; also called resistance exercises.

What are Some Other Examples of Weight-bearing Exercises?

High-impact exercises:

- Dancing
- High-impact aerobics
- Hiking
- Jogging/running
- Jumping Rope
- Stair climbing
- Tennis
- Volleyball

Low-impact exercises:

- Elliptical training machines
- Stair-step machines
- Low impact aerobics
- Walking on a treadmill
- Walking on level surfaces (such as mall walking or outdoors)

How Much Weight-bearing Exercise Should You Do?

- **Children and adolescents:** 60 minutes of moderate to vigorous activity every day, including high-impact activities
- **Adults:** 150 minutes per week of moderate or 75 minutes per week of vigorous activity, including impact activities; based on your health and abilities
- **Older adults:** Follow adult guidelines, adapted as needed based on your health

What are Some Examples of Muscle-strengthening Exercises?

Muscle-strengthening exercises can be done:

- With weight machines
- With hand and ankle weights
- With elastic exercise bands
- By moving against gravity

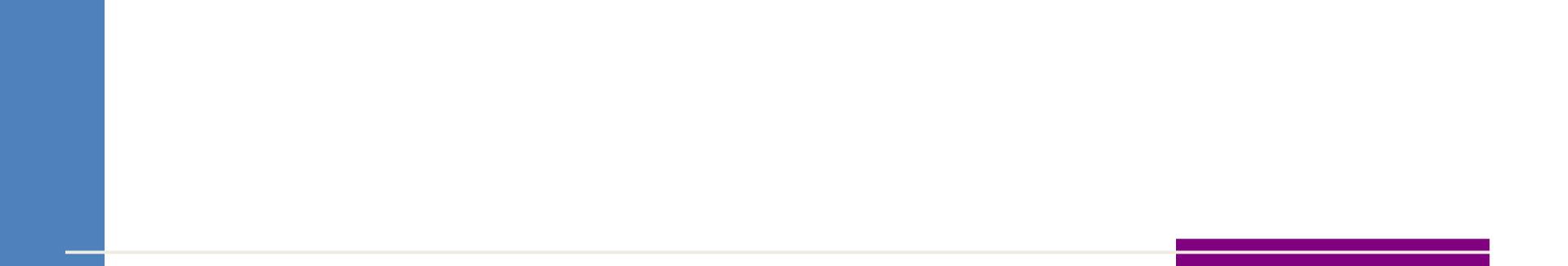


How Much Muscle-strengthening Exercise Should You Do?

The recommendations for strengthening exercises are:

- 2-3 days per week; 1-3 sets of 8-12 exercises, including all major muscle groups
- Hard enough to cause fatigue by 8-10 repetitions (or 15-20 repetitions of a lighter weight if you are frail or are at risk of a fracture)

Muscle-strengthening exercises should always be done with proper form

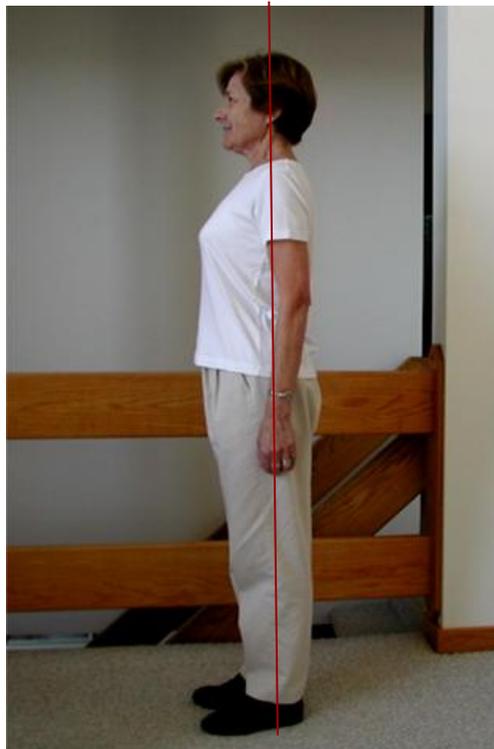


POSTURE AND BONE HEALTH

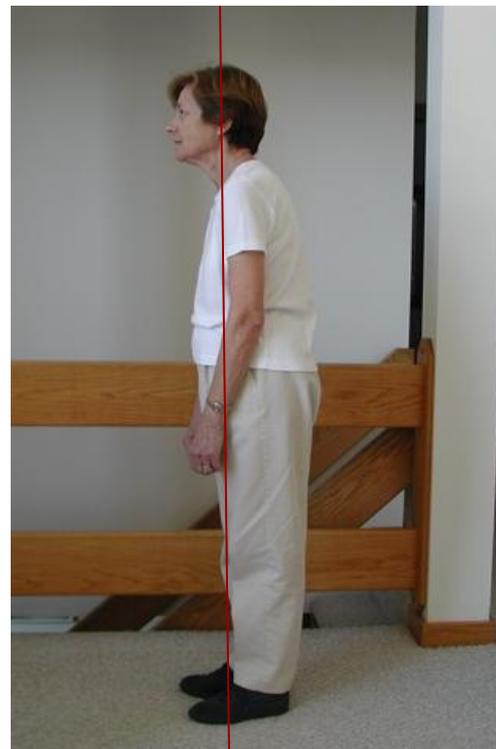
Posture and Body Mechanics

- Good posture and proper body mechanics are important to decrease your risk of spine fractures

Good posture

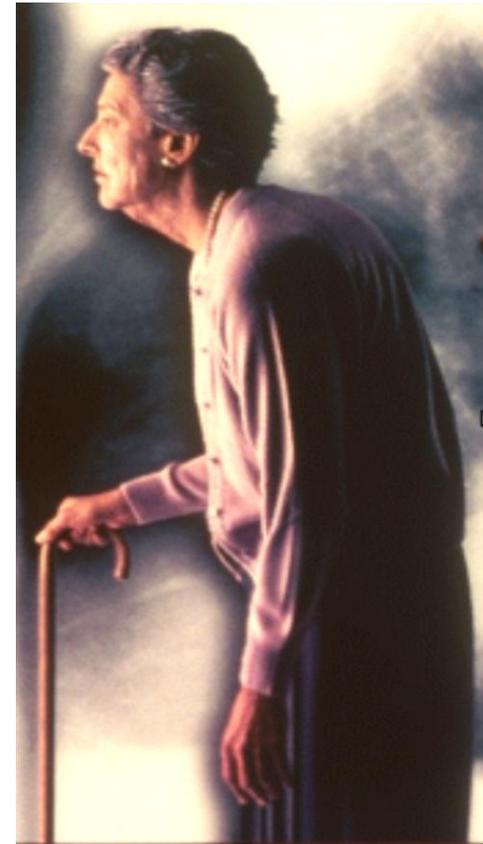


Poor posture

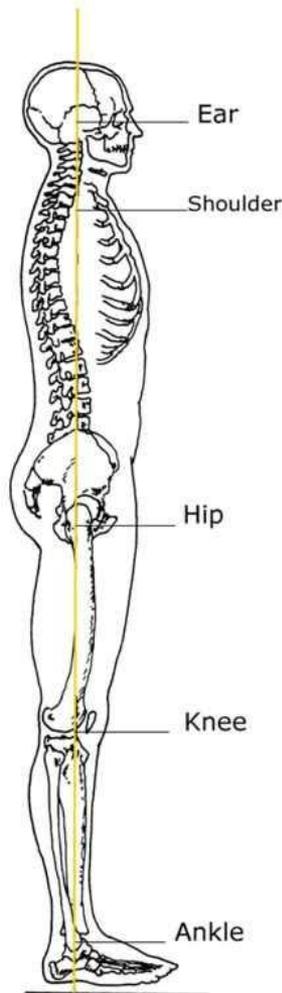


Spine Fractures May Cause:

- Pain
- Loss of height
- Stooped posture
- Difficulty breathing
- Stomach pains or digestive discomfort
- Loss of self-esteem



How is Your Posture?



Good Posture



Forward Head

Posture and Body Mechanics

- Exercises should focus on reducing forward head posture and rounded or “sloping” shoulders
- You may need to see a physical therapist to examine your posture and body mechanics; he/she can prescribe specific exercises for you
- Posture exercises can be done for a few minutes each day



Some Possible Exercises

- *Lengthen the neck: Tilt breastbone up, lift head up and back, hold for 5-10 seconds, do 2-4 repetitions*
- *This can be done sitting, lying down, standing, or on your car headrest during stop lights!*



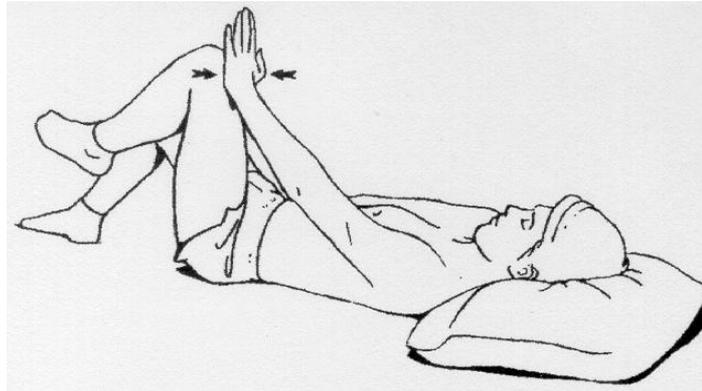
Some Possible Exercises

- *Shoulder stretch: Lie with your legs flexed up*
- *Raise your arms in an arc overhead until you feel a good stretch, hold for 30 seconds, do 1-2 repetitions*



Some Possible Exercises

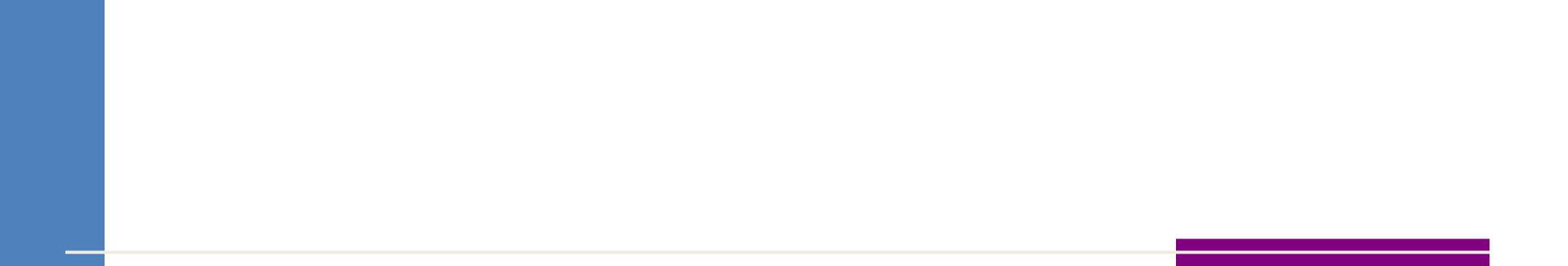
- *Abdominal isometric strengthening: Lie in a comfortable position, head on the floor/bed/pillow*
- *Pull your navel in, lift one knee toward chest as the hand pushes it away, hold 2 seconds, relax but keep your knee up then repeat 5-10 times each side and 5-10 crossing hand to opposite knee*



Some Possible Exercises

- *Pectoral Stretch: Stand facing corner or in a doorway, step into a lunge, forearms/hands on wall, elbows below shoulder level, slowly lean to get a stretch on the front of your shoulders, hold for 30 seconds, do 1-2 repetitions*





FALLS AND FRACTURES

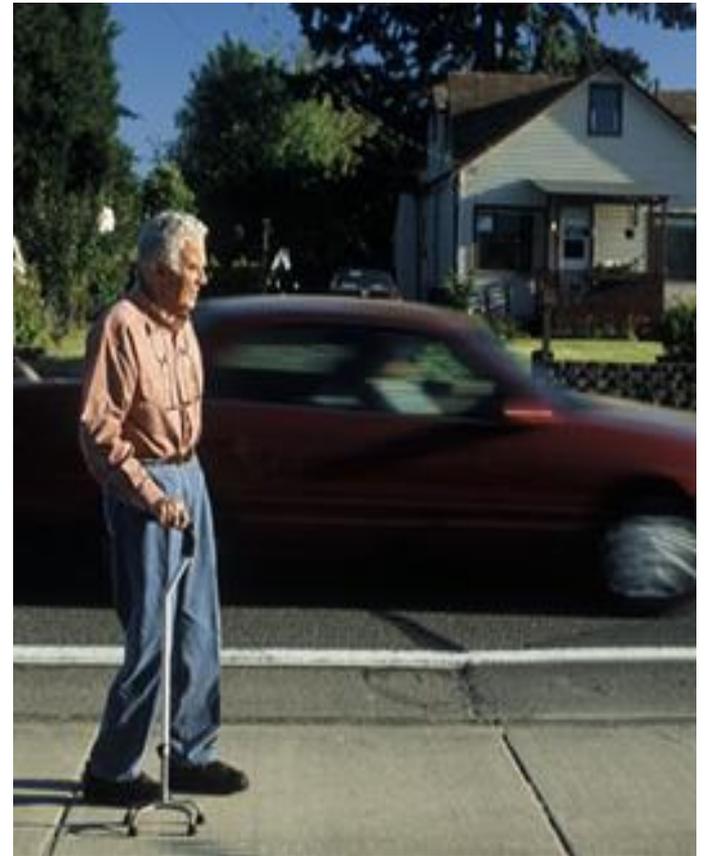
Falls and Fractures

- More than 1/3 adults, age \geq 65 yrs, fall each year
- Fall-related injuries are the leading cause injury deaths and disabilities in older adults
- Most fractures in older adults result from a fall
- Most serious injury is hip fracture
 - 90% of hip fractures are the direct result of a fall

(CDC Recommendations and Reports, 2000)

Risk Factors for Falls

- Increasing age
- Muscle weakness
- Functional limitations
- Environmental hazards
- Use of psychoactive medications
- History of falls



Hip Fractures have Serious Consequences

- Usually requires surgery
- 1 in 5 need a skilled nursing facility within a year
- 1 in 4 become disabled
- Many become isolated and depressed
- 1 in 5 die within a year of the fracture



Recovery After a Hip Fracture

- 6 months after
 - 15% can walk across a room unaided
- 24 months after fracture, assistance required by
 - 90% to climb 5 stairs
 - 83% to get in and out of a bath/shower
 - 63% to get on/off of a toilet
 - 54% to rise from an armless chair
 - 53% to walk 1 block



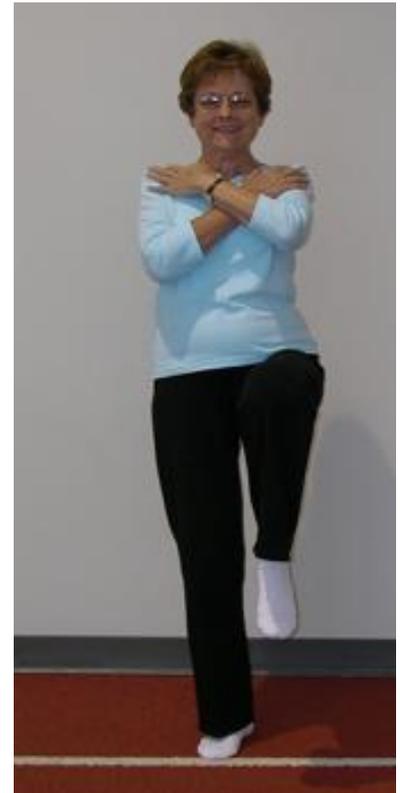
Return to Function After a Fracture

- Many people do not regain strength in the lower extremities
- Balance may not sufficient
 - It may not have been good enough prior to the fracture
- We lose about 1% of our strength for each day in the hospital
- Consider returning to physical therapy a few months after a fracture



Balance and Falls

- A complete balance assessment may include a review of your medications, a vision exam, a safety check of your home, and tests of your strength, flexibility, posture and balance



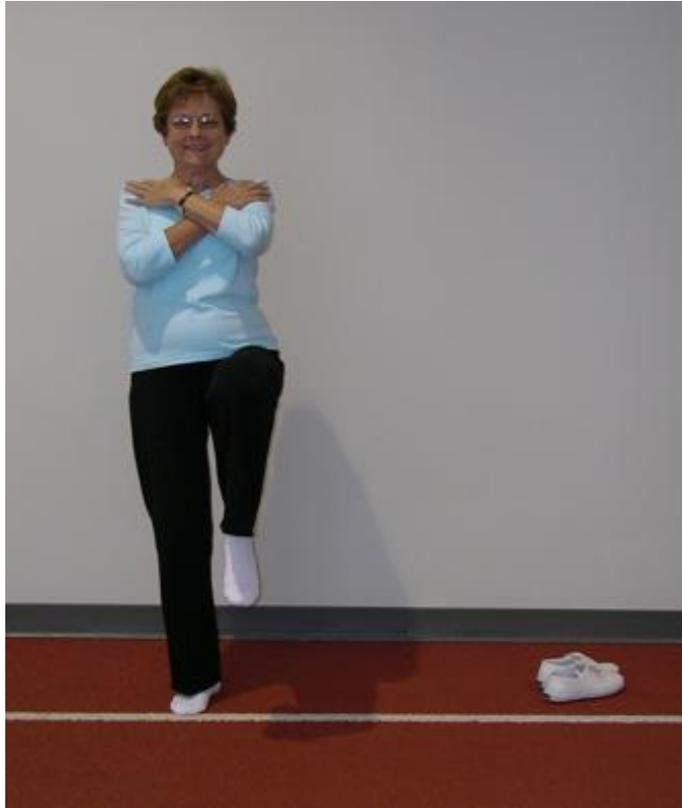
How Good is Your Balance?

One-leg Stance Test

- Stand on dominant foot, arms folded across chest, barefoot, eyes open
- How long can you stay without:
 - Stepping with your standing foot?
 - Touching the raised foot to the ground?
 - Using the lifted leg to support the weight bearing limb?
 - Moving your arms out of position?



Let's do it!



Correct Form



Incorrect Form

One-leg Stance Norms

Age	Eyes	Time in Seconds
20-29	Opened	30.0
	Closed	28.8 (2.3)
30-39	Opened	30.0
	Closed	27.8 (5.0)
40-49	Opened	29.7 (1.3)
	Closed	24.2 (8.4)
50-59	Opened	29.4 (2.9)
	Closed	21.0 (9.5)
60-69	Opened	22.5 (8.6)
	Closed	10.2 (8.6)
70-79	Opened	14.2 (9.3)
	Closed	4.3 (3.0)

How is Your Dynamic Balance?

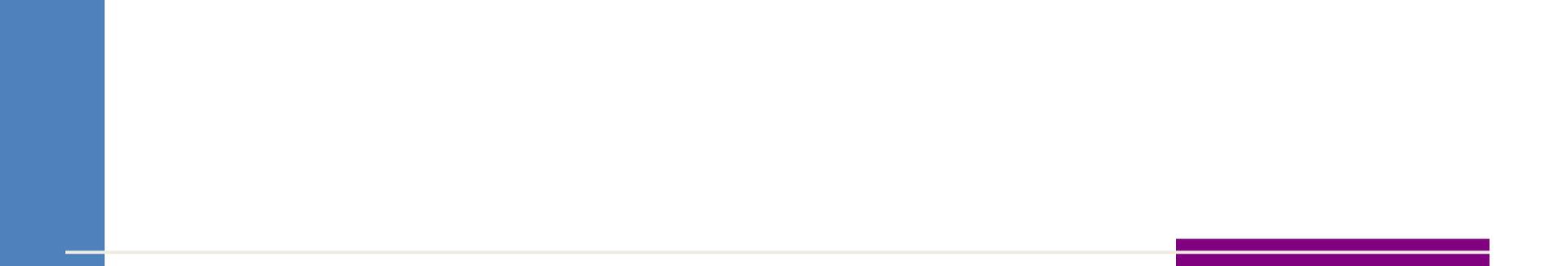
Tandem Walk Test

- Try to walk heel-to-toe along a 2 inch wide line/floor board
- Your heel and toe should touch or almost touch
- Count the steps you manage before you:
 - Touch a foot to the floor before proper placement
 - Don't touch heel to toe
 - Miss the line
 - Reach 20 steps (Yeah!)
- Should be able to complete 20 steps within 3 trials



Tandem Walk Test Norms (Vereeck,et al, 2008)

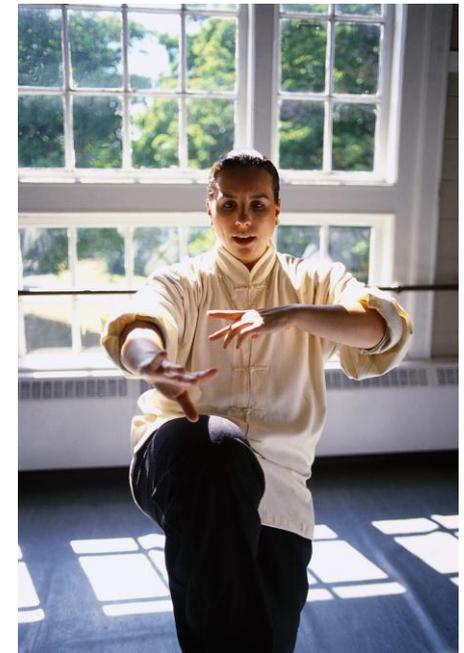
Age	Average	Standard deviation
20-29	20	
30-39	20	
40-49	20	
50-59	20	
60-69	17.2	5.7
70-79	14.1	7.0



BALANCE TO PREVENT FALLS

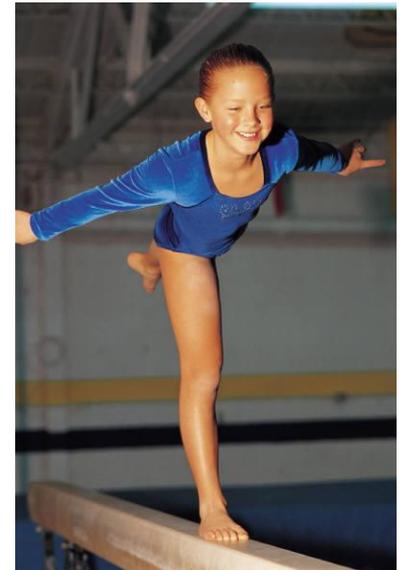
Balance Exercises

- Balance can be improved with exercises for leg strengthening and stretching, challenging balance exercises, and with tai chi
- Balance exercises can be done for a few minutes each day
- Balance exercises are very important for older adults and all who have balance problems



Balance Exercises

- *For safety, stand with back to a corner or near a sink (hands hovering in)*
- *Stand heel to toe*
- *Stand on one leg*
 - *Then do it on a pillow*
 - *Or with your eyes closed*
- *Walk heel to toe*
- *Do crossovers down the hall*
- *Do leg strengthening exercises*
- ***You should feel wobbly but not as if you could lose your balance or fall***



How Strong are Your Legs?

■ Chair Rise Test

- Chairs should be against the wall
- Cross arms over chest if possible
 - On “Go,” rise all the way to standing, sit down as many times as possible in 30 seconds

Let's Do It!



Chair Rise Test: Norms for Men (# completed)

Age → % rank ↓	60-64	65-69	70-74	75-79	80-84	85-89	90-94
95	23	23	21	21	19	19	16
75	19	18	17	17	15	14	12
55	17	16	15	15	13	12	10
35	15	13	13	12	11	9	8
15	12	11	10	10	8	6	6
5	9	8	8	7	6	4	3

(Adapted from Rikli & Jones, 2001)

Chair Rise Test: Norms for Women (# completed)

Age → % rank ↓	60-64	65-69	70-74	75-79	80-84	85-89	90-94
95	21	19	19	19	18	17	16
75	17	16	15	15	14	13	11
55	15	14	13	13	12	11	9
35	13	12	11	11	10	9	6
15	10	10	9	9	7	6	3
5	8	8	7	6	4	4	0

(Adapted from Rikli & Jones, 2001)





FUNCTIONAL EXERCISES

Functional Exercises

- Exercises that improve how well you move can help you in everyday activities and decrease your risk of falls and fractures
- If you have trouble getting up from a chair or climbing stairs, you should do functional exercises each day
- You might practice getting up from a chair without your arms, climbing stairs, rising onto your toes or practice lifting packages correctly each day

Functional Exercises

- *Do 10 chair stands in a row on a chair low enough to cause fatigue in 10 repetitions*
- *Do wall sits (hold for 30-60 seconds), knees over heels*
- *Don't use your hands to get up from sitting*







SAFETY IN EXERCISE AND MOVEMENTS

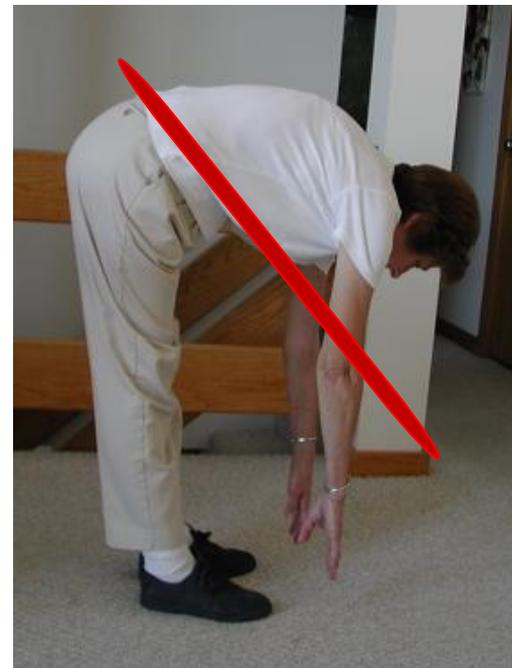
Safe Movement

- Some movements and exercises may be unsafe if you have low bone density or osteoporosis
- You should avoid:
 - spine flexion
 - full spine rotation
 - strenuous overhead lifts
 - activities that increase risk of a fall

Safe Movement

- Some examples of spine flexion are:
 - Curl sit-ups
 - Toe touches and bending to the floor

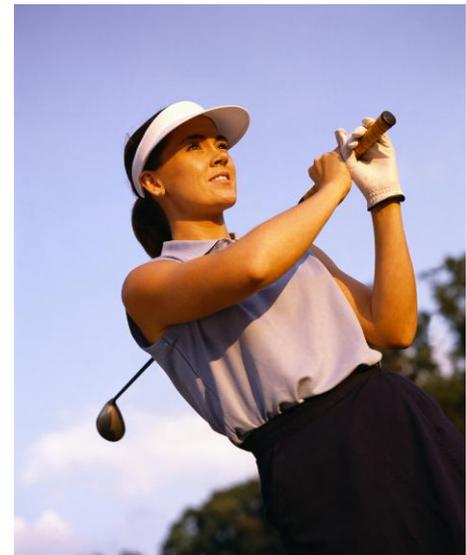
AVOID!



Safe Movement

- An example of full spine rotation is:
 - The **extreme** twist at the beginning and end of a golf swing if you have had fractures or are frail
 - Work with a professional to determine what is right for you

AVOID!



Safe Movement

- Some examples of strenuous overhead lifting are:
 - When lifting **heavy** weights
 - When lifting something heavy into a top cupboard/overhead in a plane
 - When lifting babies/children overhead
 - Work with a professional to determine what is right for you



Safe Movement

- Some examples of activities that increase risk of a fall are:
 - Downhill skiing
 - Walking on ice
 - Walking on wet floors
 - Rollerblading



Pilates and Yoga

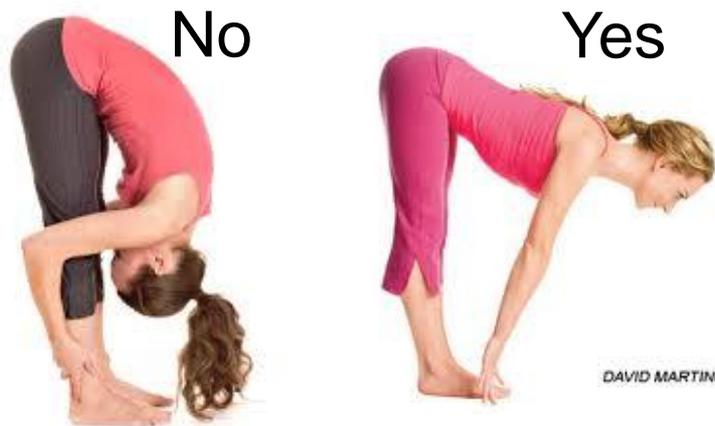
- Potential benefits
 - Improved posture/postural control
 - Balance of strength and flexibility
 - Improved joint mobility
 - Improved body awareness
 - Improved balance, control, and coordination



Yoga and Pilates

Precautions/Adaptations

- Some movements involve spine flexion
- In those with low bone mass or osteoporosis, movements should be modified to exclude spine flexion
- Some exercises involve full spine flexion so are contraindicated in some patients/clients



Not with low bone mass/osteoporosis

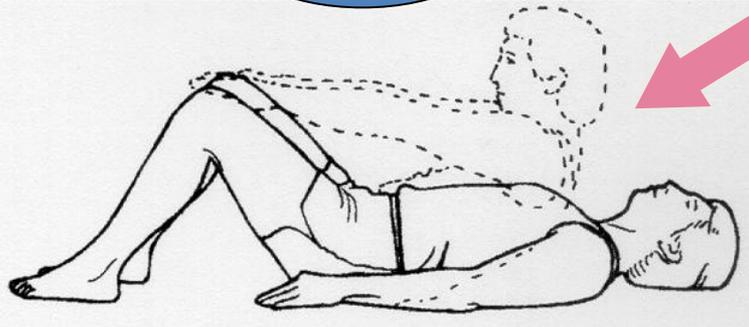


Lower the head

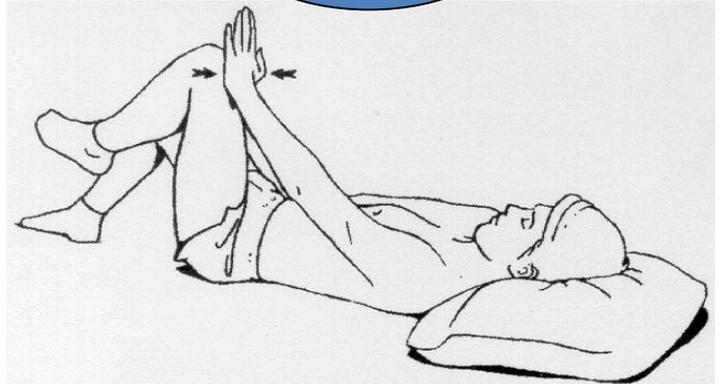
Safe Abdominal Strengthening

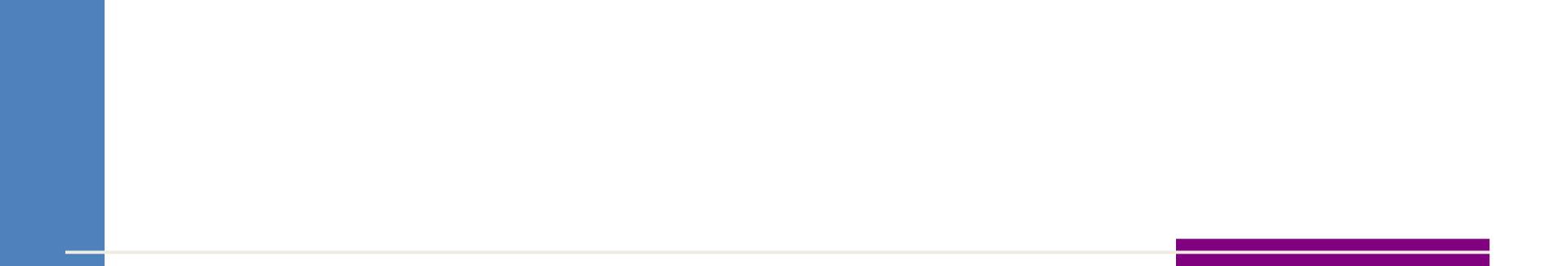
- *Abdominal crunches are not safe if you have low bone density*
- *Consider abdominal isometrics instead*

NO!



YES!





PUTTING IT ALL TOGETHER

The Exercise Prescription

- Weight-bearing exercises can be done for 30 minutes, most days of the week; focus on impact
- Muscle-strengthening exercises should be done 2-3 times per week, proper form
- Balance exercises, posture exercises and functional exercises can be done for a few minutes each day

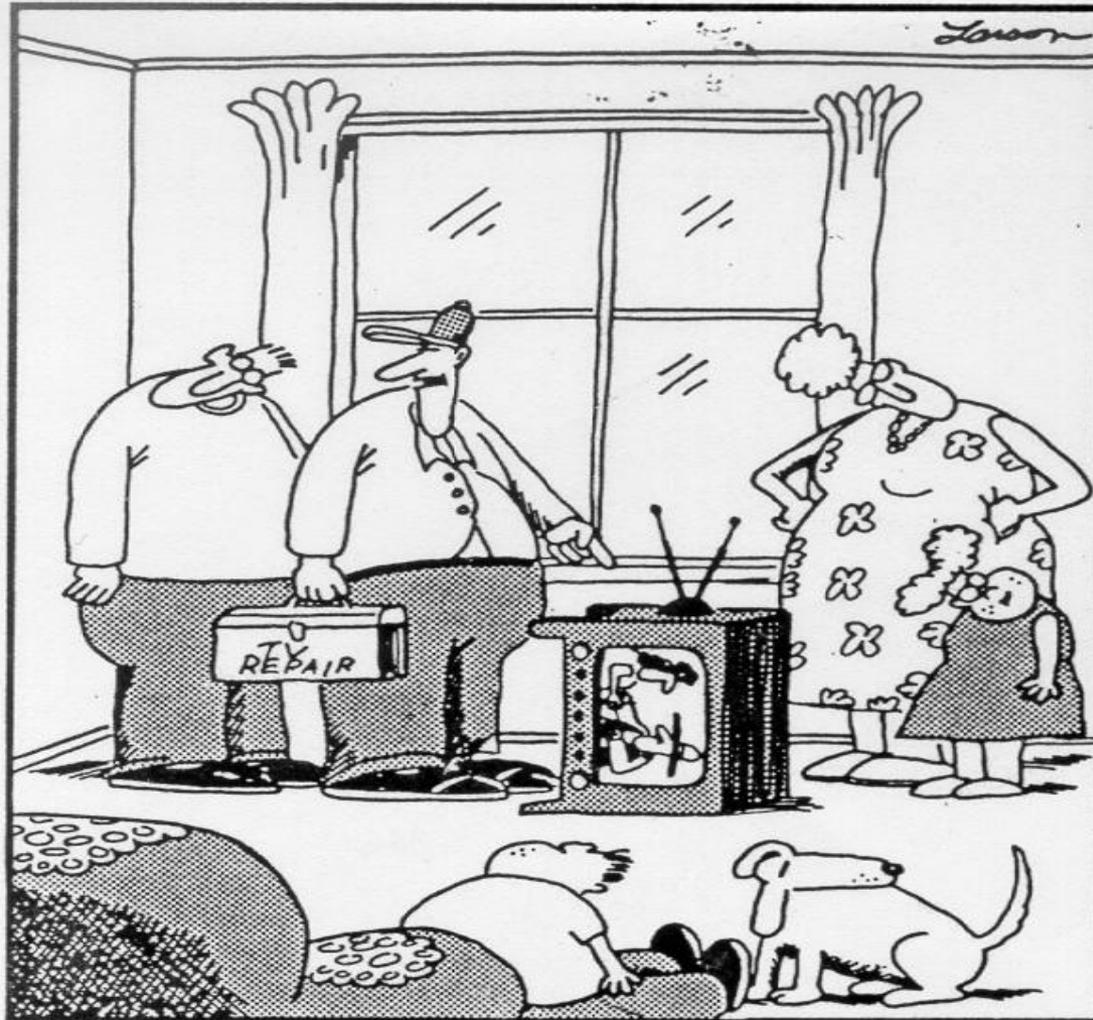
Fitting it In

- You may choose to do exercises that are most important to you
 - If you have balance problems, focus on balance exercises
 - If you have posture problems or poor body mechanics, practice improving those areas
 - If you struggle with daily activities, work on those

Working with a Healthcare Professional

- Consider working with your healthcare professional if:
 - You are not sure of the exercise program that is best for you
 - You have had a fracture
 - You have fallen recently
 - You have pain that prevents exercise

Getting a Professional to Take a Look



"Well, here's your problem, Mr. Schueler."



Thank You



Questions?