



TheraPilates® for the Frail Older Adult: --- Assessment

Sherri Betz, PT, DPT, GCS, CEEAA, PMA-CPT


www.therapilates.com

TheraPilates® for the Frail Older Adult

Assessment




with Sherri Betz, PT, GCS, CEEAA, PMA®-CPT

Adult?

TheraPilates® Physical Therapy



Growing Old Is Not For Sissies

Growing Old Is Not For Sissies


TheraPilates® Physical Therapy



What is a Frail Older Adult?



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What is a Frail Older Adult?

A person who is unable to get down to the floor and back up again without assistance.

Advanced age does NOT equal frailty!

It's all about FUNCTION!

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Sitting Rising Test



deBrito (2014)

Sitting Rising Test



Sitting Rising Test
deBrito (2014)

Joseph Pilates:
Performing Sit to Stand

Frailty: No Standard Definition

1. Decreased reserves/capacity to tolerate minor stressors
2. Increased vulnerability to adverse health outcomes
3. Impairment in multiple physiological systems

Kojima, G., et al. (2019)

The FRAIL Scale:

5 Yes/No Questions:

1. Fatigue
2. Resistance (inability to climb stairs)
3. Ambulation (inability to walk a certain distance)
4. Illnesses (>5 comorbidities)
5. Loss of weight (more than 5%)

Predicts mortality and incident ADL disabilities among community-dwelling older people in recent meta-analysis studies. (First validated in Western Australia 2010)

Kojima, G., et al. (2018)

The FRAIL Scale:

Fatigue: "How much of the time during the past 4 weeks did you feel tired?"
1 = All of the time, 2 = Most of the time, 3 = Some of the time, 4 = A little of the time, 5 = None of the time.

Resistance: "By yourself and not using aids, do you have any difficulty walking up 10 steps without resting?"
1 = Yes, 0 = No.

Ambulation: By yourself and not using aids, do you have any difficulty walking several hundred yards?"
1 = Yes, 0 = No.

The FRAIL Scale:

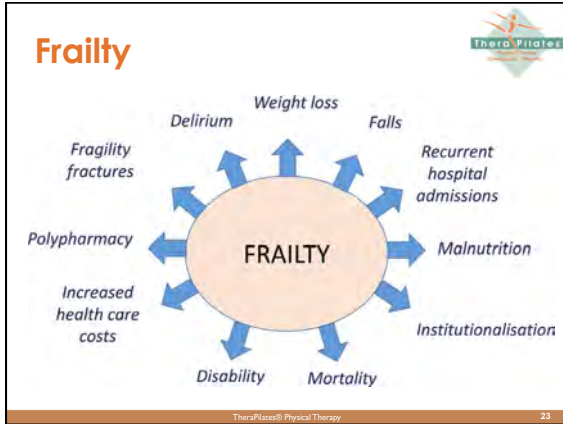
Illnesses: For 11 illnesses, participants are asked, "Did a doctor ever tell you that you have [hypertension, diabetes, cancer, chronic lung disease, heart attack, congestive heart failure, angina, asthma, arthritis, stroke, and kidney disease]?"
1 = Yes, 0 = No. The total illnesses (0-11) are recoded as 0-4 = 0 and 5-11 = 1.

Loss of weight: "How much do you weigh with your clothes on but without shoes? [current weight]"
"One year ago in (MO, YR), how much did you weigh without your shoes and with your clothes on? [weight 1 year ago]"

Fried's 5 Frailty Criteria

- 1) Weakness
- 2) Slowness
- 3) Exhaustion
- 4) Unintentional weight loss
- 5) Physical inactivity





Healthcare Costs of Frailty

An increasing frailty index score is associated with increased costs in all health care sectors as well as total costs.

Health care utilization was considered in the sectors of **inpatient treatment, outpatient treatment, pharmaceuticals, and nursing care.**

Mean total 3-month costs of frail participants:

€3659	Frail with 4 or 5 symptoms
€1616	Frail with 3 symptoms
€642	Nonfrail participants with no symptoms

An Aging Population

Between 2000 and 2050, the proportion of people aged 60 years or older in the world is projected to **double** from about 11% to 22%.

Adults over **age 60** will increase from 605 million to **2 billion!**

Older adults over **80 years** are expected to **quadruple** to 395 million during the same period.

More older adults than ever before on earth!

Pilates teachers are in the perfect position to motivate older adults to stay fit!

Did you know?

1 in 2 women....
1 in 4 men....
over age 50 have low bone density and is at risk for fracture

www.NOF.org

Create a special Intake Form with Risk Factor Assessment

Add questions about osteoporosis, fractures, height loss on your Studio Intake Forms

Osteoporosis or Fracture Risk Factors:

Member of a Non-Black Ethnic Group	Yes	No
Family Relative with Osteoporosis	Yes	No
Early Menopause (before age 40)	Yes	No
Start and Stop	Yes	No
Amniocentesis	Yes	No
Previous Radiation	Yes	No
Smoking (cigarettes)	Yes	No
Alcohol (more than 3 drinks per week)	Yes	No
Low Back Pain	Yes	No
Height Loss	Yes	No
Fractures	Yes	No
Balance Impairment	Yes	No
History of Falls	Yes	No

Fracture Risk Calculators

10 Year Absolute Fracture Risk Assessments:

FRAX® developed by John Kanis for WHO worldwide

<http://www.shef.ac.uk/FRAX/tool.aspx?country=31>
(Use =23 for New Zealand)

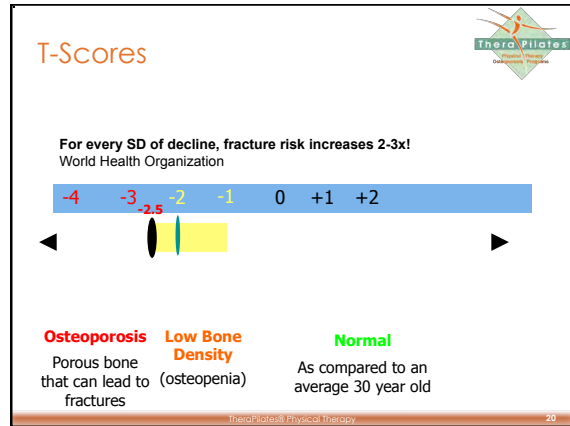
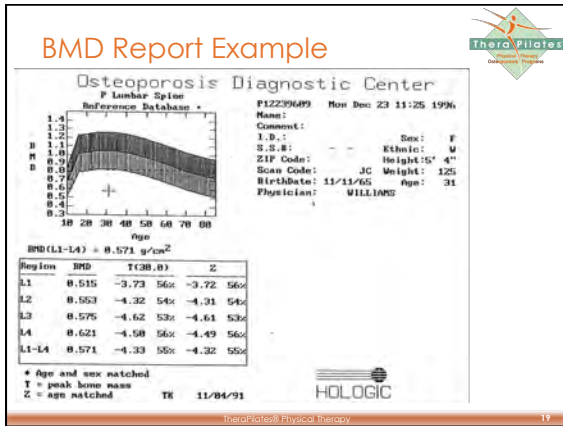
4 versions: Caucasian, Black, Asian, Hispanic

FRAX App \$5.99 US: <https://itunes.apple.com/us/app/frax/id847593214?mt=8>

Garvan Institute's Calculator also used in Australia:

<https://www.osteoporosis.org.au/health-professional-resources>

<https://www.garvan.org.au/promotions/bone-fracture-risk/calculator/>



- ### Red Flags
- Height loss of more than 1.5" (6cm or 2.4 inches strongly predictive of vertebral compression fracture)
 - Previous Fragility Fracture
 - Fall from Standing Height or Less that results in a fracture
 - Family History (70% contributing factor)
 - Presence of Kyphosis (greater than 7 cm occiput to wall distance OWD is strongly predictive of fracture)

- ### Assessment Top 10 Tests
- Sit to Stand
 - Hip Hinge/Spine Alignment?
 - Use of UE Assist?
 - Leg Alignment?
 - Balance?
 - Standing Height
 - Kyphosis/OWD
 - Rib to Pelvis Distance
 - 4 Stage Balance
 - Functional Reach/Overhead Reach
 - TUG: Timed Up & Go
 - Supine to/from Sit: Rollup? Logroll?
 - Prone Lying & Hip Extension
 - Pick Up Object from floor/Floor Rise
- Do not test spine mobility!**
- Occiput to Wall Distance
- Carleen Lindsey



Sit to Stand Ideal Alignment

Neutral Spine Alignment with Hip Hinge

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Measure Standing Height & OWD

Height Testing & Comparison (Stadiometer)
Occiput to Wall Distance

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Occiput-Wall Distance: OWD Test

Greater than 7 cm from the occiput to the wall (OWD) is strongly predictive of vertebral compression fracture (VCF).

Antonelli-Incalze R, et al. (2007) *Aging Clin Exp Res*. Jun;19(3):207-12 "Relationship between the occiput-wall distance and physical performance in the elderly: a cross sectional study."

Siminoski K, et al. 2001 Accuracy of physical examination for detection of thoracic vertebral fractures. *J Bone Miner Res* 16:S1;S274

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Hyperkyphosis Measurement

Radiographic Cobb Angle Flexible Ruler Occiput to Wall Distance

Kyphometer Block Method

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KI (Kyphotic Index): 13 or greater = Clinical Kyphosis

Carleen Lindsey

Order Instructional DVD online from www.geriaticsppt.org store

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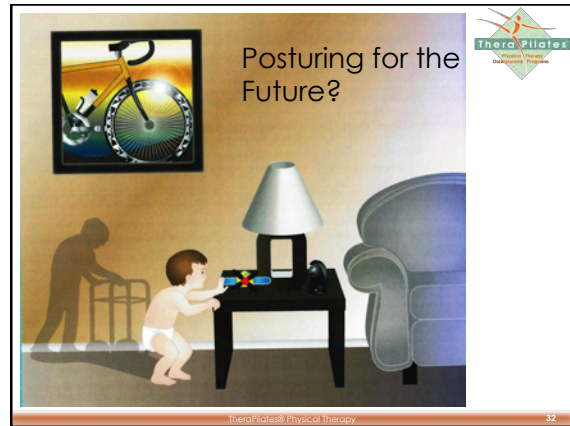
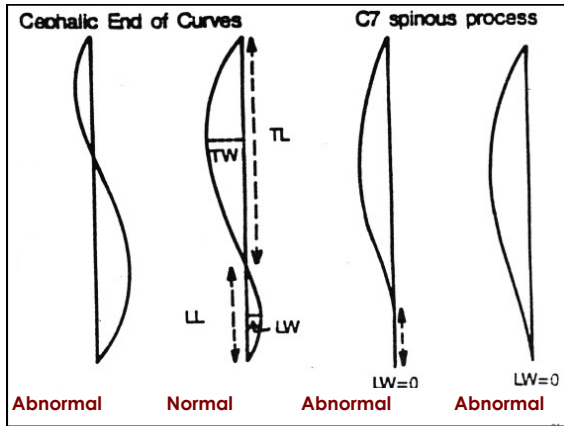
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Flexible Ruler Kyphosis Measurement-Lindsey

- Compute 100(TW/TL) (kyphotic index [KI]).
- TW: Thoracic Width
- TL: Thoracic Length
- LW: Lumbar Width
- LL: Lumbar Length

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Rib - Pelvis Distance and Height Loss Accuracy

Measure distance from 10th rib to pelvis at axillary line with fingers aligned vertically. If unequal bilaterally, record lowest score and note bilateral scores in comments. Less than 2 fingers is strongly predictive of current lumbar compression fracture.

- 4 = 4 Fingers
- 3 = 3 Fingers
- 2 = 2 Fingers
- 1 = 1 Finger

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 Siminoski K, et al. 2003 Accuracy of physical examination using the rib-pelvis distance for detection of lumbar vertebral fractures. *Am J Med* 115:233-236.
 Siminoski K, et al. 2005 Accuracy of height loss during prospective monitoring for detection of incidental vertebral fractures. *Osteoporos Int* 16:403-10.

4-Stage Balance Testing

1. Romberg Test (Stand with Feet Together)
2. Semi-Tandem Stance
3. Romberg Sharpened Test (Tandem)
3. Single Leg Stance Test (10 sec)

Instructions: "Stand with both ankle bones touching each other with your hands crossed and touching the opposite shoulders. Stand without shoes on, if possible. Stay in this position for 10 sec." (Eyes open or closed)

Criteria to stop the test: The test is stopped if the subject moves their feet on the floor or changes their arm starting position. The test is timed and could be rated for the amount of sway (Horak, 1987)

Fall Risk Assessment

Functional Reach Test:

- 6" or less maximal fall risk
- 6-8" moderate fall risk
- 8-10" mild fall risk
- 10" or greater – normal

Duncan, P. W., et al. (1990). "Functional reach: a new clinical measure of balance." *J Gerontol* 45(6): M192-197.

Fall Risk Assessment

Overhead Reach:

- Shoulder Mobility
- Kyphosis compensation
- Balance?

Fall Risk Assessment: TUG

Timed "Get up and go" test


Subject walks **10 feet**, turn around, walk back and sit down

- > 30 sec = Maximal Fall Risk
- 20-30 sec = Moderate Fall Risk
- 10-20 sec = Minimal fall risk

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Gait Speed

➤ Slow Gait Speed is the single best predictor of functional decline and disability in many different populations!



1.0 m/s (2.2 miles/hour) is the benchmark

http://www.youtube.com/watch?v=cAQiu9i_Wpw

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Gait Speed

Walking speed and **Leg Strength** are the top predictors of nursing home placement!
Guralnick 1994, Gill 1995, Studenski 2003, Guralnick 2000

1.4 m/s (3.13mph) is the usual setting for crosswalks



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Gait Speed

➤ Slower walkers tend to fall backwards with no protection from the UE's resulting in hip fractures

➤ Faster walkers tend to fall forward onto outstretched arms resulting in Colle's fractures of the wrists

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Pick Up Object from Floor

- Observe lifting mechanics




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Supine to Sit

Does the patient:

- Rollup?
- Logroll?



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Prone Lying & Hip Extension

- Can client lie comfortably in prone on pillow? They will need pillows to protect their lower ribs.
- Can they perform hip extension/thigh lift?



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Chapter 3: Discussion of Assessment

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Discussion of Assessment

Discuss findings with Client in positive language:

- BMD Report
- Fracture Risk Assessment
- "Basic" Nutrition (Protein, Ca+, Mg most important)
- Physical findings and highlight most important considerations
- Discuss Fracture Prevention
- Discuss Intervention: PT, Pilates Private, Small Group, Large Group

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Nutrition Position Statement

"Calcium and bone health: position statement for the Australian and New Zealand Bone and Mineral Society, Osteoporosis Australia and the Endocrine Society of Australia"

<https://www.mja.com.au/journal/2009/190/6/calcium-and-bone-health-position-statement-australian-and-new-zealand-bone-and>

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Tiers of Care

- Physical Therapy
- Pilates Private
- Small Group
- Large Group

Care moves from highest skill at highest cost to lowest skill or teacher student ratio (1:1 or 10:1) at lowest cost.

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Chapter 4: Client Education on Fracture Prevention

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Fracture Prevention Brochure

**DO IT RIGHT!
AND PREVENT FRACTURES!**
The Bone-Healthy Way of Life and Exercise

Fracture Prevention Brochure developed as a partnership with American Bone Health and the APTA Geriatric Section's Bone Health Special Interest Group

Download at www.therapilates.com or call American Bone Health for printed brochures

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**DO IT RIGHT!
AND PREVENT FRACTURES!**
The Bone-Healthy Way of Life and Exercise

Everyday Activities

Exercising

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General Lifting

Stand with your feet a little wider than your hips, keep knees in line with your middle toes as you squat to lift an object. Hinge at the hips, keep the chest lifted, shoulder blades back and down and bring the object as close as possible to you.

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Unpacking Groceries

Keep spine lengthened and straight, chest lifted and knees bent. Allow the knees to rest gently against the bumper to brace your body. Hinge at the hips instead of rounding the back to reach into the trunk. Lift one bag at a time, keeping shoulders back and be sure to watch where you are going to carry the groceries into the house.

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Brushing Teeth

Keep spine lengthened and straight, chest lifted and knees bent. Hinge at the hips instead of rounding the back to bend towards the sink.

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The Dishwasher

Stand to the side of the dishwasher with knees and chest aiming in the same direction to avoid twisting the spine. Keep chest lifted, shoulder blades back and down, and knees bent.

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The Oven

Keep spine lengthened and straight, chest lifted and knees bent. Hinge at the hips instead of rounding the back to reach into the oven. Use oven mitts for better control of a heavy dish. Drag the dish or pan close to the edge. "Setting" the shoulder blades down and back, draw the object out of the oven.

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Washing the Dishes

Open the door of the cabinet under your sink and place your foot on the edge of the cabinet floor. Lean against the sink keeping your spine straight to avoid rounding your back over the dishes.

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Making the Bed

Keep chest lifted, tailbone lifted and brace knees against bed.

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Gardening

Use a pad or sit on a small stool to garden. Hinge at the hips, keeping the chest lifted and the spine straight to reach the ground. When standing, avoid locking the knees and also avoid bending forward at the waist rounding your back to work in your garden.

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Driving

When checking behind, reach right hand behind passenger headrest to trace yourself and keep chest lifted as you rotate.

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Exercising

Considerations for Exercise.

Many exercises involve movements that could cause fractures to the spine or hip. Avoid or modify exercises that involve rounding the spine such as:

• Crunches	• Yoga: + Spine twists	• Pilates: + Rollups
• Curl ups	• Forward folds	• Rollbacks
• Oblique abdominals	• Ploughs	• Short spine
• Touching toes (seated or standing)	• Shoulder stands	

AVOID ROUNDING and TWISTING your SPINE.

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Core Strengthening

Avoid all forms of crunches. Instead, practice core control by drawing in abdominals as you bring one leg at a time to a 90° angle and press lower back down. Alternate touching toes to the floor.



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Spinal Twisting

Avoid seated or supine extreme spinal twists. Gently rotate the pelvis and legs keeping shoulder blades on the floor.



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Spinal Stretching

Avoid yoga Forward Fold and Pilates Spine Stretch. Instead do seated chest stretch supported by arms.



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Postural Strengthening

Avoid yoga Cat Stretch and all rounded back stretches. Instead practice "table" opposite arm and leg raises to strengthen upper back and hips.



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Spine Strengthening

Avoid yoga Plough, Shoulder Stand, Pilates Baller and Jackknife. Instead do yoga Cobra, Pilates Swan or Pilates Modified Double Leg Kick.



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Abdominal Strengthening

Avoid Pilates Rollup and Hundred. Instead do Pilates Single Leg Kick with lower abdominals supporting the back.



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Fracture Prevention

- Last but not least, sit up tall and straight when having a bowel movement. This will minimize risk of vertebral fractures!!



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Footwear: What kind is best?

- * Barefeet or Stocking Feet is associated with highest fall risk.
- * Athletic Shoes are associated with lowest fall risk.
- * Train clients in Barefeet unless they have peripheral neuropathy!

Koepsell TD et al. Footwear Style and Risk of Falls in Older Adults. *J American Geriatrics Society* (2004) 52:1495-1501.

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Chapter 5: Exercise Concepts

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Triage: Fit or Frail Class?

- Older Adults need **low-cost, long-term** group exercise programs targeted to their level of **Fitness and Function**
- Triage of Older Adults into the **Fit or Frail** categories can be simplified by asking, "Can you get down to and up from the floor without assistance?"
- The frail older adult will need chairs, props and balance poles for their exercises
- (But please don't call the frail older adult "frail!")

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Pilates for Bone Building Class



Pilates for Bone Building at Capitola Recreation Center

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Pilates for Bones & Balance




Pilates-based Exercise for Frail Older Adults at Capitola Recreation Center

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Exercise Intervention: General Concepts

- Teach Fracture Prevention FIRST!
 - Protect the vertebral bodies by avoiding flexion, endrange rotation/sidebending
 - Protect the ribcage with pillows
 - Avoid planted foot twists and forced rotation through the neck of the femur



Used with permission from Pilates Method Alliance




Pigeon Pose

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Exercise Intervention: General Concepts

- Teach Hip Hinge and Spine Alignment
- Respect Painful Joints or Regions
- Teach Standing Posture & Balance
- Improve Overall Body Awareness



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Pilates for Frail Older Adults

The exercises should be focused on:

- Balance
- Leg Strength
- Hip Extension
- Thoracic Extension

**As few seated exercises as possible!*



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Exercise Guidelines:

Safety First!



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Bone Safe Exercise Priorities

- Protect from fracture!
- Practice optimal spine posture
- Learn to get down to quadruped and up from floor in optimal spine posture
- Hinge at the hip when bending
- Avoid flexion, end range side bending and rotation
- Incorporate skills into your lifestyle
- Practice single leg balance everyday
- Breathe with good rib movement

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Pilates-The Good...

So you want to do PILATES for your BONES?

RECOMMENDED MATWORK:



SPINAL EXTENSION

For more information contact: TheraPilates® Physical Therapy
www.TheraPilates.com 877-479-2100

TheraPilates® Physical Therapy

Suggested Matwork:

- Single Leg Kick
- Push Up
- Side Lift
- Leg Pull
- Shoulder Bridge
- Double Leg Kick
- Swan
- Swimming

Pilates-The Not So Good...

So you want to do Pilates?
and you have Osteoporosis...

AVOID:

- Rounded Spine Abdominal Work
Handstands, Rollups, Rollups, Catcrows, Teaser, Single/Double Leg Stretches, Neck Pull, Open Leg Kickler
- Loaded Spine Flexion
Spine Stretches, Jack-Knife, Scissors, Bicycle, Boomerang, Sank, Crabs, Control Balance
- Deep Twists
Spine Twist, Corkswear, Saw, Crab Cross
- Pressures on the Ribcage
Rocking, Swan 2/3

For more information contact:
Sherri Betz, PT, GCS, PMA®-CPT
General Physical Therapy
182 Thomas Road #109
Pittsburgh, PA 15206-4770

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NOF Website

NOF/Pilates Anytime ADL Demonstrations:

TheraPilates® Physical Therapy

Fracture Prevention Tutorials

developed as a partnership with NOF and Pilates Anytime

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Recommendations

- Make safe movement choices throughout your daily activities
- Talk to your instructors to ensure they have the skills to address your personal wellness
- Seek out a Bone Safe Exercise class!

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Classes are Fun!

Practice Single Leg Standing Balance with Friends!

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Part II:

TheraPilates for the Frail Older Adult: Mat Class for Balance and Fall Prevention

Today at 1:30 – 3:30

TheraPilates® Physical Therapy



Pilates for Bones & Balance

Pilates-based Exercise for Frail Older Adults at Capitola Recreation Center

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Bone Building for Seniors

Sessions held on Mondays

Glenwood Regional Medical Center

Classes start Monday April 9th!

Introduction to Pilates for Bone Building 10:00am
Learns principles, proper posture, principles of alignment, core control and breathing for injury rehabilitation and bone building exercises.

Pilates for Bone Building 6:00pm
Level 2 Intermediate program for those who can get to the floor for exercise. We do standing balance, leg and back strengthening and Pilates-based core exercises for a bone building workout.

Glenwood Medical Mall
102 Thomas Rd, Suite 501
West Monroe

Outpatient Therapy Sports Gym, Suite 503 (Entrance #5)

Instructor:
Sherri Betz, PT, DPT, GCS, PMA-CPT

Cost:
\$30 for 6 week series

To enroll and pay, go to glenwoodregional.org or call 318-329-4770.

with Sherri Betz, PT, DPT, GCS, PMA®-CPT



Pilates Exercise Resources

The Osteoporosis Exercise Book
BUILDING BETTER BONES
2nd Edition
• Stop Bone Loss
• Prevent Fractures
• Build Bone
by Sherri R. Betz, PT
Foreword by Steven C. Lindsay, MD

Pilates for Seniors
The Osteoporosis Workout


TheraPilates® Reformer for Osteoporosis

Pilates Exercises for Osteoporosis
Building Better Bones

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RESOURCES



International Osteoporosis Foundation


- For more information and continued updates on research and developments for the treatment and prevention of osteoporosis go to the internet:
- To search for the Osteoporosis Societies in ANY country go to:
www.osteofound.org



Osteoporosis Australia

Osteoporosis Australia aims to improve awareness about the disease in the Australian community and reduce bone fractures.

<https://www.osteoporosis.org.au/>




ONERO Academy

An Evidence-based exercise program developed by Professor Belinda Beck, based on findings from the LIFTMOR Trials at Griffith University.

<https://onero.academy/osteoporosis-exercises/>

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ESSA Position Statement

- Beck, B. R., et al. (2016). "Exercise and Sports Science Australia (ESSA) position statement on exercise prescription for the prevention and management of osteoporosis." *J Sci Med Sport*.

<https://onero.academy/wp-content/uploads/2019/02/Essa-Positional-Statement.pdf>

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Australia & New Zealand Bone & Mineral Society

ANZBMS is a professional medical / scientific society established in 1988 to bring together clinical and experimental scientists and physicians actively involved in the study of bone and mineral metabolism in Australia and New Zealand.

<https://www.anzbms.org.au/>

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Australian Physiotherapy Association



(APA) is the peak body representing the interests of Australian physiotherapists and their patients.

<https://australian.physio/>

Special webpage devoted to consumer education about osteoporosis

<https://choose.physio/your-condition/osteoporosis>

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National Osteoporosis Foundation (USA)


For more information and continued updates on research and developments for the treatment and prevention of osteoporosis go to the internet:

www.nof.org
1-202-231-4222

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FORE: Foundation for Osteoporosis Research & Education (USA)



FORE has a public outreach program called American Bone Health.

American Bone Health was developed as a community outreach and awareness program

www.americanbonehealth.org  AMERICAN BONE HEALTH

www.FORE.org
888-266-3015

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**American Bone Health
Speaker's Bureau! (USA)**






**AMERICAN
BONE HEALTH**


Become an American Bone Health Peer Educator. Contact Kathleen Cody, Executive Director, or Shelley Powers if you are interested in the training program to become a speaker.
888-266-3015
kathleen@americanbonehealth.org

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Pilates Method Alliance



- The Pilates community at large has joined together in an effort to identify and preserve the comprehensive work of Joseph and Clara Pilates.
- The PMA believes that Pilates should evolve along with the advances in movement research and modern science.
- The PMA developed a 3rd party accredited certification program in 2005 to establish national entry-level standards in an effort to protect the public and ensure quality of instruction.



www.pilatesmethodalliance.org


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**American Physical
Therapy Association**


The Bone Health Special Interest Group is a group of "boneheads" with a passion for bone health!

Join us at: www.geriaticspt.org
or email sherri@therapilates.com




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**Academy of Geriatric
Physical Therapy**





Clinical Practice Guidelines for the Management of Osteoporosis

Under the direction of Greg Hartley and Keith Avin, Bone Health SIG members, Sherri Betz and Carleen Lindsey are participating in the CPG Workgroup to publish a Clinical Guidance Statement with a special focus on exercise and manual therapy intervention recommendations.



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**The Fountain
of Youth!**

"Hip Extension,
Thoracic Spine
Extension
Leg Strength,
&
Balance!"

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TheraPilates® Physical Therapy 101

Thank you!




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Glenwood Medical Center Physical Therapy, West Monroe, LA

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