

# Pilates Exercises for Individuals with Osteoporosis

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# Content of Program

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- ▶ Quick stats on Osteoporosis
- ▶ Why exercise is important
- ▶ Learn Pilates Principles
- ▶ Learn and practice Pilates exercises
- ▶ Learn how to make Pilates safe with necessary modifications to avoid positions that are known to cause fractures

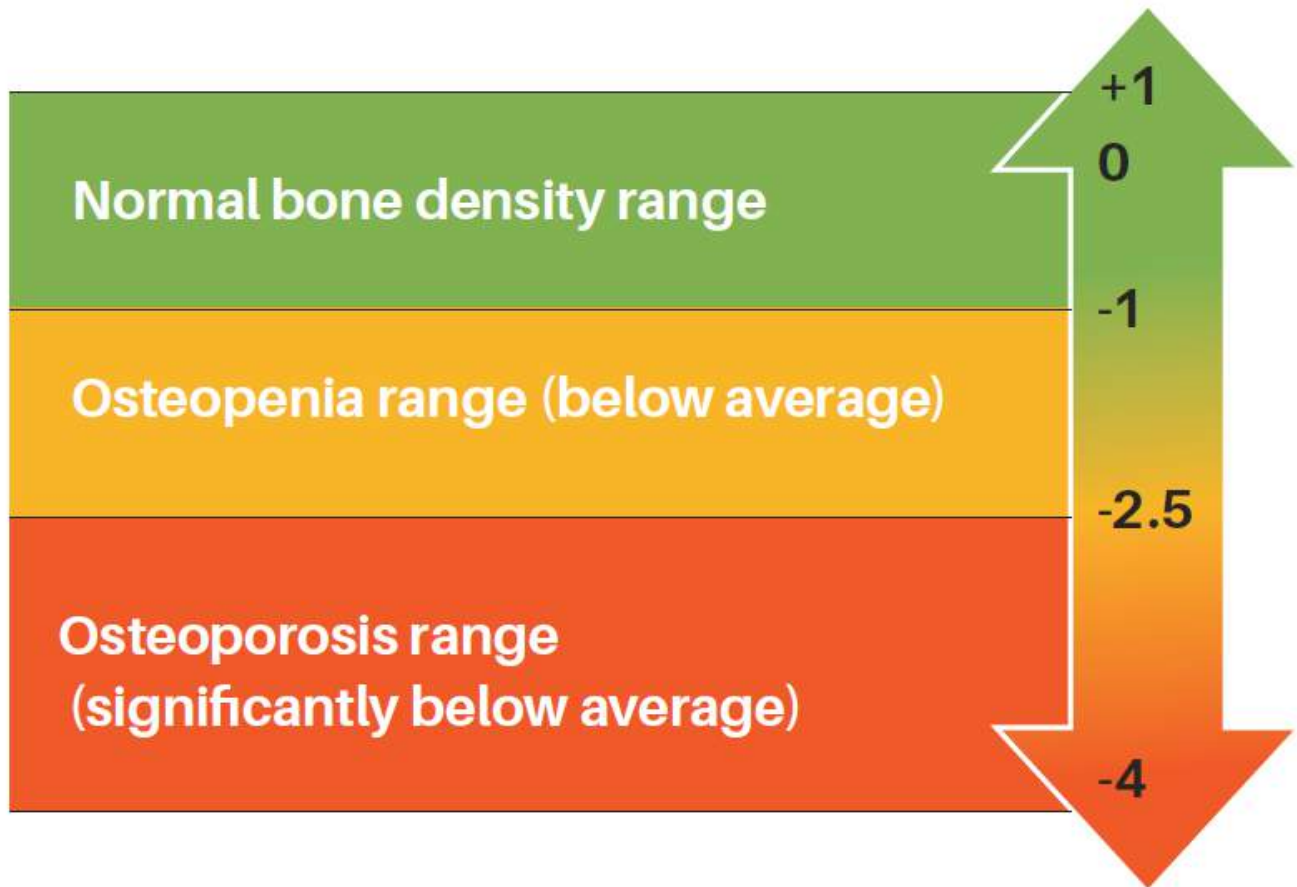


# Fast Facts

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- ▶ Osteoporotic bone is more likely to fracture than healthy bone
- ▶ 1 in 2 women and 1 in 4 men over age 50 will break a bone due to Osteoporosis
- ▶ Osteoporosis is diagnosed with a DEXA (dual energy x-ray absorptiometry)
  - ▶ T score -1.0 or above is normal bone density
  - ▶ T-score between -1.0 and -2.5 means you have low bone density or osteopenia
  - ▶ T-score of -2.5 or below is a diagnosis of osteoporosis
    - ▶ The lower the T score the lower the bone density





# National Osteoporosis Recommends Bone Density testing if...

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- ▶ you are a woman age 65 or older
- ▶ you are a man age 70 or older
- ▶ you break a bone after age 50
- ▶ you are a woman of menopausal age with risk factors
- ▶ you are a postmenopausal woman under age 65 with risk factors
- ▶ you are a man age 50-69 with risk factors

A bone density test may also be necessary if you have any of the following:

- ▶ an X-ray of your spine showing a break or bone loss in your spine
- ▶ back pain with a possible break in your spine
- ▶ height loss of ½ inch or more within one year
- ▶ total height loss of 1½ inches from your original height

# Its never too late to strengthen your bones!

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## ▶ Goals of exercise

- ▶ Safely strengthen the muscles in your arms, legs and core
- ▶ Stretch muscles as needed to improve/maintain good posture
- ▶ Weight bearing exercise can strengthen the bone
  - ▶ Putting pressure through the bone can increase bone strength



# Things to focus on to help keep our bodies moving...

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- ▶ Balance
- ▶ Leg strength
- ▶ Hip extension
- ▶ Thoracic extension



# Pilates

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- Pilates is a Method of precise exercise and physical movement coupled with breathing patterns designed to stretch, strengthen and balance the body ([www.pilatesmethodalliance.org](http://www.pilatesmethodalliance.org))

## Developed by Joseph Pilates

- A lot of the exercises focus on the core postural muscles
  - Keeps the body balanced
  - With some **modifications** Pilates exercises can be safely done by those with osteoporosis
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# Benefits of Pilates

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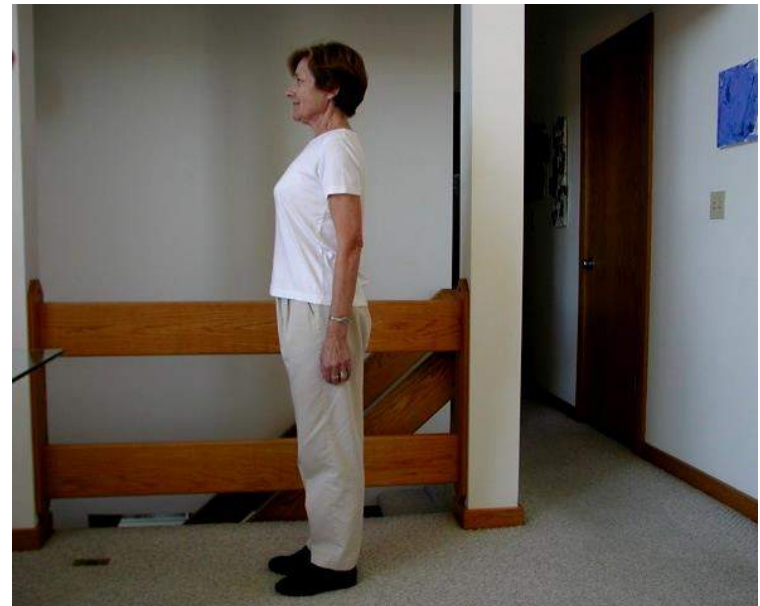
- ▶ **Postural awareness** and **Alignment** may help to prevent spinal fractures
- ▶ Pilates exercises in standing are **weight bearing**, using body weight for resistance can strengthen bones of the hip
- ▶ Pilates exercises on your stomach position strengthen the **back extensor muscles** targeting the spinal vertebrae  
*(Sinaki 1984, 1986, 2002, 2009, Briggs 2004)*
- ▶ **Balance** exercises may prevent falls
- ▶ Exercise decreases **stress hormones** that typically increase bone loss
- ▶ Exercise in **bare feet** stimulates proprioceptors to give better sensory feedback to our brain for balance reactions

*(Koepsell TD et al 2004, Sinaki 1984, 1986, 2002, 2009)*

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# Improves Posture



# Weight bearing activity

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# Exercise modifications **are needed** when doing Pilates if you have Osteoporosis

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- ▶ Exercising is safe if done properly
- ▶ Pilates exercises typically involve a lot of flexion (bending forward) which can cause compression fracture but the exercises can be modified to avoid this
- ▶ For example roll downs, teaser, curl ups (full list of exercises to avoid are at the end of this presentation)

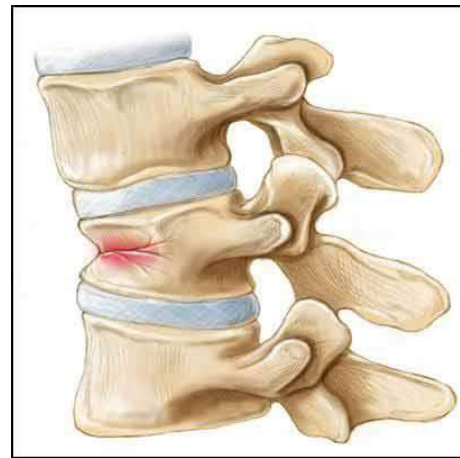


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- ▶ **Avoid excessive spine flexion**

- ▶ Flexion is the action of bending forward or being bent

- (<https://www.google.com/#q=flexion&spf=1496234869050>)



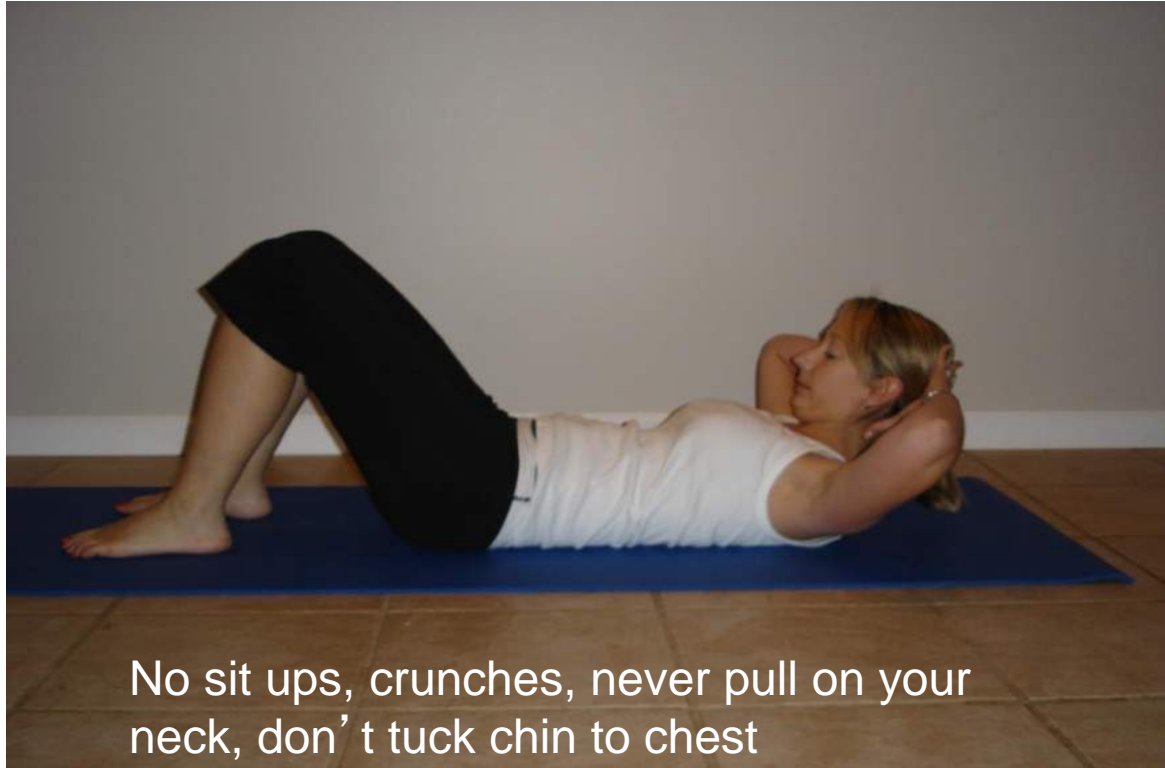
- ▶ Forceful flexion may cause compression fracture because of the forces through the vertebrae



# Avoid Flexion during exercise- bending forward through the spine

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No sit ups, crunches, never pull on your neck, don't tuck chin to chest



# Precaution Continued

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- ▶ Avoid excessive rotation of the spine
  - ▶ Do not perform a full twist in the upright position
  - ▶ Do not force rotation into pain
  - ▶ May be okay in lying if NO pain occurs



This is ok if not painful, do not force the movement



This is not safe if you have low bone density  
([www.pilatesanytime.com](http://www.pilatesanytime.com))

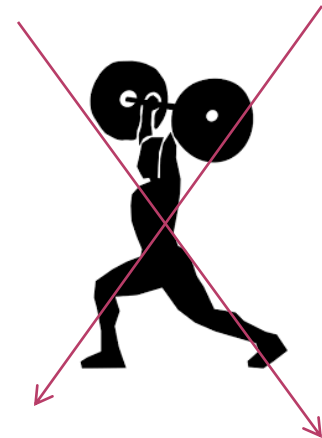




# Precautions Continued

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- ▶ Avoid heavy lifting overhead
  - ▶ Can cause excessive compression through the spine
- ▶ Avoid jarring through the spine or buttock
- ▶ Be cautious with exercises that challenge your balance
  - ▶ Use external support as necessary
    - ▶ For example touch wall, back of chair



# Does This Look Safe?

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# Hopefully you all said NO!

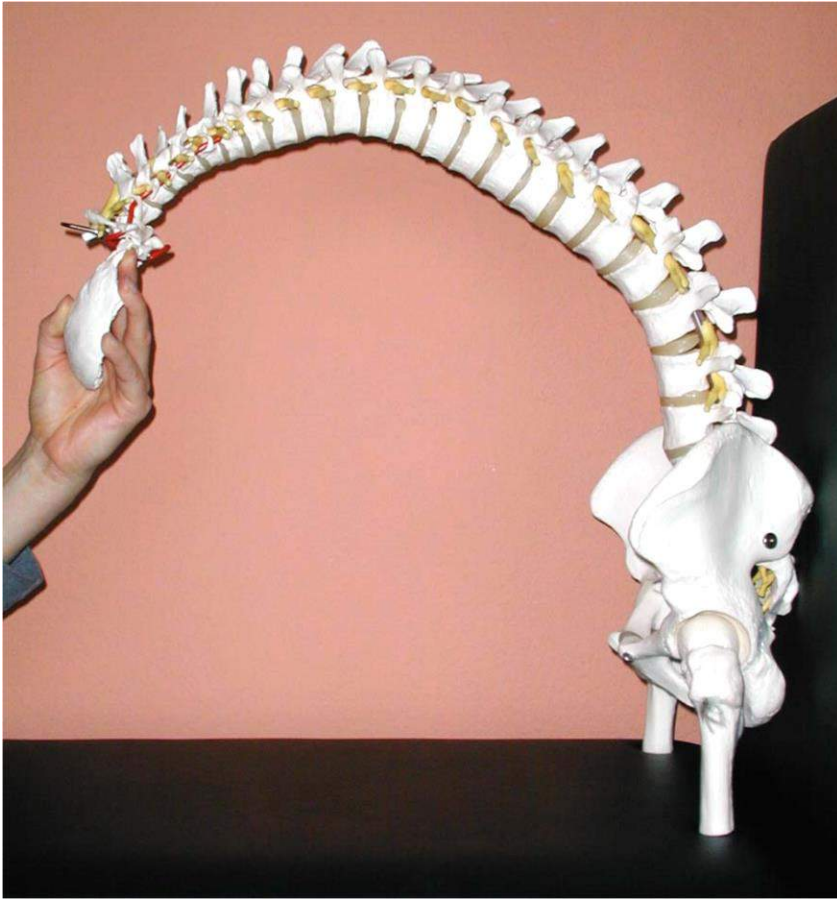
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- ▶ Toe touches with straight legs can cause undue stress on the spine
- ▶ With decreased bone density this can result in a fracture of the spine
- ▶ Most fractures associated with osteoporosis occur in the spine and hip, but any bone can be affected
  - ▶ Spine, hip and wrist are the most common bones broken



# Most fragile position for the spine

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# Stott Pilates 5 Basic Principles

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- ▶ Breathing
- ▶ Head and cervical spine position
- ▶ Scapular placement
- ▶ Pelvic placement
- ▶ Rib cage placement



# Importance of Breath

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- ▶ Pilates uses breath to coordinate the deep abdominals and obtain good recruitment of the muscles
- ▶ Instructions for each exercise include how to breathe
- ▶ Lets practice this now because it is so important!



# Breathing in Sitting

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Start in your normal seated position.

Elongate spine and lift the sternum and hold.

This will correct posture, decrease stresses on the spine



# Breathing

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- ▶ In through nose, out thru mouth with pursed lips
- ▶ Emphasize 3D breath into lower, posterior lobes of the lungs
- ▶ Deep breathing promotes engagement of the transverse abdominis
- ▶ Ribs open up and out during inhalation, close in and down during exhalation

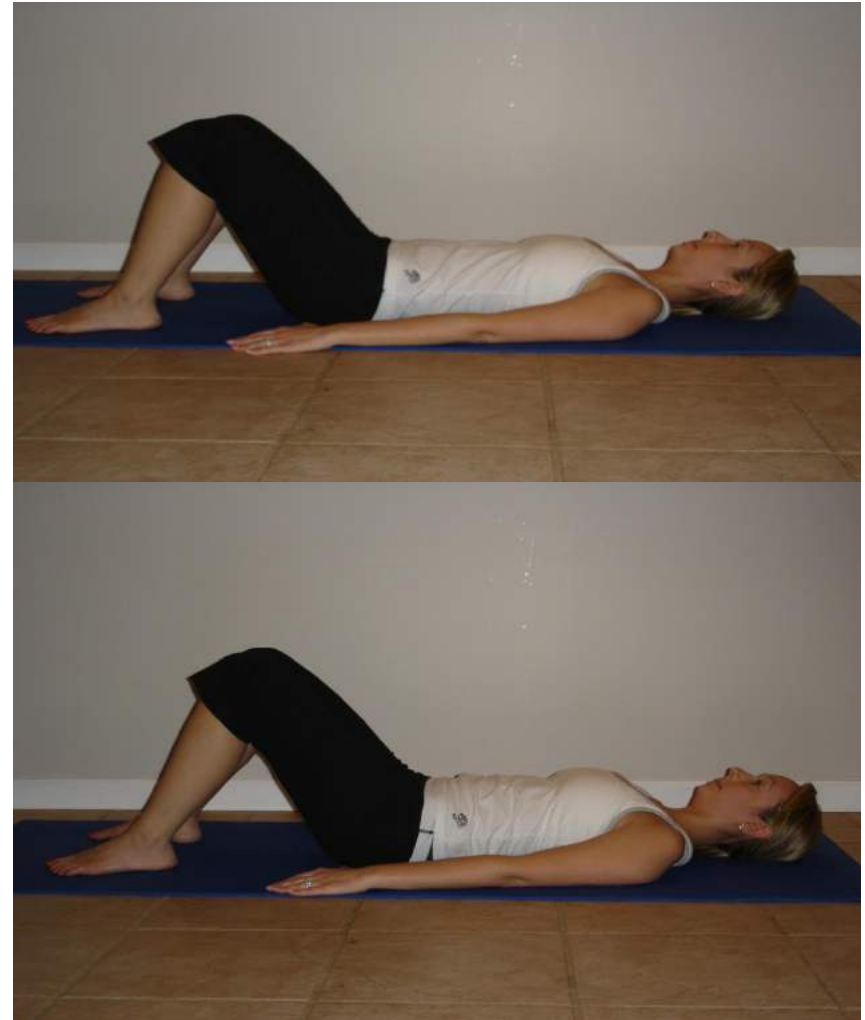




# Head and Cervical Placement

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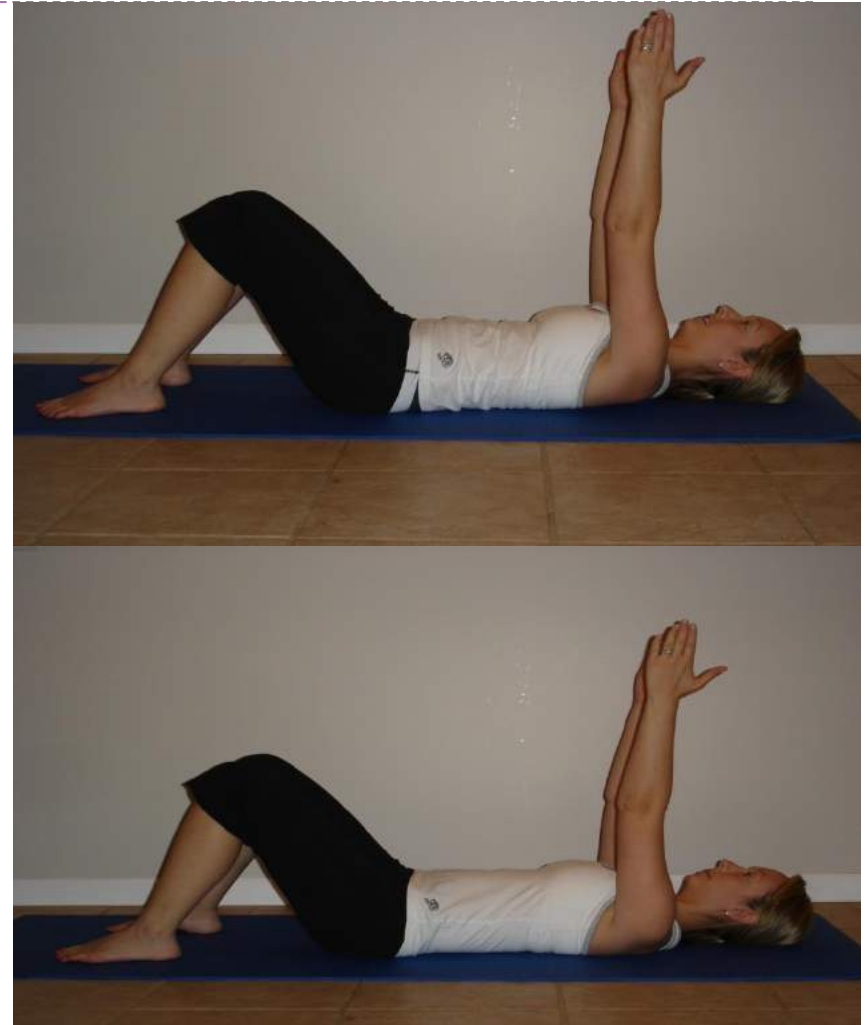
- Always maintain natural curve of neck
- During exercise allow neck to follow the rest of the spine
- When flexing neck only a head nod should be performed
  - Move the head on the first two vertebrae (tuck chin)
  - This will dynamically stabilize neck and protect it
  - **May require pillow under your head to keep head in line with spine**



# Pelvic Placement

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- In neutral, natural lumbar lordotic curve is present
    - Absorbs shock well
    - Promotes efficient movement patterns
    - Used when feet are planted
  - Imprint is a slight posterior pelvic tilt with lumbar flexion
    - Used to gain stability
- 
- ▶ – Used when legs are up



# Rib cage placement

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Abdominal muscles attach to the lower ribs. A good contraction of the deep abdominals will keep the ribs from lifting up or “popping”. Think of maintaining a sense of weight in your ribs during the exercises.



# Scapular Movement and Stabilization

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- ▶ During exercise maintaining scapular stability is important to maintain balance in the area
  - ▶ Impaired scapular stability will cause muscles in the neck and back to work too much
- ▶ Scapula can move...
  - ▶ Up and down
  - ▶ Forward and back
- ▶ Lets practice



# Warmup

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- ▶ Breathing
- ▶ Imprint and release
- ▶ Hip release
- ▶ Hip rolls
- ▶ Scapula isolation
- ▶ Arm circles
- ▶ Head nods
  
- ▶ Turn the principles into a warm up to get the body ready for more difficult movements



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# The Exercises

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# Modified Hundred

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- ▶ Head will remain on the mat- no flexion
- ▶ Legs can be in table top or feet can be on the floor
- ▶ If feet flat on floor position low back in neutral, if feet are up imprint- engage abdominals with both
- ▶ Inhale and pulse arms for a 5 count then exhale for a 5 count
- ▶ Repeat until you reach 100 beats



To make the hundred more difficult try...

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# Modified Single Leg Stretch

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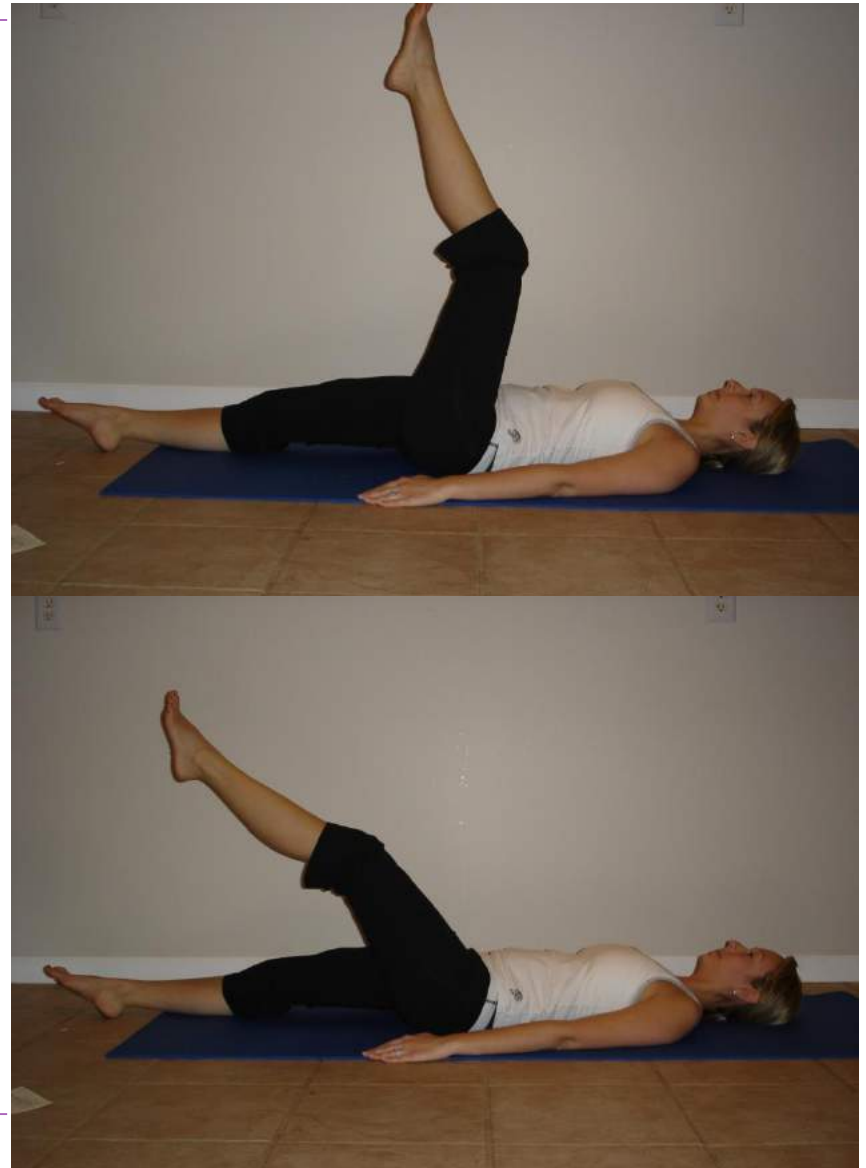
- ▶ Start with head down, legs in table top, hands resting on outside of knees
- ▶ Exhale, extend one leg out to diagonal moving outside hand to ankle, inside hand to knee of bent leg
- ▶ Inhale, begin to switch legs
- ▶ Exhale, extend the other leg
- ▶ Repeat for 8-10 repetitions



# One Leg Circle

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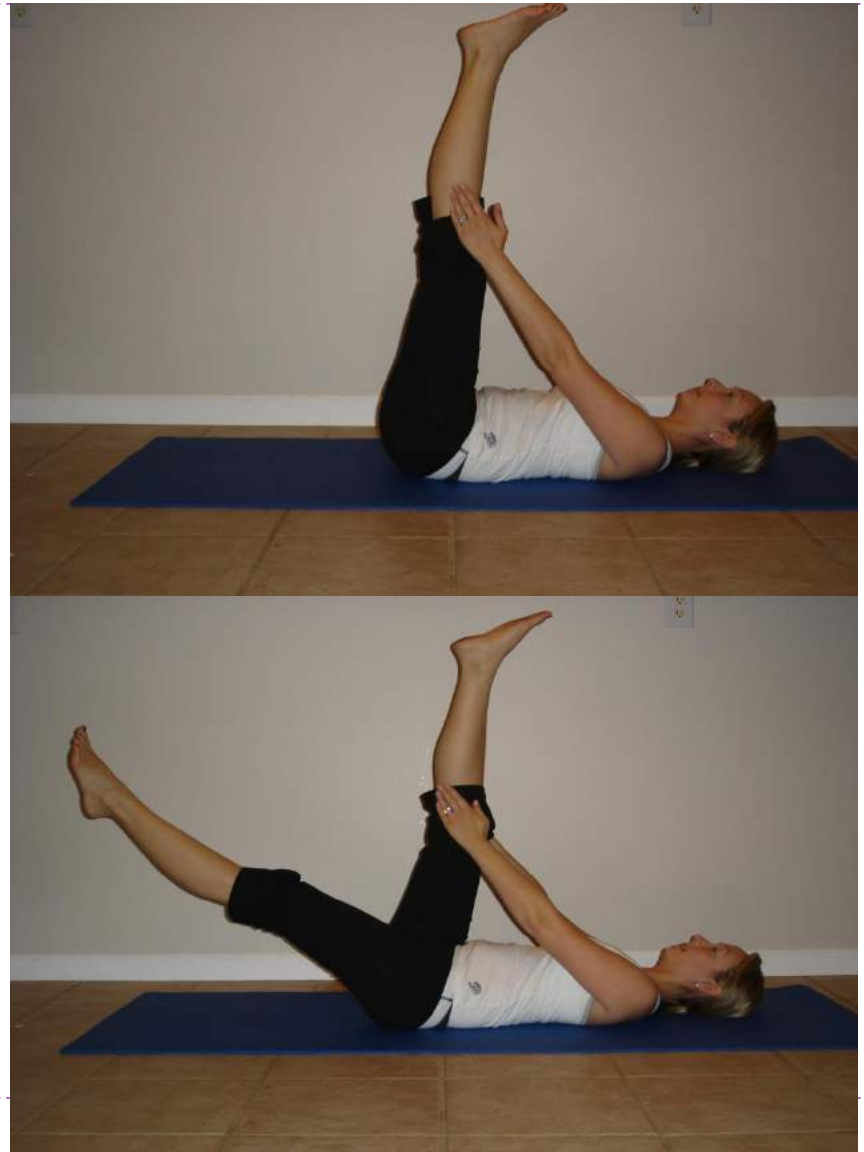
- ▶ Neutral spine, one leg long and the other reaching toward the ceiling
- ▶ Move leg in circular motion, moving across body then away
- ▶ Move leg only as much as you can keep pelvis still
- ▶ Inhale first part of circle, exhale to finish
- ▶ Circle 5 times each direction, perform with both legs



# Modified Scissors

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- ▶ Start with head down, both legs extended toward ceiling
- ▶ Exhale, reach one leg down toward floor and draw the other closer to the body for 2 counts
- ▶ Inhale, start to switch legs
- ▶ Exhale and repeat with other leg reaching toward the floor
- ▶ 8-10 repetitions



# Slow double leg stretch

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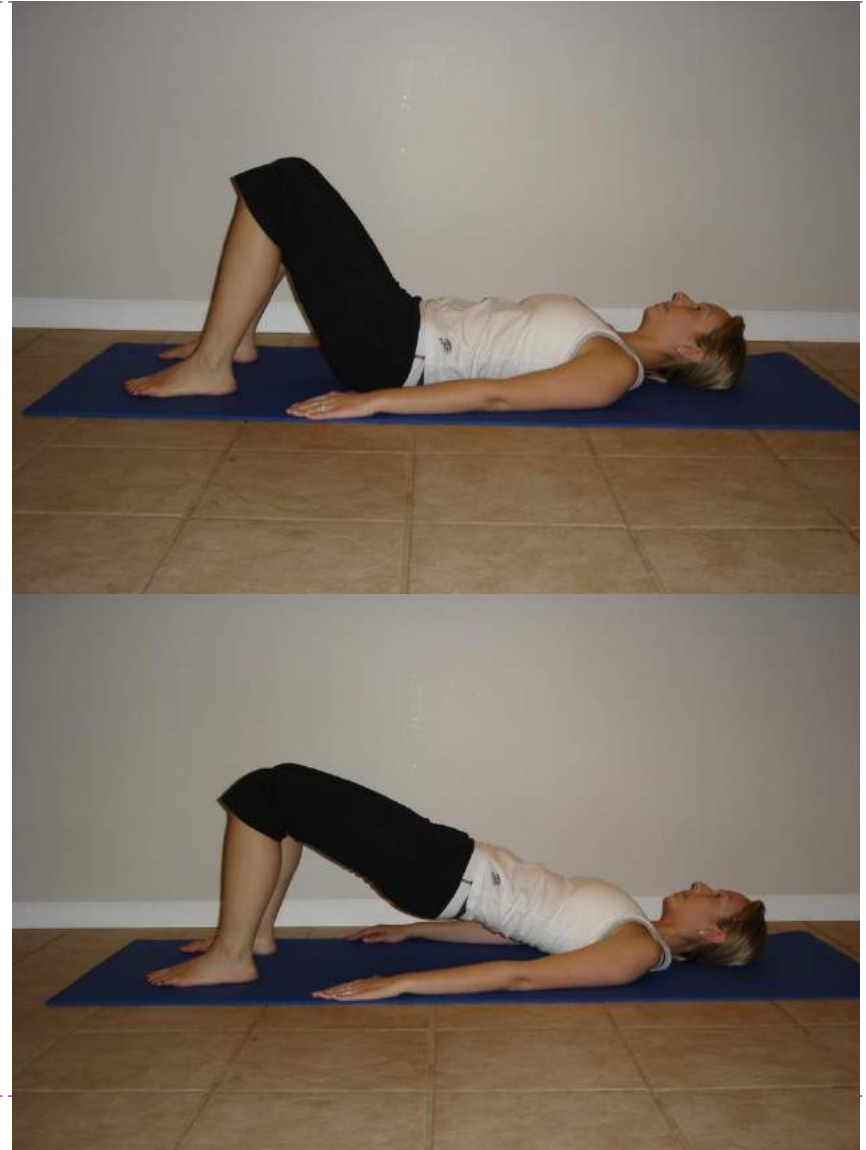
- Inhale to prepare
- Exhale to extend the legs out and move the arms overhead
- Inhale bring the legs back in and circle the arms back to your sides



# Shoulder Bridge Prep

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- ▶ Start lying on your back with knees bent, feet hips width apart
  - ▶ Inhale to prepare
  - ▶ Exhale, stabilize pelvis and maintain neutral spine while lifting hips off mat
  - ▶ Inhale, stay
  - ▶ Exhale, place pelvis back onto mat
  - ▶ Repeat 4-6 times
- 



To make the Shoulder Bridge more difficult...

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# Breast Stroke Prep 1

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- ▶ Start lying on stomach, hands on floor just above shoulders
- ▶ Inhale to prepare
- ▶ Exhale, stabilize scapulae and apply pressure through forearms
- ▶ Lengthen the neck and upper back
- ▶ Inhale stay
- ▶ Exhale, lengthen back down to mat
- ▶ Repeat 3-5 times



# Overhead View of Starting Position

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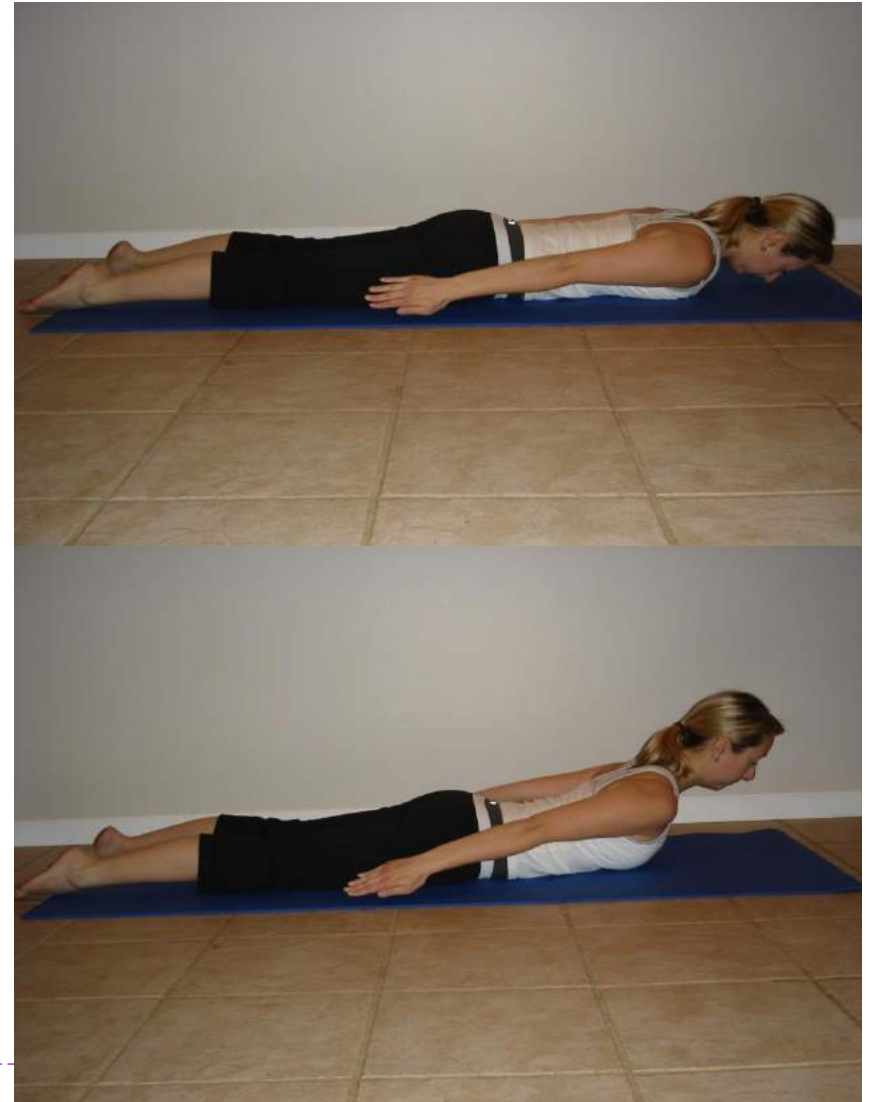




# Breast Stroke Prep 2

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- ▶ Start with hands by hips
- ▶ Inhale, open front of shoulders and stabilize shoulder blades
- ▶ Exhale, reach fingertips towards your toes and extend upper back
- ▶ Inhale stay
- ▶ Exhale lengthen back down to mat
- ▶ Repeat 3-5 times



# Breast Stroke Prep 3

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- ▶ Start with arms bent, hands under forehead
- ▶ Inhale to prepare
- ▶ Exhale, reach top of head away from toes and extend upper body up off mat
- ▶ Inhale, suspend
- ▶ Exhale, lengthen back down to mat
- ▶ Repeat 3-5 times



# Breast Stroke

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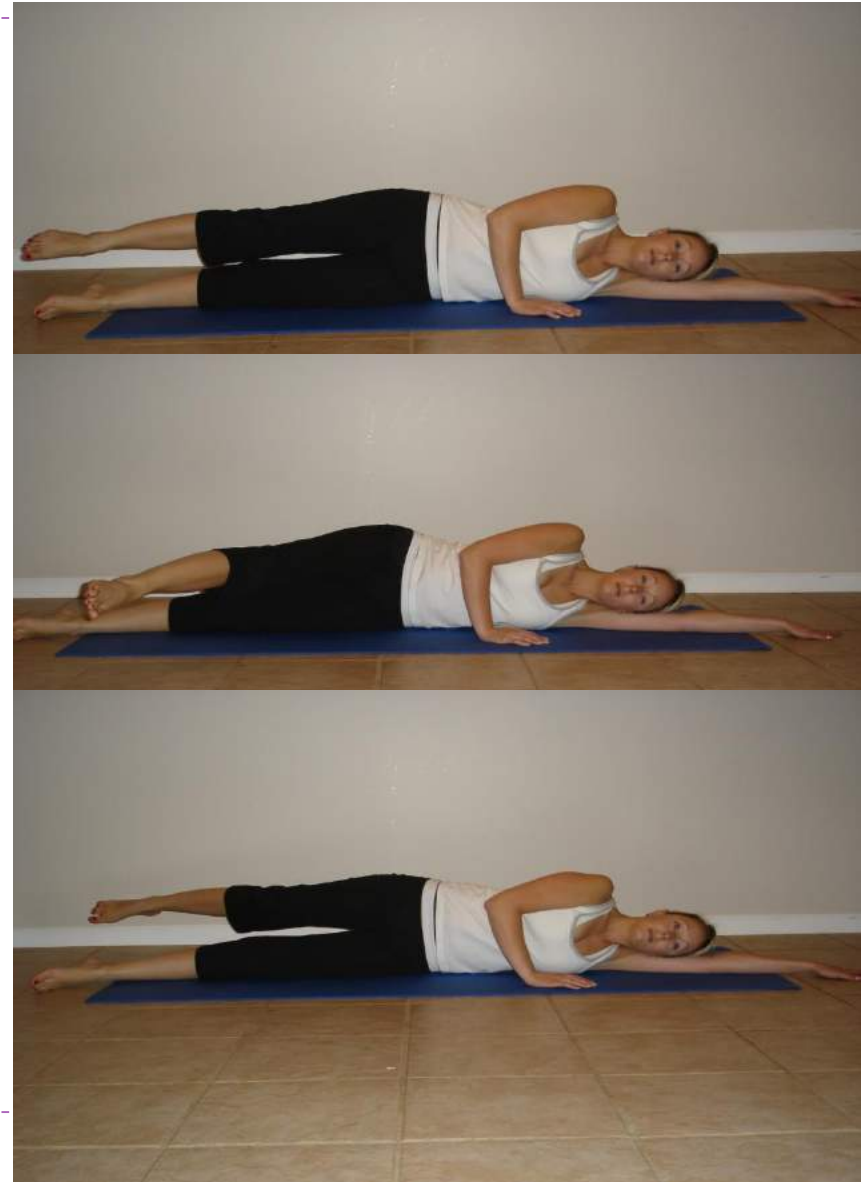
- ▶ Start in same position as breast stroke prep 1
- ▶ Exhale, stabilize scapula and reach arms forward
- ▶ Inhale, circle arms out to sides while extending thoracic and cervical spine
- ▶ Bottom rib should remain in contact with floor
- ▶ To transition to next repetition, bend elbows and reach hands to overhead position
- ▶ Repeat 5-8 times



# Side Kick

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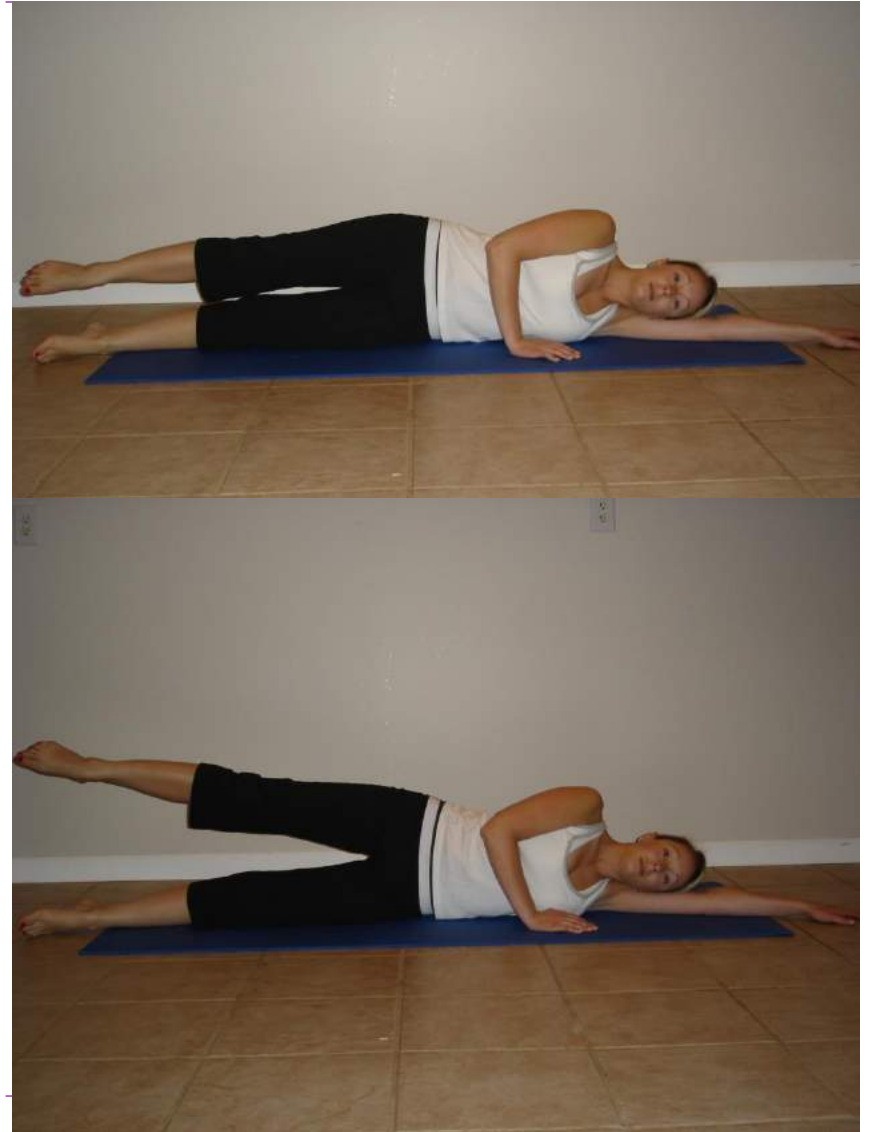
- ▶ Start side-lying with spine in neutral, legs slightly forward, top leg lifted
  - ▶ Inhale for 2 counts while flexing top hip and reaching foot forward
  - ▶ Exhale, extend hip and reach leg back
  - ▶ Repeat 8-10 times on each side
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# Side Leg Lift 1-hip abduction

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- ▶ Start side-lying with body in straight line, neutral spine
- ▶ Inhale, lift top leg with the foot pointed
- ▶ Exhale, flex foot and bring top leg down to bottom leg



# Side Leg Lift 2-leg lift with circles

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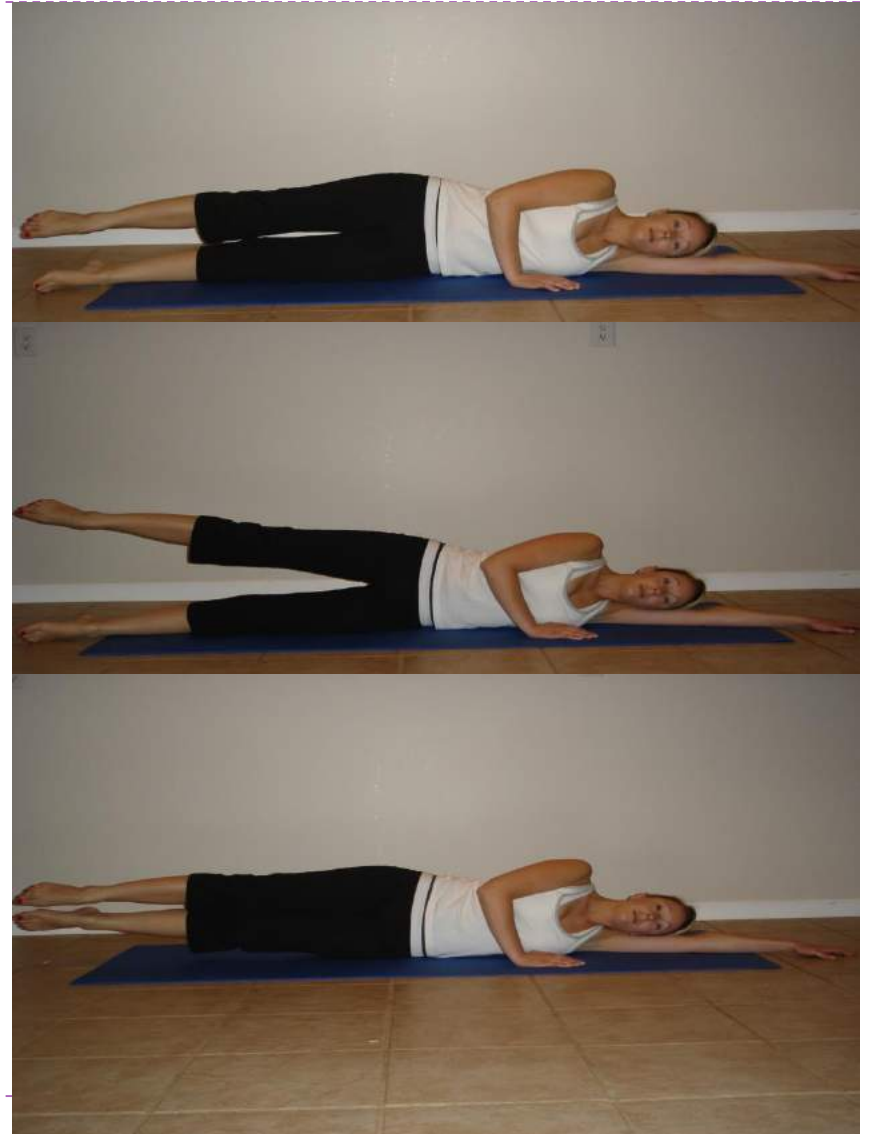
- ▶ Inhale, reach top leg up as far as able while maintaining pelvis stability
  - ▶ Exhale, circle top leg back
  - ▶ Inhale to finish the circle
  - ▶ Repeat 5-10 times then reverse circle and complete 5-10 times
  - ▶ Breathing is more rapid than in leg lift 1
- 



# Side Leg Lift 3-lift top leg then lower leg

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- ▶ Inhale, lift top leg as far as stability can be maintained
- ▶ Exhale, lift bottom leg to meet the top leg, then lower both legs together
- ▶ Repeat 5-10 times

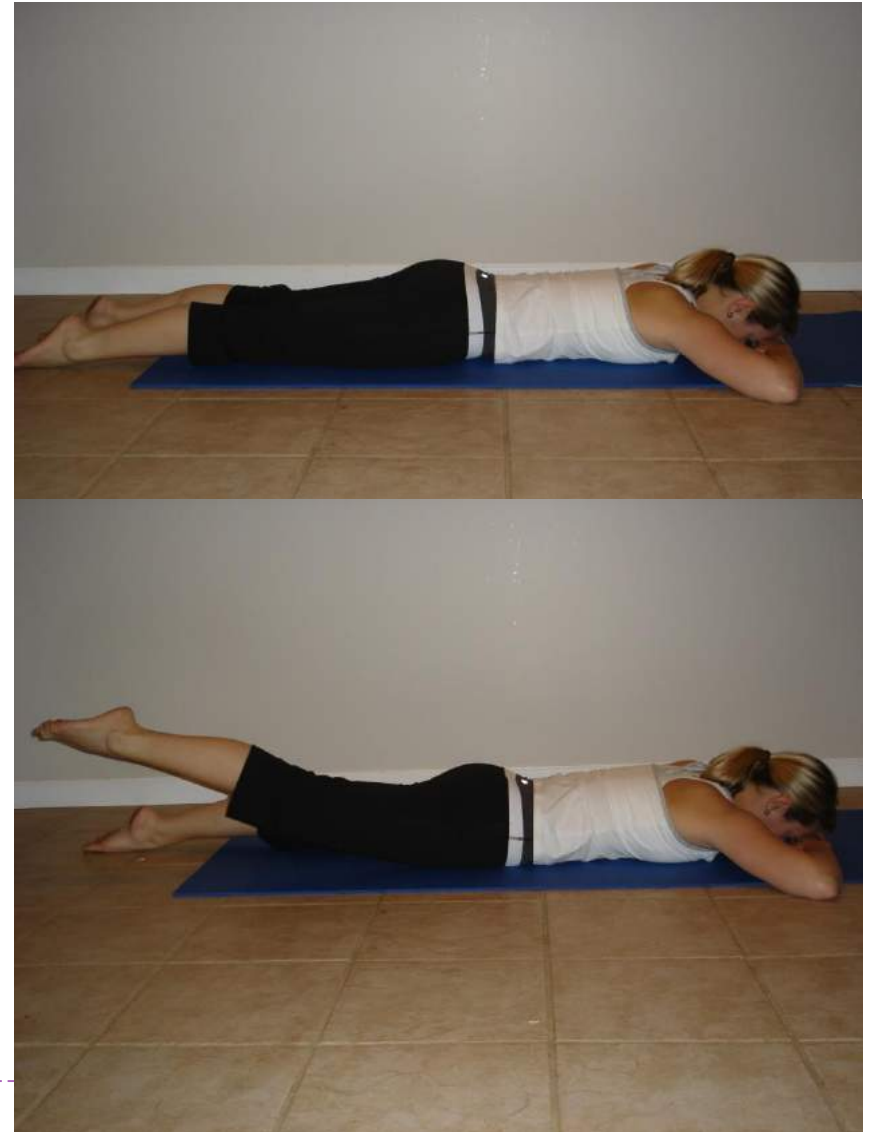




# Single Leg Extension

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- ▶ Start lying on stomach, body long, hands under forehead
- ▶ Inhale to prepare
- ▶ Exhale, reach one leg off mat
- ▶ Inhale, lower leg
- ▶ Exhale, reach other leg off mat
- ▶ Inhale, lower leg
- ▶ Repeat 6-8 times with each leg
- ▶ If you cant lie flat on the floor position yourself over pillows

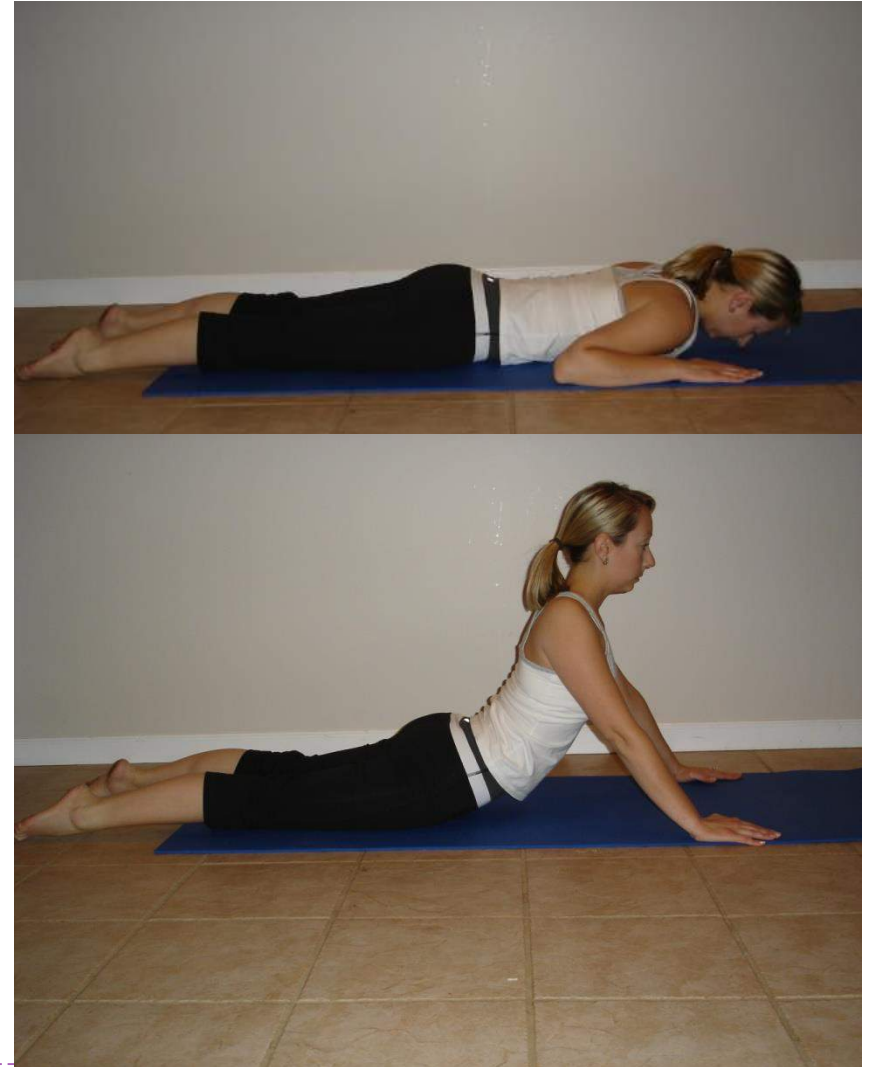




# Swan Dive Prep

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- ▶ Start on stomach, elbows bent, hands by shoulders, legs shoulder width apart and turned out, head hovering mat
- ▶ Inhale stay
- ▶ Exhale extend spine as far as able without losing abdominal or scapular stabilization
- ▶ Inhale stay
- ▶ Exhale, place chest down
- ▶ Repeat 5-8 times



# Swan dive

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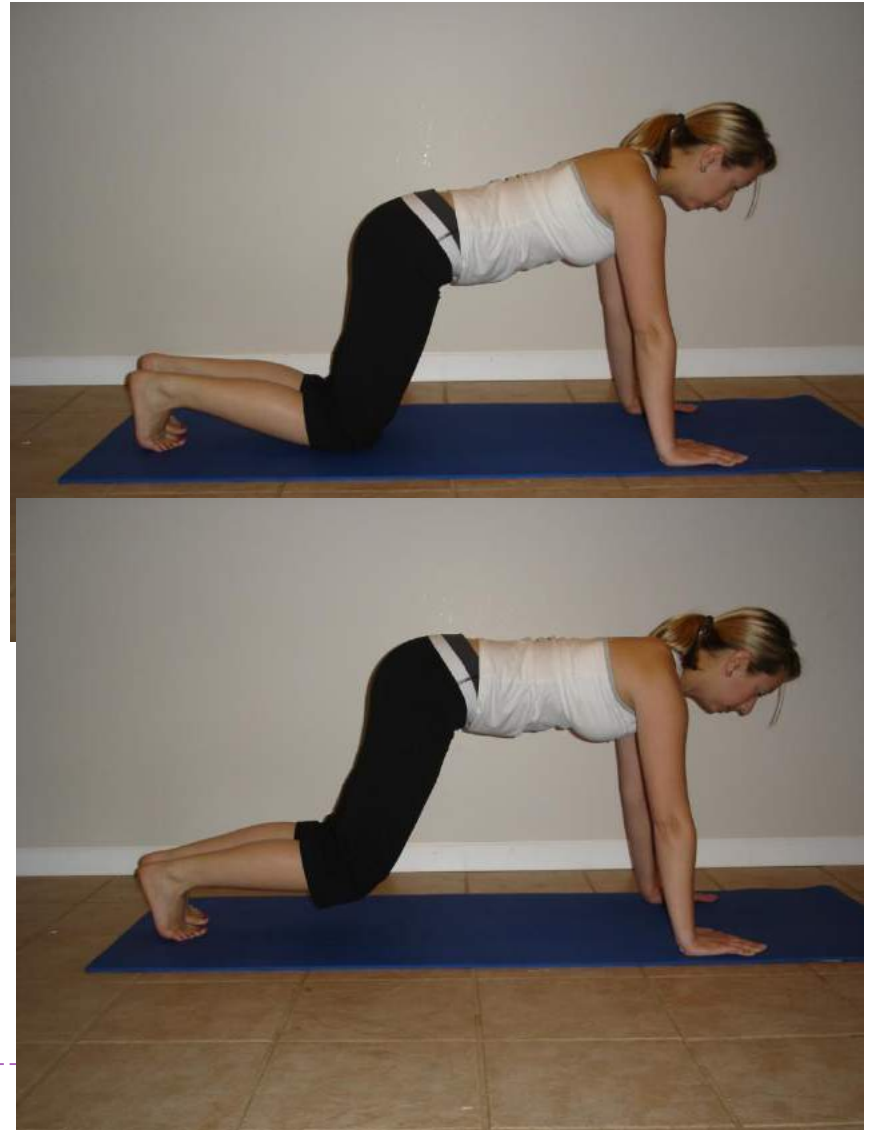
- ▶ Perform the prep but as you lower your body down the hips extend and the legs lift up



# Leg Pull Front Prep

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- ▶ Start on hands and knees, spine and pelvis neutral, knees under hips, legs together
- ▶ Inhale stay
- ▶ Exhale squeeze knees together and lift knees off mat ~2 inches
- ▶ Inhale Stay
- ▶ Exhale, lower knees to mat
- ▶ Repeat 3-6 times



# Plank

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- ▶ Inhale to prepare
- ▶ Exhale to lift the hips up off the table while drawing the belly button toward the spine
- ▶ Hold to fatigue while breathing as needed
- ▶ Repeat 5 times



# Plank on knees

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# Plank on Forearms

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# Push Up Prep

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- ▶ Start in push up position, legs together, feet on or off mat
- ▶ Inhale for 3 counts, flexing elbows more with each count
- ▶ Exhale, straighten elbows
- ▶ Repeat 2-3 times



# To make the Push Up more difficult...

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# Spine Twist

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- ▶ Inhale to prepare
- ▶ Exhale to slowly drop  
Knees out to the side  
Moving only as far as is  
Comfortable



This is OK

- ▶ Inhale stay
- ▶ Exhale while moving knees back to start position

This is not safe if  
you have low bone  
density



# Sliding Down the Wall

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Position with your back on the wall, feet one foot distance from the wall and legs hips width apart

Inhale to bend the knees so that the body slides down the wall- be sure to keep the knees apart

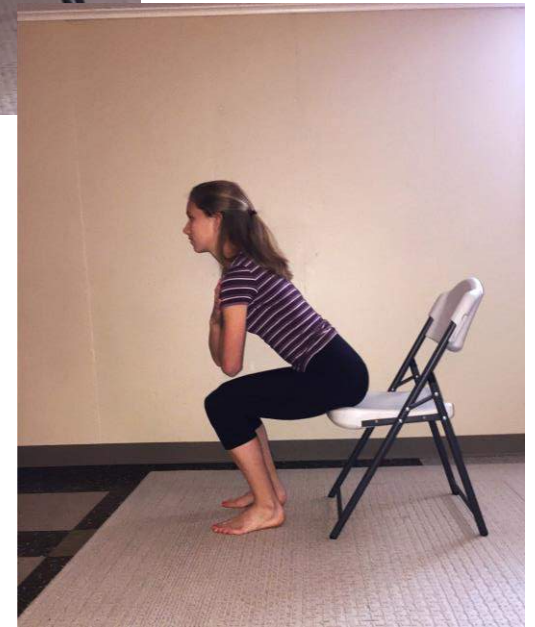
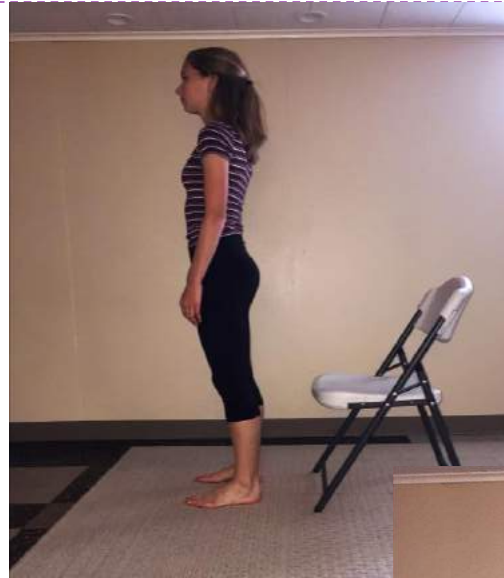
Exhale while pressing through the legs to move the body back to the start position



# Squats

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- ▶ Inhale to prepare
- ▶ Exhale to bend the knees
- ▶ Inhale to return to standing
- ▶ Repeat 10-20 times



# One legged stance

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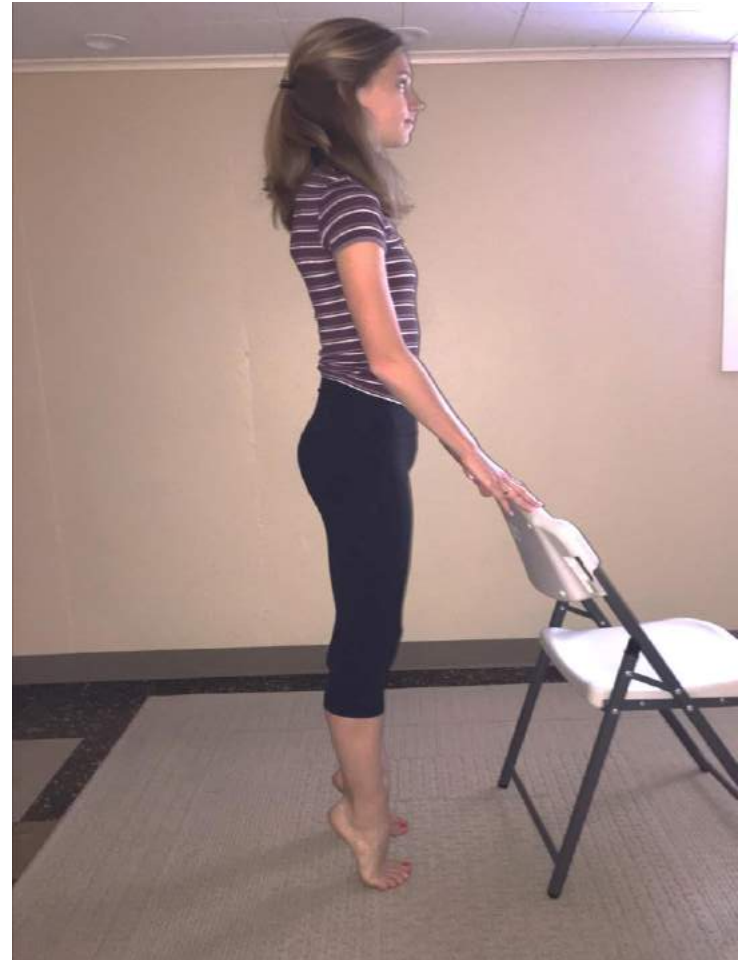
- ▶ Inhale to prepare
- ▶ Exhale to shift your weight to the right leg and balance
- ▶ Hold as long as possible while using a normal breathing pattern with your deep abdominals engage
- ▶ Repeat to the other side
- ▶ Stand near something to use for support as needed to avoid falling



# Heel raise

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- ▶ Inhale to prepare
- ▶ Exhale raise up onto your toes
- ▶ Inhale to lower
- ▶ Repeat 20 times



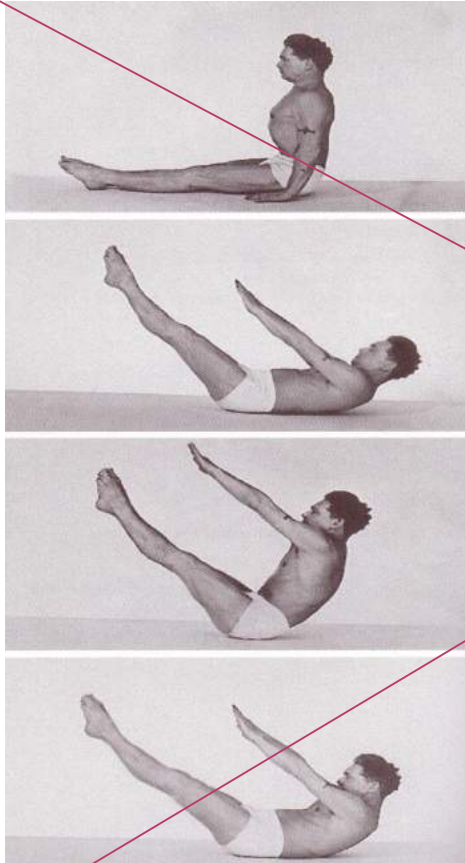
# If you take a Pilates Class here are some names of **exercises to avoid...**

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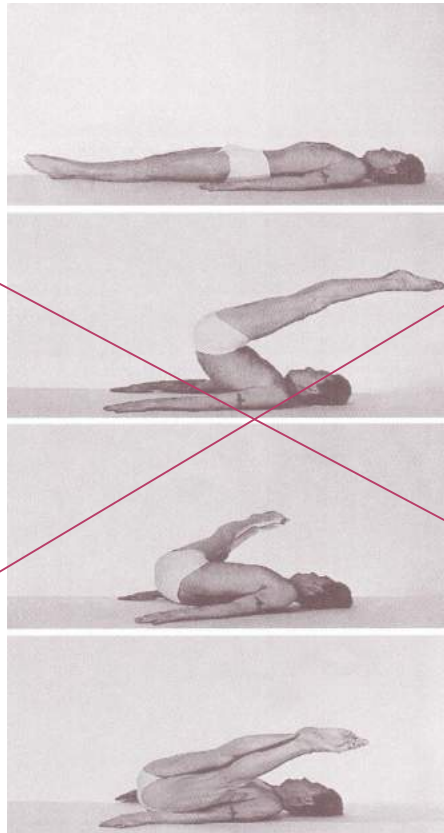
- ▶ Roll up
- ▶ Roll over
- ▶ Rolling like a ball
- ▶ Open leg rocker
- ▶ Corkscrew
- ▶ Saw
- ▶ Neck pull
- ▶ Scissors
- ▶ Teaser
- ▶ Bicycle
- ▶ Boomerang
- ▶ Twist part of advanced Side Bend
- ▶ Seal
- ▶ Rocking
- ▶ Control Balance
- ▶ Crab



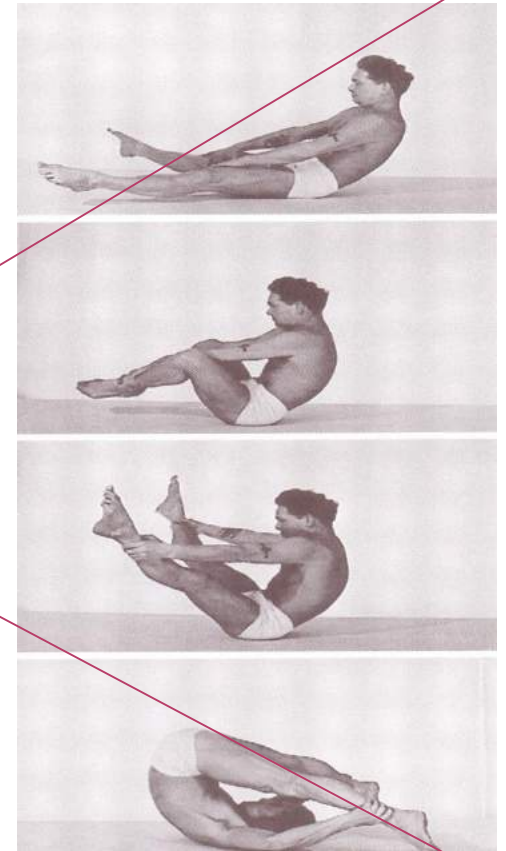
Here is what some of these look like...



Teaser



corkscrew



Open leg rocker





# Summary

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- ▶ Stretching and strengthening is beneficial for individuals with Osteoporosis
- ▶ Pilates can be done safely by those with Osteoporosis **if modified**
- ▶ As with any exercise, avoid spine flexion and exercise safely
- ▶ Be careful and do only what you are capable of
- ▶ Start slow if these exercises are new to you
- ▶ Do not force any movement and modify exercises as needed





# Thank You!

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- ▶ The end😊
- ▶ Questions?

