

LIMITLESS

Programming for Enhanced Function with Kyphosis

PRESENTED BY

Candice Campbell, M.S., C.S.C.S., C.E.S., C.P.T.

Objectives:



How to assess the effects of kyphosis and associated structural changes with fitness assessments



How to design useful programs to best improve quality of life for those living with kyphosis



So many exercises and so many resources???? – understand the principles so you can have more tools available (find them or create them!)

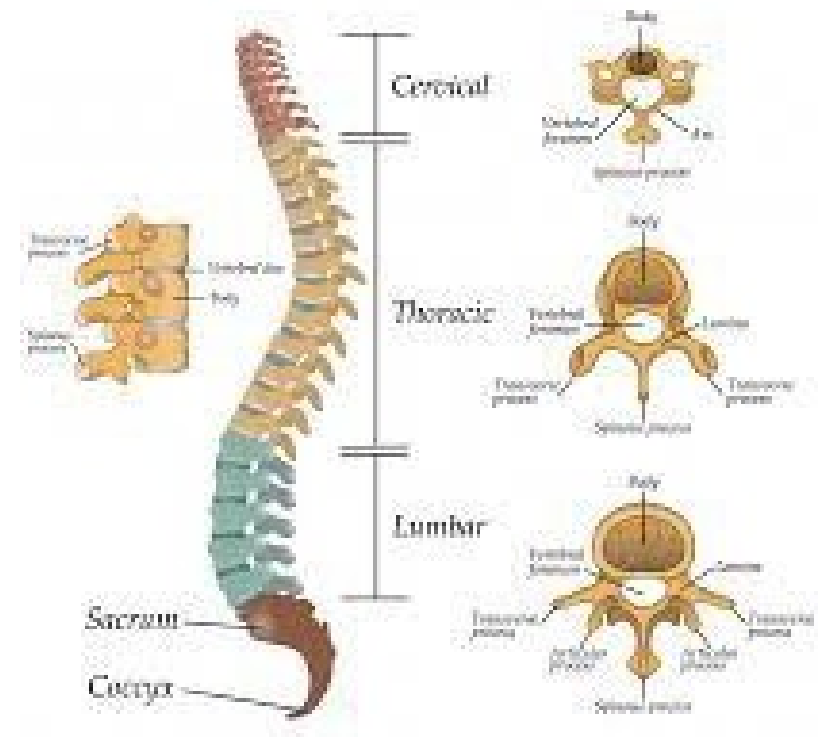
The Unique Role of Fitness Professionals

- Physical Therapists vs. Fitness Professionals
 - PTs have limited time with clientele
 - We may see clients much more often and for longer periods of time
- Several scenarios we can work with clients who have spinal deviations
 - Some may be working with a PT currently
 - Some may have had experience working with PT
 - Some may be continuing care (chronic conditions)
- Scope of Practice!!!
 - We do NOT diagnose. Period!
 - Work with a team – communicate and know when to refer
 - Chiropractors, LMTs, MD, orthopedic surgeon, etc

The Spine – Let's Review!!

- 33 Vertebrae, intervertebral discs
- 7 cervical, 12 thoracic, 5 lumbar, 5 sacral, 4 fused coccyx (tailbone)
- Vertebrae get larger lower
- Ribcage limits movement
- More rotation occurs in thoracic/cervical
- 3 normal curves
- Kyphosis in thoracic spine/sacrum
- Lordosis in cervical/lumbar spine
- Maintain head over hips and decrease forces from gravity

The structure of the segments of the spine



Most Common Postural Deviations

- Kyphosis
 - Lordosis/Flat Back
 - Scoliosis
-
- What is posture?
 - Position of the body
 - Any deviation = Load not evenly distributed

Kyphosis

- Excessive curvature of the thoracic spine— technically hyperkyphosis
- “normal” curve = 20-40 degrees
- Degree of curve increases with age (over 40)
- 20-40% of the older population
- Rate of increase is greater in females
- Results in forward head, neck hyperextended & forward rounded scapulae
- Range from postural (habits) to structural (skeletal) – catch it early!
- Exercise can improve with minor cases & can help improve function for those who have structural change
- It takes time!! Can't always measure progress with a picture
- We will discuss postural kyphosis (most common)

Define some terms:

- **Thoracic Spine** = 12 vertebrae that each attach to the ribs
 - Movements:
 - Flexion and extension
 - Lateral flexion
 - Rotation
 - Mobility helps improve and enable upper extremity movements
 - Not inherently mobile (ribcage)

Scapulothoracic joint

- **Scapulothoracic joint** : indirect attachment of scapula (concave) and thoracic cage (convex)
 - Serratus anterior & subscapularis
- Shape of the thoracic wall will affect function

Shoulder Girdle

- **Shoulder girdle:** scapulae, clavicles & sternum
- Controlled by 5 muscles:
 - Trapezius (mid, lower & upper)
 - Rhomboids
 - Serratus Anterior
 - Pec Minor
 - Levator Scapulae
- Position the scapula for shoulder movement
 - (1/3 of abd ROM)
 - Beyond 120°

Example of movement:

- Overhead Press
- GH: flexion or abduction
- +
- Shoulder girdle: upward rotation, protraction, & elevation (2° GH elevation = 1° ST elevation)
- Thoracic spine must have adequate extension for last 10 degrees of movement (above 120 degrees)
- Reduced mobility in the thoracic spine OR improper position of the shoulder joint will disrupt this synergy
- Can lead to compensations above or below the thoracic spine

Potential Problems from Kyphosis

- Impairs mobility/strength
 - Altered length-tension relationship of muscles
 - ↑ risk of injury
- Thoracic cage rounds
 - Can change shape of vertebrae
 - Can lead to collapse of intervertebral discs
 - Weakens ligaments that support the spine
- Scapula does not sit correctly on thoracic cage
 - Decreased function in muscles and movement of scapula
- Displacement of the scapula/shoulder girdle/GH Joint
 - Closed packed position of shoulder
 - Stress on ligaments and joint capsule
 - ↑Compressive force
 - Difficult to flex & abduct the arm

Possible injuries

- Lead to joint trauma (above and below thoracic spine)
 - Shoulder pain
 - Linked to Forward shoulder
 - Neck pain
 - Forward head – hyperextension of cervical spine
 - Low back pain
 - Limited mobility can lead to increased lumbar rotation, extension, and stress
- Older/Severe cases:
 - Increases risk of falling
 - Reduced vital capacity and lung function
 - Damage to the vertebral column

Assessing Kyphosis

- Clinically – standing lateral radiographs or kyphometer and flexicurve ruler
 - Get any info from MD
- FITNESS:
 - Help to determine degree of structural change
 - How is mobility restricted?
 - Look for if and how they compensate
 - Formal and/or informal
- Daily Habits > Soft Tissue > Structural
- How?
 - Static
 - Mobility/movement
 - Range of motion (ROM)
 - What muscles/tissues appear tight/overactive?
 - What muscles appear lengthened and/or underactive?

How is their static Posture?

- Static assessment – may indicate more severe structural changes or just habits
- Look for:
 - Anterior rounding of shoulders (Pecs, ant delt)
 - Elevated shoulders (Upper traps, Levator scapulae)
 - Excessive posterior convexity
 - Forward neck
- Really cool apps!!
 - Use photos to give clients quick feedback
- Alignabod
- Lateral photos
- Have a checklist ✓

How do they move?

- Movement assessments
 - OH Squat: Modify with hands on hips
 - Push/Pull/Press
 - OH reach:
 - Elevated shoulders
 - Winged Scapulae
 - Arms fall forward from OH
- Thoracic and shoulder mobility exercises!
 - Why not use these with the programming AND to track progress?
 - Thread the needle
 - Open book



ROM assessments... where are restrictions that can affect ADLs?

- Thoracic:
 - Flexion/**Ext**
 - Rotation (even):
 - Seated
 - “X” assessment
 - Quadruped (Child’s pose)
- Shoulder (GH):
 - Flexion
 - Abduction
 - External rotation
- Shoulder Girdle:
 - Protraction/retraction?
- ***Note if the motion seems to be coming from another segment.

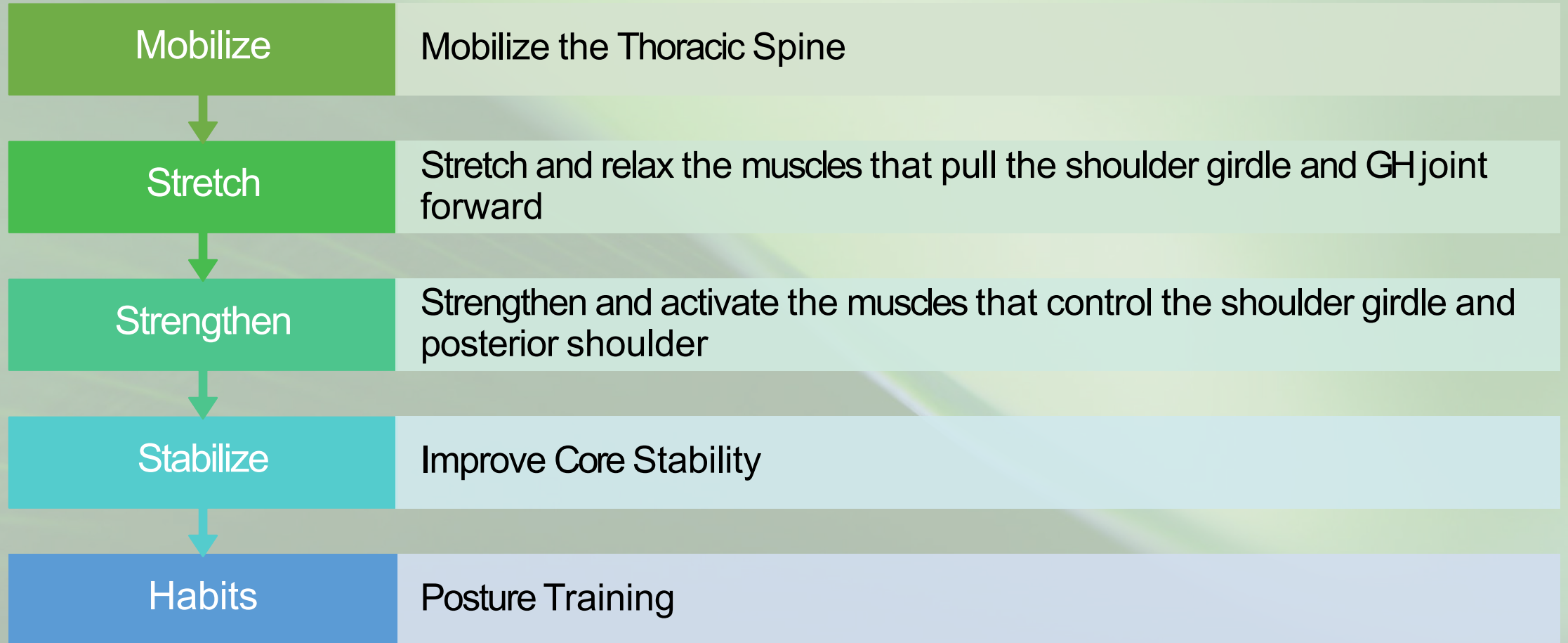


Joint & motion	Normal Range:	<i>Possible tight muscles</i>	<i>Possible underactive muscles</i>
Thoracic spine:			
Flexion:	30-35°	Erector Spinae, Multifidus	Rectus Abd., Int/ext obliques
Extension:	20-25°	Rectus Abd., Int/ext obliques	Erector Spinae, Multifidus
Rotation:	30-35°	Ipsilateral: Ext obliques, rectus abdominis, lumbar multifidus Contralateral: Lats, int obliques, transverse abd	Ipsilateral: Lats, int obliques, transverse abd Contralateral: Ext obliques, rectus abdominis, lumbar multifidus
Lateral flexion:	25-30°	Contralateral: ext/int obliques, quadratus lumborum, rectus abdominis	Ipsilateral: ext/int obliques, quadratus lumborum, rectus abdominis
GH joint:	(+Shoulder girdle)		
Flexion:	90-100° (180)	Lats, teres major, pec major, triceps	Mid/lower traps
Abduction:	90-95° (180)	Lats, teres major, pec major, subscapularis	Supraspinatus, mid/lower traps
External rotation:	70-90°	Pec Major, Lats, teres major, subscapularis	Infraspinatus, teres minor

The Good News!!

- Intervention has proven to improve posture, strength and physical performance in several populations
- Spinal extension exercises have been shown to stop the progression of kyphosis in the most aggressive years for women (Ball 2009)
- Manual Therapy (massage & myofascial release) has been shown to be effective (Kamali et al, 2016)
- Increasing thoracic extension has been shown to improve shoulder & neck problems (Boyles et al, 2009; Young et al, 2004; Nakamaru et al, 2019)
- Improving thoracic rotation can decrease the stress placed on the lumbar spine (Heo et al, 2015)

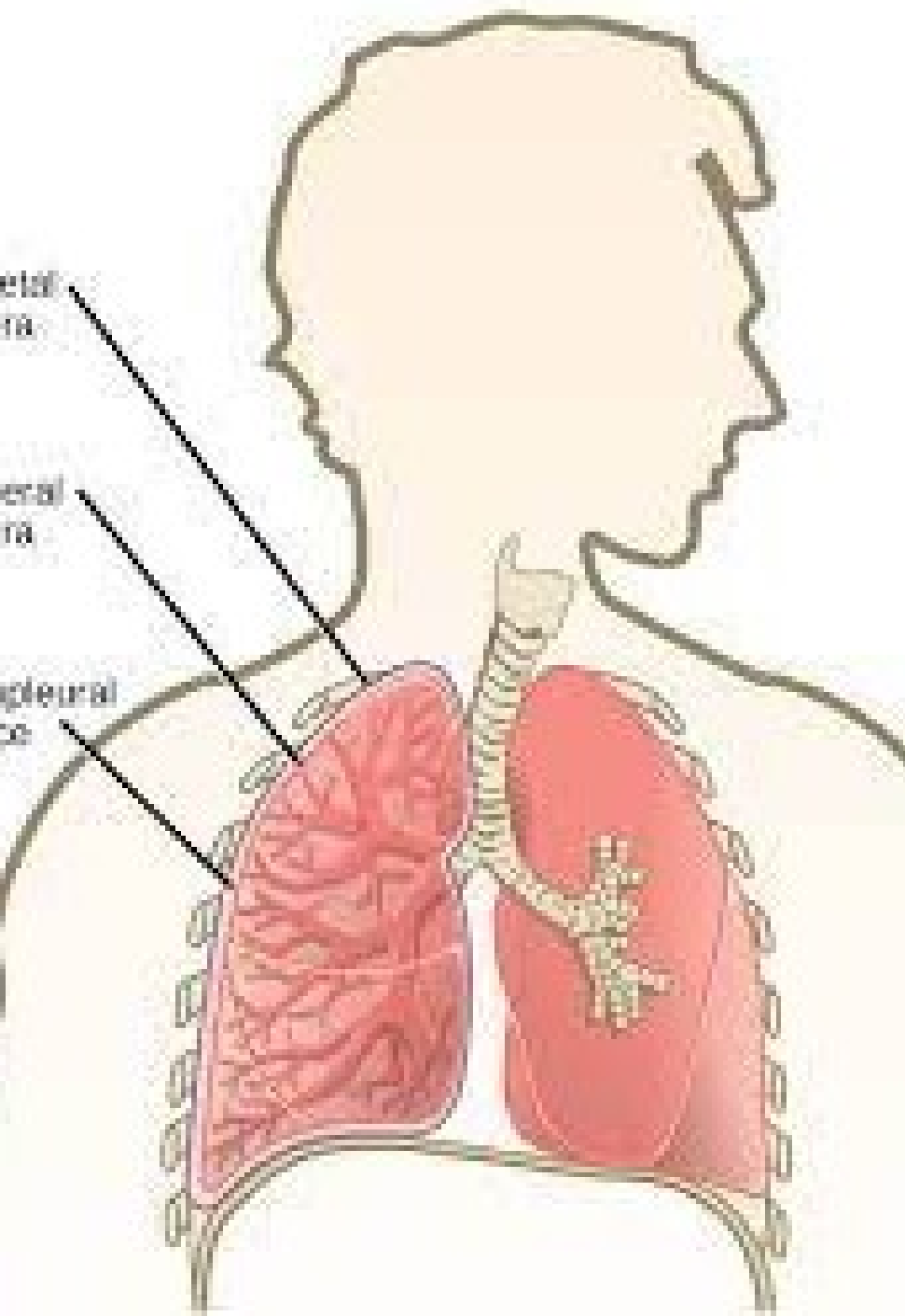
Training Focus



- Allow for the Scapulothoracic joint to function
- Increase activity of mid & lower Traps
- Allows the scapula to move better
- ↓ Strain on rotator cuff
- ↑ ROM for OH pressing & horizontal ADD
- Should have 45-60° rotation
 - Lumbar 10-12°
- Manual Therapy
 - Work with LMT/Chiropractor
 - Thrust manipulation – shown to improve Thoracic mobility
- SMR
- Static Stretches
- Dynamic Stretches
 - Minimize movement in lumbar and cervical spine

IDEAS

- Rotation
 - Thread the needle
 - Open book
 - Squat rotate
 - Half kneeling reach
- Extension
 - Foam Roll – segments
 - Child's pose
 - Prayer pose – foam roller?
 - Prone extensions – snow angels, hand cuffs
 - Cat/Cow – sit back to heels to minimize lumbar flexion/ext
- Quadruped:
 - Protraction + thoracic extension
 - 1. Extension
 - 2. Maintain Th ext – post pelvic tilt + lumbar flex + cervical flex



Breathing to Improve Kyphosis

- Who benefits?
- Helps to improve the mobility of the ribcage
- Helps to improve feedback

Exercise Ideas

- I, Y, T
- Scapular retraction? – avoid forward head
 - Activate retractors
 - Habit - More valuable to think of thoracic extension (sit up tall)
- Rows? – multiplanar
- Reverse Fly
 - Band, cables, DBs
- External rotation
 - Bands, cables, DBs
- Scap push-ups, presses
- Chin Tucks –
 - Keep in mind – with proper posture this will not be needed

Programming for Strength

- Start simple!! Then progress
- FITT
 - Frequency: 3-5 days/week
 - Intensity: 10-15 RM
 - Time: 2-3 sets
 - Type: Goal specific
- Make sure to keep proper movements!
 - Watch for elevated shoulders
 - Keep full range of motion
- Notes:
 - Latissimus Dorsi:
 - Involved in any rowing exercises
 - Can be tight/overactive
 - Focus on form and the scapular retraction
 - Overhead pressing:
 - Adjust for pain/compensation
 - Low back arch
 - Head flexing forward
 - Try Dumbbells?
 - More flexion than abduction?

3. Stretch and Relax Anterior Shoulder/Shoulder Girdle

SMR & Static/PNF

Muscles:

- **Pec Minor**
- Pec Major
- Latissimus Dorsi
- Levator Scapule
- Upper Traps
- Serratus anterior**

4. Improve Core Stability

- Plank
 - Add progressions (arm movement, leg movement, etc)
- Prone 1 arm/leg extension
- Quadruped (Bird/Dog)
 - Add progressions (band, holds, abduction, etc)
- Balance trunk flexion!
 - Crunches *can* make posture worse

5. Alignment/Posture Training



Important!



The muscles of the trunk use mostly automatic/feedforward control – not voluntary



Learning proper posture for static and dynamic posture

Quiet standing

During movement (both exercises and movements that mimic ADLs)

Integrate **PROPER** movement



Daily habits

Ergonomic set-up

Carrying tasks (purse, backpack, bags, etc)

Programming for Kyphosis Overview

- What are the client's goals?
 - Kyphosis specific
 - OH Athletes
 - Pain?
 - General Fitness
- Address the most affected areas based on assessments
 - Forward shoulder posture
 - Forward head
 - Shoulder internal rotation
- Even if you cannot always correct – you can still improve function
- With regular programming:
 - Modify exercises that are not “possible” to get safe ROM
 - Encourage balance between anterior/posterior
- Improve habits - posture and daily activities

- Muscles to stretch:
 - **Pectoralis minor**
 - **Levator Scapulae**
 - **Upper Trapezius**
 - **Latissimus dorsi**
 - **Pectoralis major**
- Muscles to strengthen:
 - **Mid and lower trapezius**
 - **Rhomboids**
 - **Posterior Deltoids**
 - **GH external rotators**
(infraspinatus, teres minor)
 - ***Spinal extensors***

Resources

Recommended reading:

- Manual of Structural Kinesiology (21st Edition)
- R.T. Floyd

CECs, CEUs

Social Media?

YouTube?

- If you understand the concepts/science you can better spot useful content

Final Thoughts

- Work with a team you trust
 - Keep learning!
 - Communicate expectations upfront
-
- Contact me: Candice.Campbell@csulb.edu
 - Thank you!!