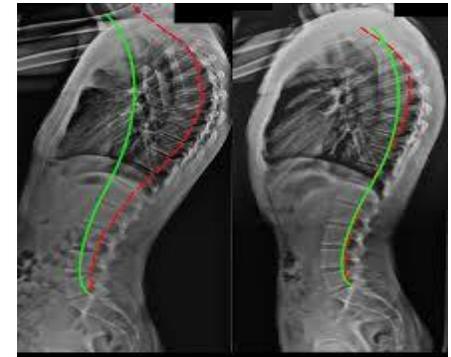


Thoracic Kyphosis

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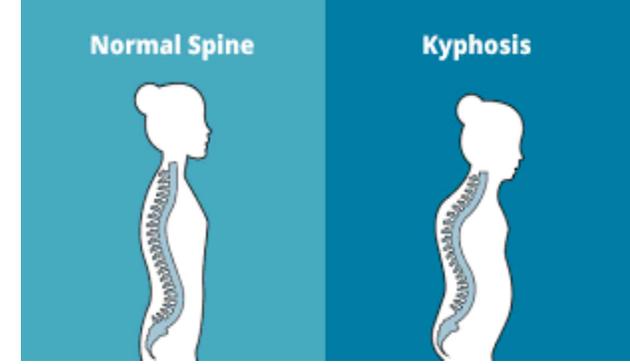


Definition



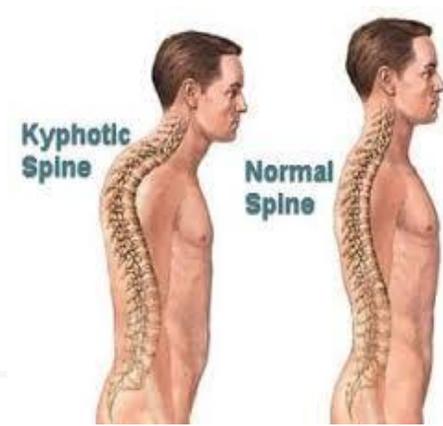
- Normal kyphosis angles vary between 20° and 45° in the younger public
- Thoracic hyperkyphosis is described as an excessive antero-posterior curvature of the thoracic spine of greater than 50°

Prevalence



- The prevalence of hyperkyphosis increases with age in women and men, with the greatest change in women age 50 to 59 years.
- Estimates range between 20-40% among aged ≥ 60 years.
- Studies have reported kyphosis increases by about 9 degrees per decade.
- Level of kyphosis increases with age.

Clinically Relevant Anatomy

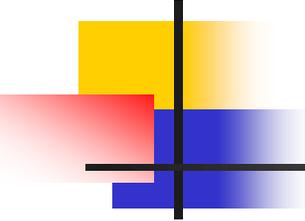


- In standing postures, the gravity line passes ventral to the vertebral bodies.
- The load of the gravity will increase the thoracic kyphosis.
- Bending forces bring anatomical changes.
- Anatomical changes include: passive constraint of the posterior ligaments; contraction of the deep one-joint muscles and thoracic parts of the long extensors

Biomechanical Factors

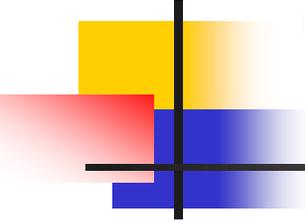
- Higher spinal loads and trunk muscle force in an upright stance.
- Accelerate degenerative process and contribute to dysfunction and pain.
- Daily activities with poor posture e.g. protruding head positions and loss of shoulder ROM.





Characteristics

- Hyperkyphosis of the thoracic spine can be **postural** or **structural**.
 - ✓ 1. Postural impairments are flexible and respond to positional changes
 - ✓ 2. Structural alignment impairments are fixed regardless of the position
 - ✓ 3. Combination of structural and postural alignment impairments, postural correction may only be partially successful.



Types

1. Postural

2. Scheuermann

3. Congenital

4. Age related

Postural Kyphosis



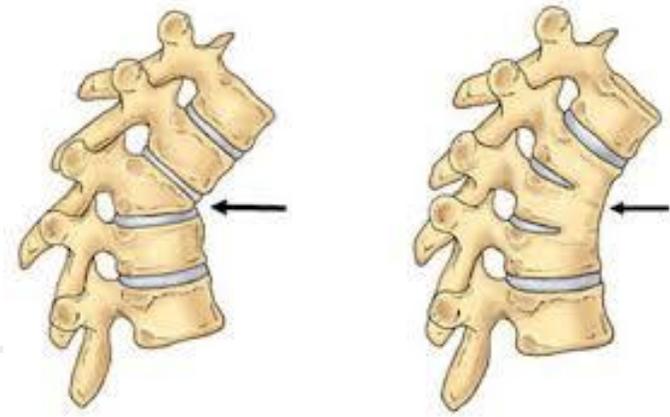
- It is the most common type of kyphosis.
- More common in girls than in boys
- It is caused by poor posture and weakening of the muscle, ligaments in the back (paraspinous muscles)
- The vertebrae are typically placed in postural kyphosis.
- It progressively gets worse with time.
- These people will have symptoms of pain and muscle fatigue.

Scheuermann's kyphosis



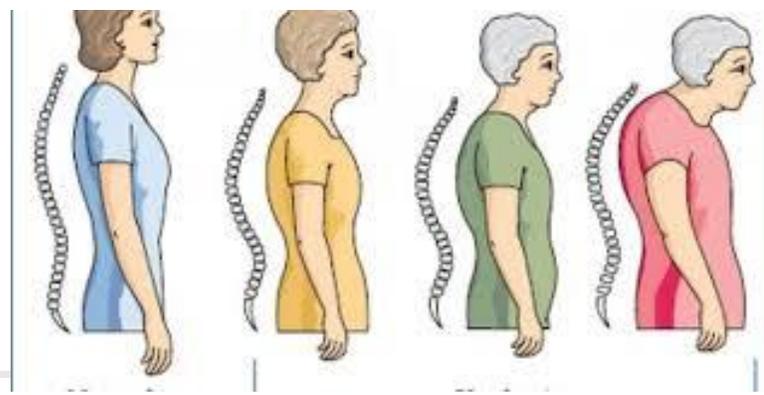
- Juvenile form of kyphosis.
- It is a result of structural deformity
- It commonly develops with scoliosis
- Resulting in weakened vertebral body and causing wedging.
- Stops at the end of growth

Congenital kyphosis



- It is the least common type of abnormal kyphosis.
- It is caused by abnormal development of the vertebrae prior to birth
- Occurs due to fusion of many vertebrae together.

Age-related kyphosis



- Despite the fact that increased kyphosis is one of the typical results of osteoporosis, up to 70% of patients with age-related hyper kyphosis do not suffer from decreased BMD.
- The exact prevalence of patients for non-osteoporotic kyphosis is unknown
- It is estimated that 10% to 45% of the people aged over 50 years .
- thoracic kyphosis increases to 50% in men and 65% in women over the age of 65 years

Clinical Features

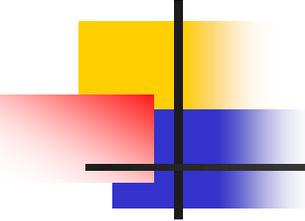


Depending upon the cause and severity of the curve:

- A visible hump on the back
- Rounded shoulders
- Mild back pain
- Fatigue
- Spine stiffness
- Tight hamstrings

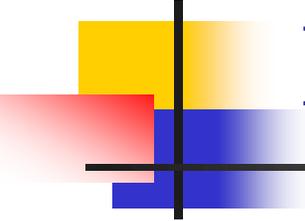
Rarely, over time, progressive curves may lead to:

- Weakness, numbness, or tingling in the legs
- Loss of sensation
- Shortness of breath or other breathing difficulties



Complications

- Decreased lung capacity
- Disabling pain
- Neurological symptoms including leg weakening or paralysis
- Round back deformity



Differential Diagnosis

The diagnosis of thoracic hyperkyphosis can be established by clinical examination and can be confirmed by radiologic imaging.

Some differential diagnosis can be:

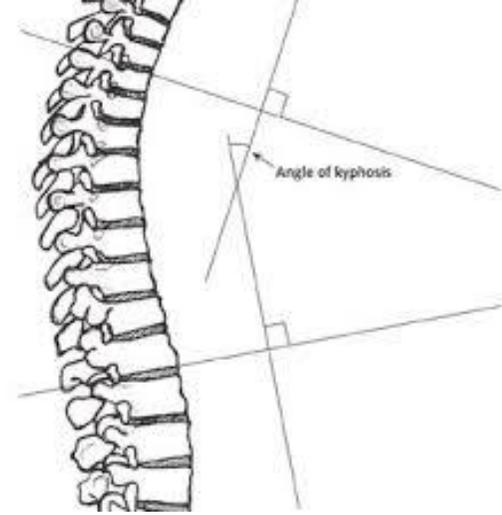
- Osteoporosis
- Trauma-related spinal changes eg vertebral fracture
- Tumor
- Infection
- Degenerative disc disease

Examination

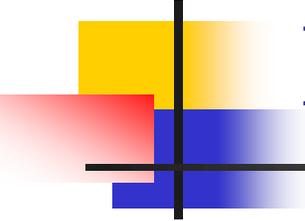
- Begins with observing the patient
- Examined in sagittal plane in standing and relaxed position “in order to assess the most affected areas and posture alterations.”
- Tragus to wall test can be used



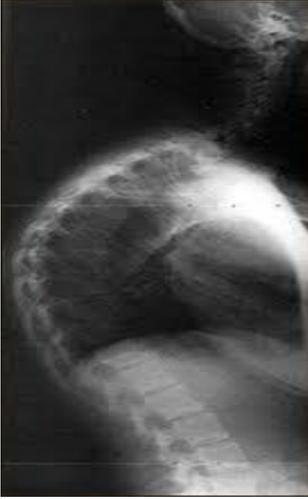
Equipment



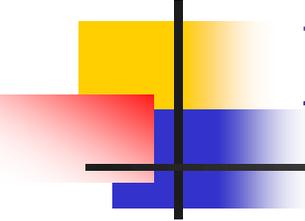
- Modified Cobb Angle
- The spinal pantograph
- The Debrunner kyphometer: Arms of the kyphometer are placed on C7 and T12, we read the angle from the protractor



Diagnostic Evaluation



- Starting point of any diagnostic investigation of the thoracic spine - Plain radiography. AP and lateral radiographs are always required.
- AP radiographs evaluation of the vertebral bodies, while the lateral radiographs assessing vertebral body height, disk height, endplate irregularity, erosions, and alignment.
- If further investigation needed - Reformatted CT scans and MR images .



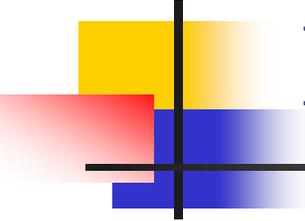
Management

- kyphosis except for the congenital variety rarely produces harmful effects
- Treatment is based on the symptoms.
- For those complaining of pain, exercises to strengthen the core muscles and pain-relieving medications are used.
- Surgery is only needed in severe cases of kyphosis.

Thoracic Manual Therapy

- Thoracic joint mobilizations are required in patients diagnosed with hyperkyphosis because of the reduced thoracic motion. e.g. Scapular, myofascial and spinal mobilization techniques.
- Self-mobilization techniques





Exercise



For mild hyperkyphosis and the flexible postural curves , daily home exercise program focusing on core strengthening and back extensor stretching and strengthening is often successful in managing the problem appearance and pain associated with kyphosis.

Stretching Exercise



- Chest stretching on foam roller: lengthening pectoralis muscles
- Prone hip extension/ knee flexion: lengthening iliopsoas and rectus femoris
- Supine knee extension with hip at 90° flexion: lengthening hamstrings

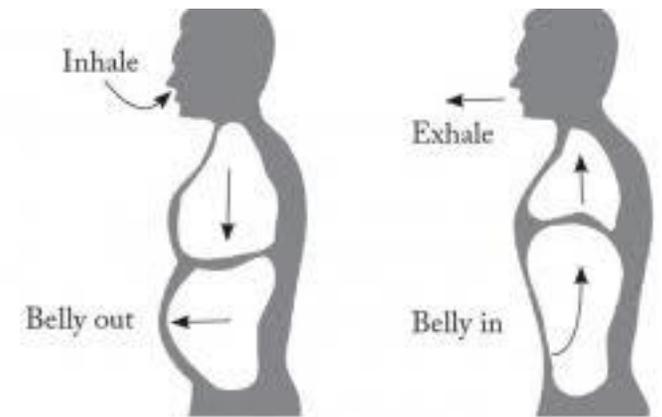
Strengthening Exercise

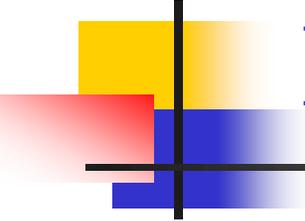


- Prone trunk lift to neutral: strengthening spinal extensors, middle- and lower trapezius
- Prone trunk lift to neutral with weighted backpack: strengthening spinal extensors
- Quadruped alternate arm/leg lift: strengthening spinal extensors, scapula and trunk stabilization, reducing anterior tightness

Other Exercise

- Breathing exercises to help improve tolerance for physical activity
- Thoracic correction exercises. Main goal of these types of exercises correction of the thoracic position as well as improve the structural alignment and stiffness of the thorax
- Balance exercises and gait training to increase general fitness and reduce risk of falls.
- Yoga & Pilates





Bracing

- Only recommended when the hyper kyphosis is no longer reversible through exercises because it is too stiff or because exercises have already proved insufficient.
- Passive bracing without the addition of physical therapy, doesn't have any effect on the thoracic spine

Types of Bracing



- A **Milwaukee** Brace is the most common brace used. The patients should wear this brace 23 hours a day for 1-2 years.
- The results of the **Lyon Antikyphosis** Brace were very satisfactory in most patients with thoracic hyperkyphosis.
- Also a new bracing design called the **Kyphologic** Brace has been shown to have a good in-brace correction on average.
- Another kind of brace using the two 3-point pressure system is the ‘**Gschwend** type’ brace. This brace is mostly used in Germany.

Taping

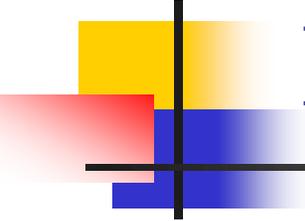
- May also reduce kyphosis. Tape from the anterior aspect of the acromioclavicular joint, over the muscle bulk of the upper trapezius, and diagonally over the spinous process of T6.



Spinal Orthosis

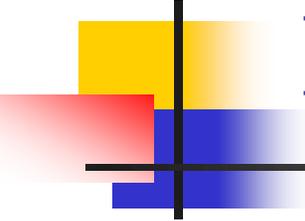
- A SpinoMed is a spinal orthosis which can be used for a thoracic hyperkyphosis.
- The patient should wear this for 2 hours a day during 6 months.
- This will result in a decrease in kyphosis angle, an improvement of standing height, an increase in spinal extensor strength and a decreased postural sway





Prevention

- Treating and preventing osteoporosis can prevent many cases of kyphosis in the elderly.
- Early diagnosis and bracing of Scheuermann's disease can reduce the need for surgery.

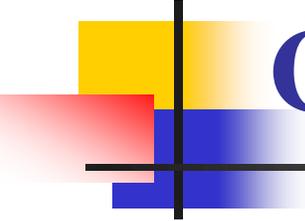


Prevention

- Postural kyphosis can be prevented by being aware of your posture and by taking care of your back.

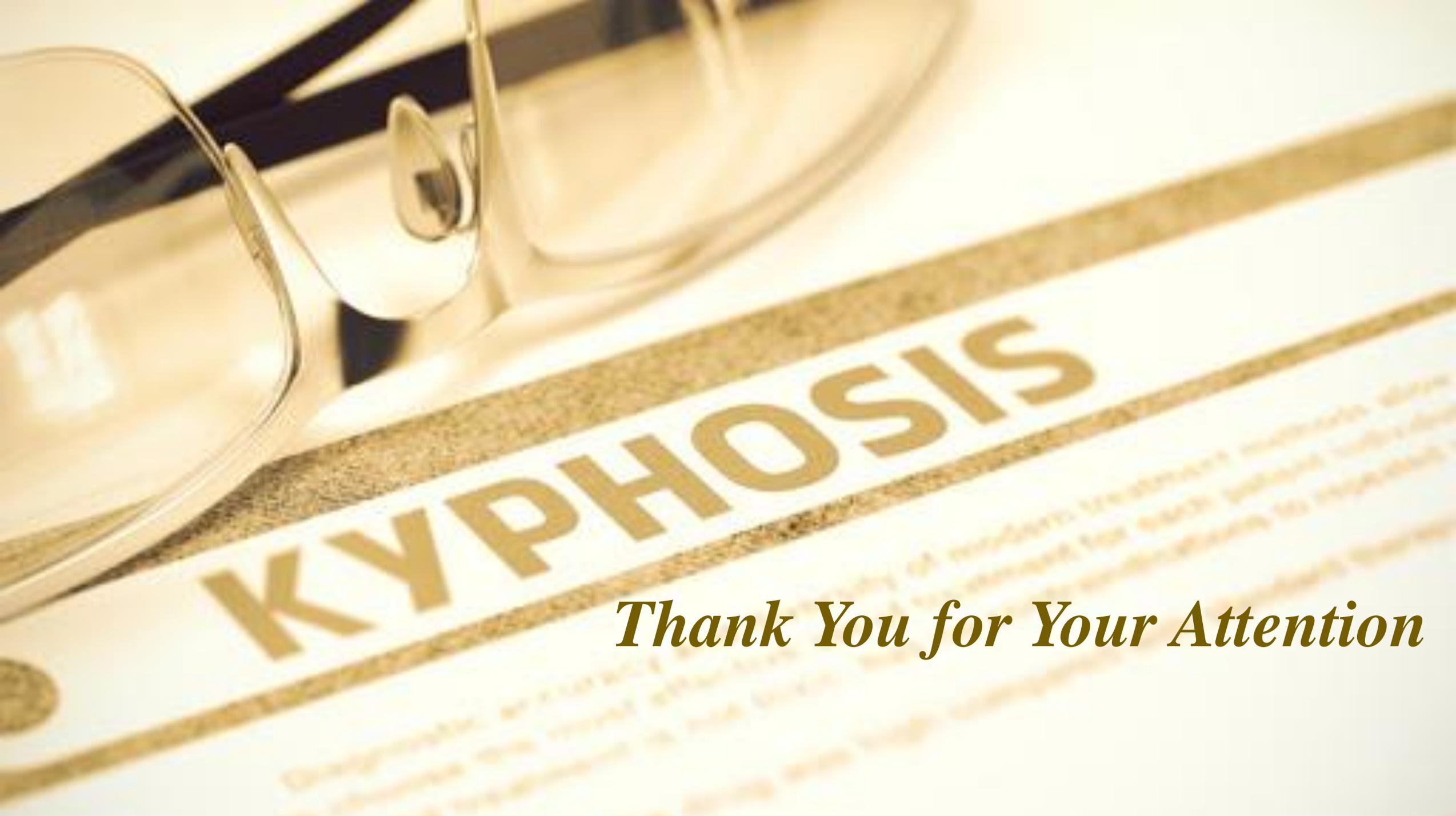
You should encourage your child to:

- avoid slouching
- sit correctly – sit upright, ensuring that the small of the back is supported
- avoid carrying heavy schoolbags that can pull on the back muscles and ligaments; the best schoolbags are well-designed backpacks
- take regular exercise such as swimming, running, walking, yoga are ideal for helping to prevent back problems



Conclusion

According to international studies, the conservative treatment for patients with thoracic hyperkyphosis is regarded as being effective.

A close-up photograph of a pair of glasses with thin frames resting on a document. The document has the word "KYPHOSIS" printed in large, bold, gold-colored letters. The background is a warm, golden-yellow color, and the overall lighting is soft and focused on the text and glasses.

KYPHOSIS

Thank You for Your Attention