Volume 9, Issue 6, June – 2024 International Journal of Innovative Science and Research Technology
ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUN1904

The Progression of Hyperkyphosis in the Senile Population

Kurukuntla Pranitha[1]; Gaddampally Abhilash[2]; Banoth Vikas Kumar[3]
Mallareddy College of Pharmacy, Approved by AICTE, PCI & amp; Affiliated to Osmania University, Hyderabad, Maisammaguda, Dhulapally, (Post via Hakimpet), Hyderabad - 500100

➢ ***Background Information***

The majority of people in geriatric population are suffering with hyperkyphosis which decrese physical and physiological well being of geriatric population.

➢ ***Physical Impact :***

- ***Pain and Discomfort :***

Majority of people suffering with chronic backpain and feel discomfort in doing daily activities.

- ***Reduced Mobility :***

As the excessive curvature lead to decreased flexion of spinal cord lead to decreased mobility.

- ***Balance and Stability :***

Hyperkyphosis might effect the balance and stability in people.

- ***Respiratory Effects :***

As hyper curvature may compress the the chest cavity lead to respiratory distress while doing physical activities.

Keywords:- *Hyperkyphosis, Kyphosis, Geriatrics, Senile, Measurement, Review.*

I. INTRODUCTION

Senile hyperkyphosis, also known as age-related hyperkyphosis or dowager's hump. Kyphosis is a spinal condition characterized by an excessive outward curvature of the thoracic region (upper back), resulting in a hunched back appearance(1). This curvature is typically more than 50 degrees when measured on an X-ray. Kyphosis can occur at any age but is most common in older adults due to age-related degenerative changes.(2)

II. TYPES OF KYPHOSIS

➢ *Postural Hyperkyphosis :*

This is the most common type of kyphosis. It usually happens during adolescent age. Bad alignment Your vertebrae, or spinal bones, are held in place by muscles and ligaments that can be stretched. Lifting heavy bags on the back and using mobile phones in young age over back may also cause postural kyphosis. Your spine becomes rounded as a result of stretching because it forces your vertebrae out of their natural alignment. More children assigned to be female at birth than those assigned to be male at birth are affected by it. It doesn't usually cause pain.

➢ *Scheuermann's Kyphosis :*

This type happens when vertebrae have a different shape than expected. This is also known as Scheuermann disease, juvenile kyphosis, or juvenile discogenic disease, is a condition of hyperkyphosis that involves the vertebral bodies and discs of the spine identified by anterior wedging of greater than or equal to 5 degrees in 3 or more adjacent vertebral bodies. The thoracic spine is most commonly involved, although involvement can include the thoracolumbar/lumbar region as well.

➢ *Congenital Hyperkyphosis :*

Congenital means a condition present at birth. Congenital kyphosis occurs when your spine doesn't properly develop or develop completely in the uterus. It can increase in severity as you grow. Surgery can correct the spine arc during childhood to prevent it from worsening. It can happen in addition to other congenital growth defects like those that affect your heart and kidneys.(3)

➢ *Cervical Kyphosis (Military Neck) :*

This type occurs when your cervical spine, or the part of your spine at the bottom of your head to your upper back), curves toward your front instead of its natural curve to your back.

III. PREVALENCE

In childhood and through the third decade of life the angle of kyphosis averages from 20° to 29°. After 40 years of age, kyphosis angle begins to increase more rapidly in women than men; from a mean of 43° in women aged 55 - 60 years to a mean of 52° in women 76 - 80 years of age.(4) Reports of prevalence and incidence of hyperkyphosis in older adults vary from approximately 20% - 40% among both men and women. As kyphosis angle increases, physical performance and quality of life often declines, making early intervention for hyperkyphosis a priority(5)

IV. MEASUREMENT FOR KYPHOSIS

The Cobb angle is the most widely used measurement to measure the magnitude of spinal deformities, especially scoliosis, on plain radiographs. Scoliosis is a lateral spinal curvature with a Cobb angle of >10° 4. The Cobb angle technique can also assess the degree

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUN1904

of kyphosis or lordosis in the sagittal plane. This article is focused on the Cobb angle technique in scoliosis.[6]

➢ *Steps for Measurement of Cobbs's Angle :*

- 1.Identify superior and inferior end vertebrae on the X ray
- 2.Draw a line along superior and inferior end plate of vertebrae
- 3.Draw perpendicular lines to lines of superior end plate downward and inferior end plate upwards
- 4. Measure the angle using protractor or digital tool to calculate the cobb's angle
- 5. If the angle is > 40 often reffered to as patient suffering with hyperkyphosis.

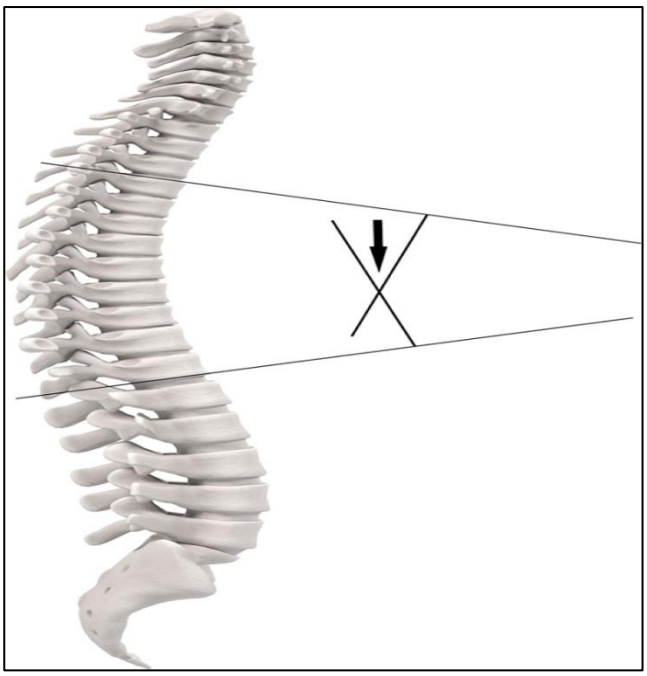

Fig 1 Measurement of Cobb's Angle

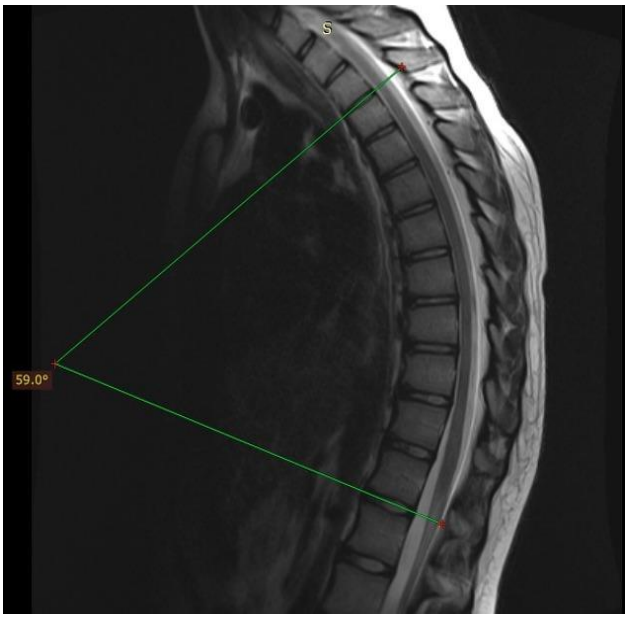

Fig 2 X-Ray Measurement of Cobb's Angle

Fig 3 Debrunner's Kyphometer

➢ *Other Measurements*

Acceptable alternatives are Debrunner's kyphometer

The Debrunner Kyphometer measures an external Cobb angle with the feet of the kyphometer placed over the T2/3 and T11/12 interspaces[7].

- *Flexicurve Ruler :*

A useful tool for evaluating hyperkyphosis is a flexicurve ruler, which enables medical practitioners to take a non-invasive measurement of the spine's curvature. The degree of kyphosis can be measured by molding it along the patient's back and then transferring the shape onto paper. This technique helps monitor the evolution or amelioration of the ailment over time. Utilizing the flexicurve ruler on a regular basis is crucial for managing and monitoring hyperkyphosis effectively.

➢ *Consequences of Hyperkyphosis*

- *Functional Limitations*

✓ *Pain And Discomfort :*

Aggregated pain in thoracic region due to arc of spine,causing muscle rigidity.

✓ *Reduced Movement / Mobility :*

Due to curvature of spine the range of movement is limited or constricted, this causes difficulty in performing day to day activities[8]

✓ *Respiratory Issues :*

Reduced lung expansion space due to aberrant spine curvature results in lower lung volumes and worse respiratory mechanics. Reduced lung capacity and efficiency occur from the thoracic cavity's compression, which also restricts the diaphragm's range of motion and the lungs' capacity to fully expand.[9]

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUN1904

✓ *Postural Imbalance :*

Due to increased spine curvature the normal posture of the body gets deviated.

✓ *Digestive Problems :*

Excessive hyperkyphosis may compress the gastrointestinal system, resulting in trouble swallowing, acid reflux, and intestinal blockage. Managing these digestive issues requires addressing the underlying kyphosis.

✓ *Psychological Problems :*

Visible abnormality that causes anxiety, despair, and problems with self-esteem. Negative effects on mental health and social connections.

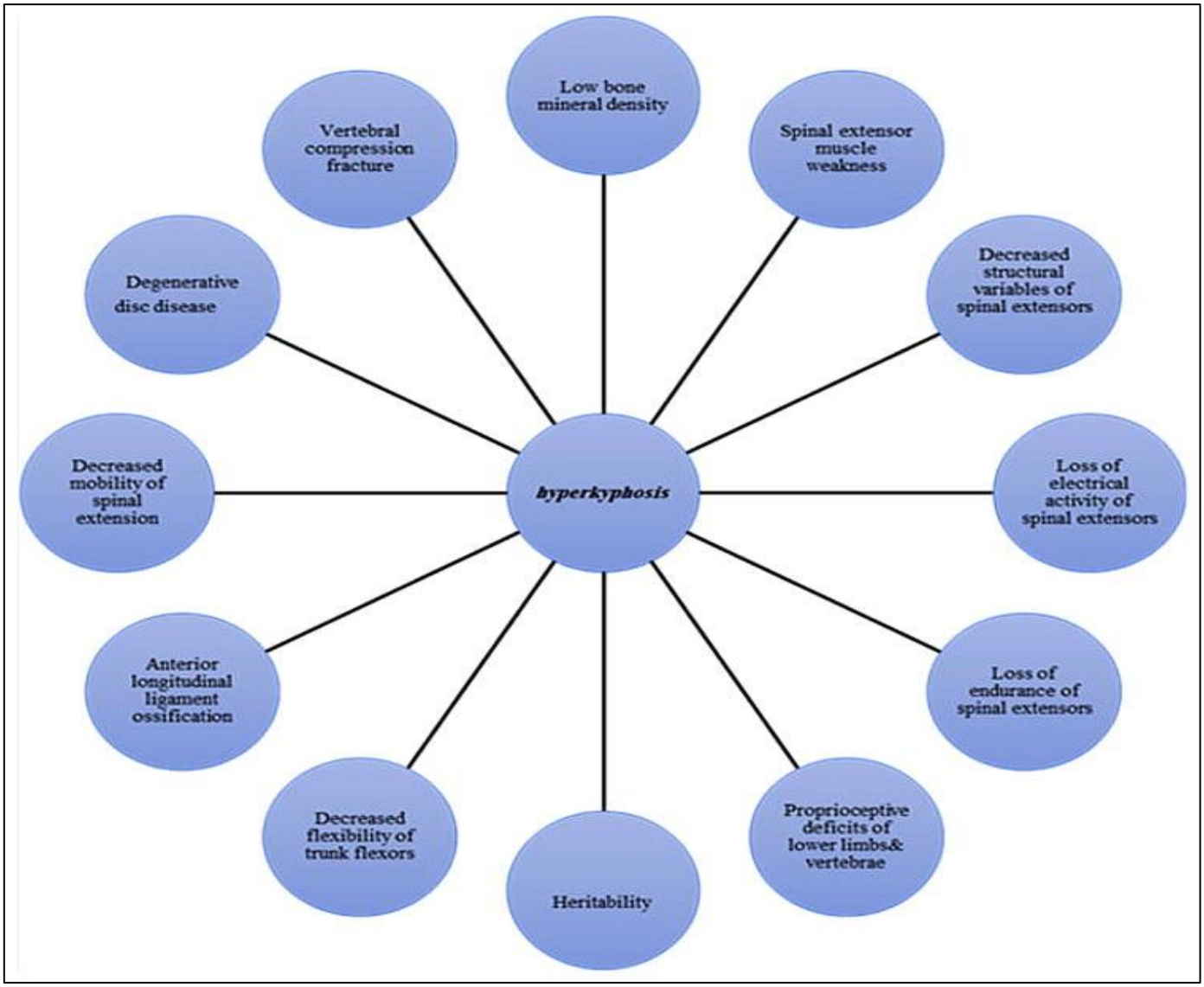

Fig 4 Causes of Age Related Hyperkyphosis

➢ *Vertebral Factors and Age Related Hyperkyphosis*

Vertebral morphology was a strong predictor of thoracic curvature, whereas disc morphology showed a weaker correlation. Together, they accounted for over 85% of the variability in kyphosis. A pronounced anterior wedge shape was noted in the midthoracic vertebral bodies and discs, with higher correlations between variables in this region.

➢ *Degenerative Disc Disease and Hyperkyphosis in Senile Patients*

While disc morphology showed a weaker correlation with thoracic curvature, vertebral morphology was found to be substantially predictive of the latter. Both factors worked together to explain more than 85% of the variation in kyphosis. A tendency existed for the midthoracic anterior wedge structure to become more prominent.[10]

➢ *Osteoporosis and Age Related Hyperkyphosis*

Age-associated hyperkyphosis and osteoporosis are closely connected conditions. Vertebral fractures brought on by osteoporosis have the potential to induce or exacerbate kyphosis. Because the weaker bones are more prone to breaking, a fractured vertebrae might collapse and cause the spine to bend forward. Further issues like as pain, reduced mobility, and a higher chance of falls and ensuing fractures can result from this forward curvature.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUN1904

V. CONCLUSION

To sum up, hyperkyphosis is a common and serious disorder that affects the physical and physiological well-being of the elderly population. As hyperkyphosis worsens in older persons, quality of life is negatively impacted by chronic pain, decreased mobility, problems with balance and stability, and respiratory concerns. In order to effectively manage hyperkyphosis, early intervention and accurate measurement are essential. Methods like the flexicurve ruler, Debrunner's kyphometer, and Cobb angle measurement are crucial instruments for precisely determining the curvature and tracking the state over time.

It is imperative to address the underlying causes of hyperkyphosis in order to manage and potentially mitigate its effects. These causes include changes in spinal morphology, degenerative disc disease, and osteoporosis. Understanding this condition's multifaceted nature allows medical experts to create more individualized and successful treatment regimens, which improves patient outcomes.

REFERENCES

[1]. Julio Urrutia , Tomas Zomoria, Ianiv Klaber, Thoracic scoliosis prevalence in patients 50 years or older and its relationship with age, sex, and thoracic kyphosis , 2014 Jan 15;39(2):149-52
[2]. M.C. Koele, W.F. Lems, H.C. Willems, The Clinical Relevance of Hyperkyphosis: A Narrative Review - PMC (nih.gov), Published online 2020 Jan 24 Kyphosis
[3]. Julio Urrutia , Tomas Zomoria, Ianiv Klaber, Thoracic scoliosis prevalence in patients 50 years or older and its relationship with age, sex, and thoracic kyphosis , 2014 Jan 15;39(2):149-52
[4]. K E Ensrud, D M Black, F Harris, B Ettinger, S R Cummings, Correlates of kyphosis in older women. The Fracture Intervention Trial Research Group , 1997 Jun;45(6):682-7.
[5]. Julio Urrutia , Tomas Zomoria, Ianiv Klaber, Thoracic scoliosis prevalence in patients 50 years or older and its relationship with age, sex, and thoracic kyphosis , 2014 Jan 15;39(2):149-52
[6]. Amy Gladin, Wendy Katzman, Meeta Parimi, Secondary analysis of change in physical function after exercise intervention in older adults with hyperkyphosis and low physical function, February 2021, BMC Geriatrics 21(1)
[7]. Lara Banzini, Luca Vannucchi, Francesco Benvenuti, Maurizio Benucci, Mileno Monni, Aurelio Cappozzo, Steven J Stanhope, Clinical characteristics of flexed posture in elderly women, J Am Geriatr Soc 2003 Oct;51(10):1419-26.
[8]. Amanda L. Lorbergs, George T. O'Connor, Yanhua Zhou, Thomas G. Travison, Douglas P. Kiel, L. Adrienne Cupples, Hillel Rosen, Elizabeth J. Samelson, Severity of Kyphosis and Decline in Lung Function: The Framingham Study, The Journals of Gerontology: Series A, Volume 72, Issue 5, 1 May 2017, Pages 689–694, Published: 24 June 2016
[9]. S Goh 1, R I Price, P J Leedman, K P Singer, The relative influence of vertebral body and intervertebral disc shape on thoracic kyphosis, Clin Biomech (Bristol, Avon). 1999 Aug;14(7):439-48