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EVALUATION OF CERVICAL SAGITTAL PARAMETERS IN NORMAL INDIVIDUALS BETWEEN 20-40 YEARS OF AGE

20-40 YAŞ ARASI NORMAL BİREYLERDE SERVİKAL SAGİTTAL PARAMETRELERİN DEĞERLENDİRİLMESİ

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SUMMARY

Objective: To obtain data that could be beneficial for investigation of spine and pelvis parameters in a healthy Turkish population sample who haven't any spine deformities.

This article discusses the prevalence of cervical sagittal balance in the spinal column and cervical sagittal parameter values in the normal population. The parameters related to the sagittal equilibrium in the cervical vertebrae.

Material and Methods: These four parameters were analyzed in standing lateral graphics of 30 healthy individuals in 20-43 age groups (mean age:33,51±9,27). C0 inclination angle (angle made with the horizontal line of the Frankfurt line), C0-C2 angle (angle between the Mc Gregor line passing through the skull base and C2 lower end plane), T1 slope angle (angle between C7 lower end plate and T1 upper end plate), and cervical lordosis (angle between C2-C7) were assessed in normal healthy individuals between 20 and 40 years of age.

Results: Cervical sagittal parameters; C0 inclination angle (24,82± 2,82), C0-C2 angle (43,03± 14,78), T1 slope angle (2,68 ± 1,33) and cervical lordosis (42,39 ± 7,59) were measured.

Conclusion: Results of this study may be stated to be able to be used as markers to provide normal cervical sagittal balance in Turkish patients with healthy population.

Keywords: Sagittal Balance, Cervical, Sagittal Spine Parameters

Level of evidence: Retrospective Clinical Study, Level III

ÖZET

Giriş: Bu makalede omurgada servikal sagital dengenin önemi ve normal popülasyonda servikal sagital parametre değerlerinden bahsedilmektedir.

Materyal-Metot: Servikal omurgadaki sagital denge ile ilişkili anlatılan parametreler; C0 inklinasyon açısı (Frankfurt hattının horizontal ile yaptığı açı), C0-C2 açısı (kafa tabanından geçen Mc Gregor hattı ile C2 alt son plağı arasındaki açı), T1 slope açısı (C7 alt son plağı ile T1 üst son plağı arasındaki açı), servikal lordoz (C2-C-7 arasındaki açı) 20-40 yaş arası normal sağlıklı bireylerde değerlendirilmiştir.

Sonuçlar: C0 inklinasyon açısı ortalama 24,82°± °2,82, C0-C2 açısı 43,03°± 14,78°, T1 slop açısı 2,68° ± 1,33° ve servikal lordoz 42,39°± 7,59° olarak ölçüldü.

Sonuç: Bu çalışma, Türk popülasyonunda servikal sagital parametrelerin değerlendirildiği ilk çalışma olup, bu parametrelerin literatürle uyumlu olduğu görülmüştür.

Anahtar Kelimeler: Sagital Denge, Servikal Sagital Vertebra Parametreleri

Kanıt Düzeyi: Retrospektif Klinik Çalışma, Düzey III

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INTRODUCTION

This article explains the significance of sagittal balance of the cervical spine parameters associated with sagittal balance of the spine. We aimed to emphasize the importance of the physiological curvature of the cervical sagittal plan. The physiological importance of the sagittal plan has long been known. Sagittal balance in the spine; Cervical lordosis, thoracic kyphosis and lumbar lordosis are in compatible harmony. Cervical, thoracic, and lumbar curvatures increasing or decreasing were known to cause pain. Spino- pelvic parameters have been used for the last 10 years and spinal deformity and especially degenerative spinal diseases are the most important. For the last few years it has begun to work on the assessment of the cervical sagittal plan. Especially the disruption of the cervical sagittal balance, has led to the formation of curvatures of the entire spine compensator. It is understood that the most important cause of neck pain is the deterioration of the cervical sagittal contours. Therefore, we have measured these cervical sagittal angle parameters in a limited number of people without any cervical spine disease between the ages of 20-40.

MATERIALS AND METHODS

These four parameters were analyzed in standing lateral graphics of 30 (6 male, 24 female) healthy individuals in 20-40 age groups (mean: 29,51±9,27), C0 inclination angle (angle made with the horizontal line of the Frankfurt line), C0-C2 angle (angle between the Mc Gregor line passing through the skull base and C2 lower end plane), T1 slope angle (angle between C7 lower end plate and T1 upper end plate) and cervical lordosis (angle between C2-C7) .

RESULTS

Cervical sagittal parameters; C0 inclination angle (24,82± 2,82), C0-C2 angle (43,03± 14,78), T1 slope angle (2,68 ± 1,33) and cervical lordosis (42,39± 7,59) were measured **(Table-1).**

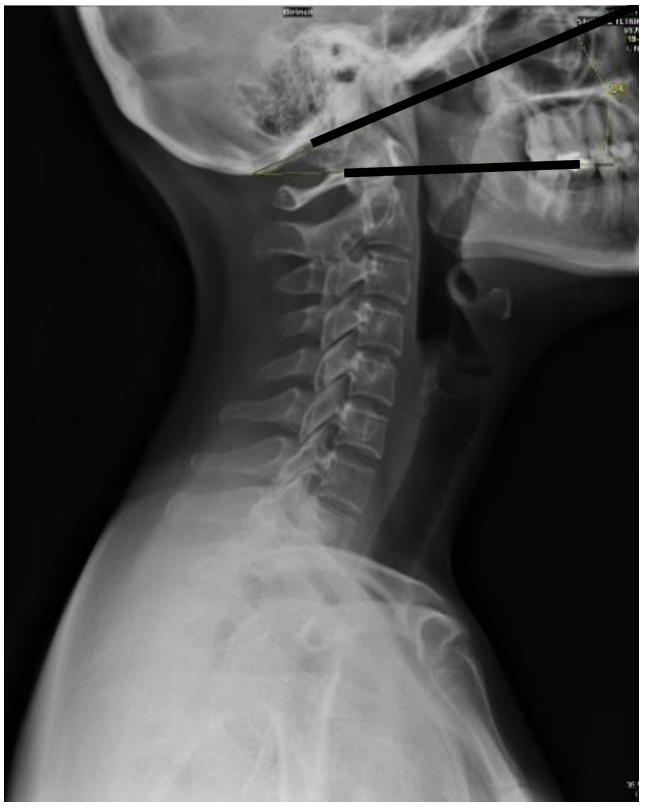

Figure-1. C0 inclination angle (angle made with the horizontal line of the Frankfurt line)

Figure-2. C0-C2 angle (angle between the Mc Gregor line passing through the skull base and C2 lower end plane)

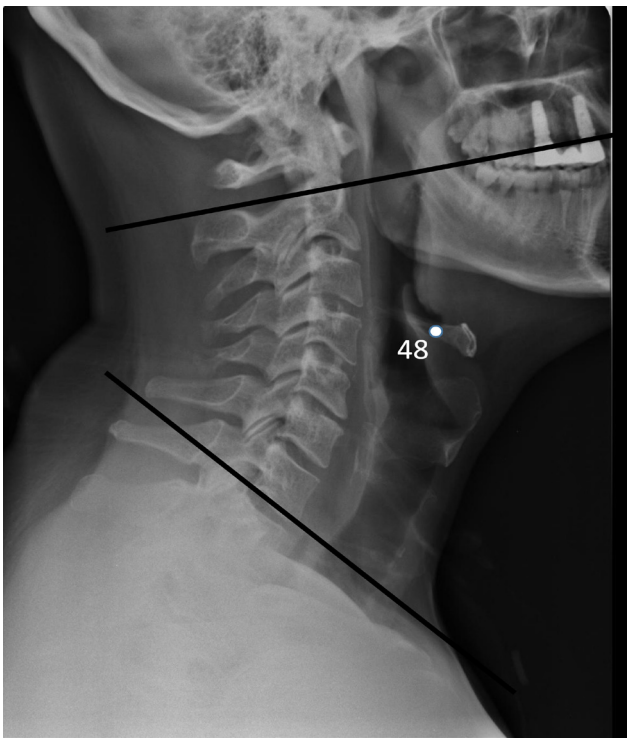

Figure-3. Cervical lordosis (angle between C2-C7)

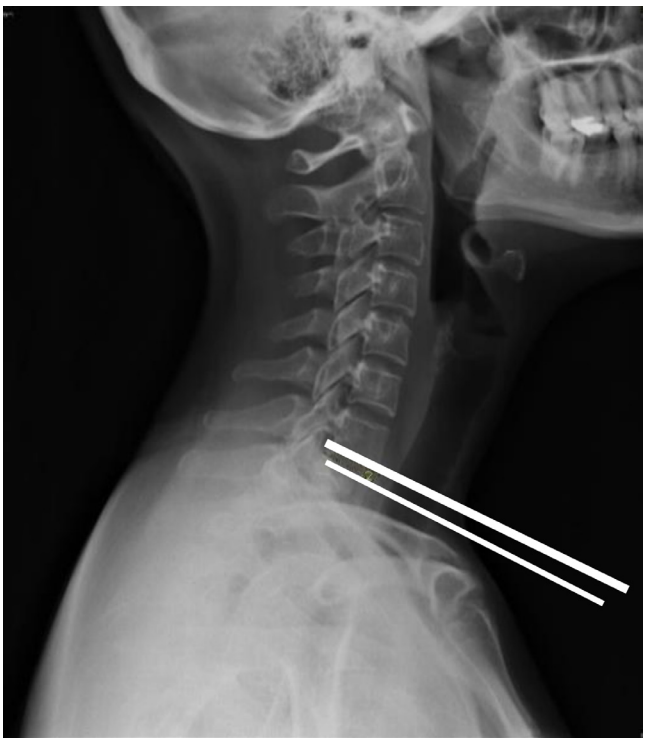

Figure-4. T1 slope angle (angle between C7 lower end plate and T1 upper end plate)

Table-1. Normal segmental cervical angles in asymptomatic adults.

Cervical Sagittal Parameters	Mean	SD
C0 inclination angle	24,82	2,82
C0-C2 angle	43,03	14,78
T1 slope angle	2,68	1,33
Cervical lordosis	42,39	7,59

DISCUSSION

There are several causes of cervical kyphosis. This condition can develop in children and adults. The first cause is degenerative disc disease. The process of degeneration of the intervertebral discs causes many spine problems. In older adults, the wear and tear of aging on the discs between each vertebra can cause the disc to collapse. This slowly leads to an increasing curve and may end with a kyphosis [15].

The second cause of cervical kyphosis is congenital, meaning it is a birth defect affecting the development of the spine. Congenital kyphosis usually leads to a growth disturbance of the vertebrae themselves. Instead of growing normally, the vertebrae grow into a triangular-shape with the small end pointing forward.

When a child has congenital kyphosis, there are generally additional birth defects in other areas of the body. Most commonly, there are defects of the kidneys and urinary system.

The third cause of cervical kyphosis is traumatic, meaning it is the result of an injury to the cervical spine. This may be from a compression fracture of the vertebrae or from an injury to the ligaments in the back of the cervical spine. When a compression fracture of the vertebra occurs, the vertebral body may heal in a wedge shape. Pressure on the spinal cord due to the narrowing can lead to neurological problems, such as pain, numbness, and a loss in muscle strength.

The fourth, and the most common cause of cervical kyphosis, is iatrogenic. Iatrogenic means the problem results from the effects of a medical treatment, such as surgery. Kyphosis

following laminectomy surgery is quite common. It happens much more frequently with children than with adults.

Other less common causes of cervical kyphosis include infection in the spine, tumors of the spine, and systemic diseases that affect the spine (such as ankylosing spondylitis) [2,4]. A cervical kyphosis may also occur years after radiation therapy for cancer involving the neck. The radiation therapy may affect the growth of the cervical vertebrae in children who received radiation therapy in childhood. A laminectomy is a type of surgical procedure that is done in the spine to relieve pressure on the spinal nerves. Laminectomy means "remove the lamina", which is exactly what is done. The lamina is the back side of the spinal canal and forms the roof over the spinal cord. By removing the lamina, there is more room for the nerves and bone spurs can be removed from around the nerves. A laminectomy reduces the pressure on the spinal cord and the irritation and inflammation of the spinal nerves [1].

Given the serious complications of cervical surgery, we need a deep understanding of spine cervical anatomy, preoperative planning, and correction methods [12-18]. These changes between normal values we have identified correctly. Firstly, we need to know the normal cervical sagittal angles.

Knowledge of these normal relationships is of prime importance for the comprehension of sagittal balance in normal and pathologic conditions of the cervical spine [9-11].

As the results of our study compared with the others studies in the literature, our measures were higher than literature was determined [3,5-8,17].

Especially normal cervical sagittal parameters compare with pathological values which are distorted, after cervical discectomy and cervical fusion will open new horizons. Results of this study may be stated to be able to be used as markers to provide normal cervical balance in healthy Turkish people.

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