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CLINICAL EVIDENCE

Anterior thoracic adjusting and the relationship to cervical flexion:

A retrospective case series of twenty-four patients.

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Indexing Terms: subluxation; thoracic spine; anterior thoracic technique; chiropractic.

Introduction

The National Institute for Occupational Safety and Health (NIOSH) has determined that cervical spine musculoskeletal disorders (MSDs) are an important factor in work related injuries. (1) A NIOSH study found high prevalence and incidence of neck and shoulder pain is present in the working population, especially sedentary workers. Their study also found '*strong evidence for support of an association between static or specific postures and neck and neck/shoulder MSDs ... Although various factors are related to neck and shoulder pain, representative causes include reduced range of movement and abnormal activation patterns of para-cervical muscles.*' (2, 3, 4)

One epidemiological study noted that cervical spine surgical procedures increased between 2002-2009 and were associated with significant increased costs during that time period. Oglesby et al hypothesized '*that these increased costs are due to an increased comorbidity burden in patients undergoing anterior cervical or posterior cervical fusions.*' (5)

The measure of the active cervical range of motion (ROM) has frequently been used to discriminate between individuals with pain and those who are asymptomatic and has been reported to be one of the best estimators of cervical disability. (6) Reduced active movement within the cervical region has been found to disturb functional activities and cause a lack of corrective and protective reactions, along with loss of mobility in the neck area that is associated with changes in the passive structures of the cervical spine. (6, 7) Lee et al. reported that there were early changes in cervical ROM and muscle endurance associated with the development of neck discomfort. (8, 9)

> *... twenty-three of 24 patients show improvement in cervical forward flexion following 'anterior thoracic adjustment'. Only one patient showed no improvement in CFF at the post-adjustment check; he was the only patient with a scoliotic spine'*

Quick Tap or Scan:

A decrease in cervical range of motion is believed to be a predictive factor for changes in head and neck posture after long-term visual display terminal work, (10) as well as to relate to overhead work activities (11) and carpal tunnel syndrome. (12) Cervical range of motion assessments have been found capable of discriminating between asymptomatic persons and those with persistent whiplash-associated disorders. (13) Ultimately, as might be assumed, reduced cervical range of motion (ROM) is a common finding in people with neck pain. (14)

Chronic cervical spine dysfunction was studied in '*patients with whiplash and degenerative changes of the cervical spine tested twice (4-7 days). Compared to normal subjects, both groups had a 25% to 35% reduction in cervical motion.*' (15) A systematic review (n=36 studies) found that '*restricted ROM appears associated with negative outcomes while greater ROM is associated with positive outcomes.*' (16)

With the nature of reduced cervical range of motion and its relationship to work-related musculoskeletal disabilities, surgical interventions, and various co-morbidities it would seem important that conservative methods to improve or restore range of motion would be worthy of investigation. The purpose of this study was to determine if a chiropractic intervention, the anterior thoracic adjustment (ATA), (17, 18, 19, 20, 21)could be used effectively in coordination with a common orthopedic cervical range of motion test, (22) cervical forward flexion (CFF).

In general, the ATA is believed to be used predominately for hypokyphotic thoracic spines (18) and related to two factors:

- the vertebral subluxation felt anterior (spinous) and
- the adjustive thrust was applied anteriorly. (21)

Clinically, in this study, the CFF is used as a pre- and post-adjustment assessment to identify the effectiveness of the ATA. Improvement of CFF following the ATA could be a factor in the care of patients experiencing cervical pain and dysfunction. (23) This is consistent with Prushansky and Dvir (24) who found that cervical motion measures provide substantial information regarding the severity of motion limitation and level of effort, and may also be used for performance testing during and after conservative or invasive interventions. (24)

The CFF testing that was used in this study is performed and recorded in the initial exam, and, if a positive finding (pain and limitation) was identified, it was then adjusted (ATA). CFF would then be re-tested and compared to the previous adjustment at each subsequent patient visit until maximized. This paper is a retrospective analysis of how patients presenting with a specific selection criteria, CFF, responded to a one-time ATA intervention.

Method

All patients in this study had limitations of CFF initially, along with neck pain, reported in their initial history and had previously received an ATA at this office. None of the participants had been adjusted within two weeks of this study. None of the subjects were in acute pain (pain increased since their last adjustment in this office). The data collected in this study was obtained during one office visit. The patients in this study were tested in CFF sitting upright on the adjusting table with their legs (supine) down the length of the table. They were instructed to lower their chin to their chest, without moving anything else, especially their shoulders. They were considered a candidate for this study if they could not comfortably touch their chin to their chest. The degree of CFF was noted by a balance goniometer. (25, 26) The ATA was applied and then, while sitting in the same position, CFF was retested. The reference points for both the pre- and post-adjustment checks were the patient's external auditory meatus and the tip of their nose. As was the routine in this office, the pre- and post-adjustment checks were measured and recorded. Measurement was not taken in either instance until the instructions were properly followed.

The 'anterior' vertebrae that were adjusted in these cases were determined by palpation within a cupped area of the mid-thoracic spine (a loss of the apex of the thoracic kyphosis), known as Pottenger's saucer, (21, 26) not only for pain but a diminishment of the interspinous space. (26) All 24 of the patients in this study had these findings inclusive of and between the seventh, eighth, and ninth thoracic vertebrae. The patient, when sitting on the adjusting table, crossed their arms to the opposite shoulder while maintaining their head in maximum CFF. The doctor was stationed on the patient's right with left hand cupped at the designated interspinous space. The doctor's right hand was placed on the patient's elbows as they were lowered onto the doctor's left hand making sure that the concerned area contacted the doctor's hand before any other area of the thoracic spine. The doctor's anterior right shoulder was placed over the right hand so that the thrust was with doctor's body, not just the arm. The patient maintained maximum CFF throughout the adjustment.

As previously stated, all 24 patients had been previously adjusted (ATA) at this office and had restrictions in CFF of the cervical spine with cervical-related pain at the initial consultation. Each subject in this study was asked two questions at the time of their adjustment. At the pre-adjustment check of CFF they were asked when assessing cervical flexion, '*Does this feel tight?*' and all 24 subjects studied answered in the affirmative. At the post-adjustment CFF check they were all asked again, when assessing their cervical flexion, '*Does your motion feel any different?*' and all 24 subjects studied again answered in the affirmative.

Results

Twenty-three of 24 patients show improvement in CFF following ATA. Only one patient showed no improvement in CFF at the post-adjustment check. He was the only patient in the study who had a scoliotic spine, '*an abnormal lateral curve of the spine.*' (27) As can be seen from Chart #1, there were significant changes in CFF re-measured immediately after an ATA (28) even though all of the subjects studied had a previous ATA.

Chart # 1

Degree of CFF improvement	0-5	6-10	11-15	16-20	21-25	26-30	31-35	36+
Number of patients	1	4	9	6	3	1	0	0

{n=24} The number of patients' degree of improvement in CFF following an ATA

Discussion

The Soto Hall orthopedic test is used to diagnose the cause of cervical pain. (29) '*The patient lies supine as the doctor uses one hand to press on the sternum. With the other hand the doctor passively flexes the patients head to their chest. It is considered a positive test if pain is elicited in the cervical spine. Diagnoses vary from ligament damage, muscular damage, osseous pathology or cervical cord disease. A disc defect is suspected when radicular symptoms are elicited.*' (29) This test, considered the primary cervical orthopedic test involving cervical forward flexion, does not measure the effects that the thoracic spine could have on cervical forward flexion, nor is it intended to produce a functional change.

Calliet, referring to the angulation of the anterior curve of the cervical spine, states in his book Neck and Arm Pain, '*There is great normal variation in the sites of maximum flexion and extension*

of the neck due to numerous factors that influence flexibility. Anatomical variations, soft tissue influences and postural factors change the site of angulation.' (30)

Cleland et al, studied 140 patients with neck pain, contrasting outcomes of an exercise-only group with a manipulation of the thoracic spine plus exercise group. Data on disability and pain were collected at one week, four weeks, and six months. The manipulation plus exercise group received an adjustment similar to the adjustment utilized in this study. They described their intervention as follows: '*With the patient in a supine position an anterior –posterior force was applied through the elbows to the upper thoracic spine on the mid thoracic spine in cervicothoracic flexion. The therapist used their manipulation hand to stabilize the inferior vertebra of the motion segment targeted and used their body to push down through the patient's arms to perform a high-velocity, low-amplitude thrust….The results demonstrated that patients with mechanical neck pain who received thoracic spine manipulation and exercise exhibited significantly greater improvements in disability at both the short and long-term follow-up periods and in pain at the one week follow-up compared with the exercise only group*.' (31)

Limitations to this study involved one practitioner doing the pre- and post-adjustment assessments and treatments as well as asking verbal questions, which could be considered leading the patient since it is possible that their responses were an attempt to please the doctor. Utilizing a control group with a sham procedure and having the pre- and post-adjustment assessment blinded to the intervention by another examiner would help minimize some of these confounders.

Conclusion

The CFF assessment appears to be a helpful method to monitor the functional improvement of the cervical spine before and after a successful ATA. The ATA may also appear to improve some cervicothoracic symptoms that accompany limitations in CFF. In this somewhat limited study (24 patients examined and adjusted by one practitioner), it can be determined that an ATA can be an effective remedy for a cervical problem. This study does not discount the need for a comprehensive assessment and adjustment of the cervical spine. Greater inquiry into this assessment and treatment methodology with a larger sample size and minimizing confounders is an important consideration based on the conservative aspect of this care.

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Anterior Thoracic Adjusting and the Relationship to Cervical Flexion: A Retrospective Case Study of Twenty-Four Patients

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Introduction

A decrease in cervical range of motion (ROM) is believed to be a predictive factor for changes in head and neck posture after long-term visual display terminal work, as well as to related to overhead work activities and carpal tunnel syndrome. Cervical range of motion assessments have been found capable of discriminating between asymptomatic persons and those with persistent whiplash-associated disorders. Ultimately, as might be assumed, reduced ROM is a common finding in people with neck pain.[1]

This paper is a retrospective analysis of how patients presenting with a specific selection criteria, cervical forward flexion (CFF), responded to a one-time anterior thoracic adjustment (ATA) intervention. In general, the ATA is believed to be used predominately for hypokyphotic thoracic spines and related to two factors: a) the vertebral subluxation felt anterior (spinous) and b) the adjustive thrust was applied anteriorly. Clinically, in this study, the CFF is used as a pre- and post-adjustment assessment to identify the effectiveness of the ATA.

Methods

The data [n-24] collected in this study was obtained during one office visit. Pre- and post CFF assessments were performed using a goniometer to measure any changes in CFF[2] following the ATA intervention.

Anterior Thoracic Adjusting (ATA) and Cervical Forward Flexion (CFF): n = 24

Degree of CFF Improvement	0-5°	6-10°	11-15°	16-20°	21-25°	26-30°
Number of Patients	1	4	9	6	3	1

The degree of CFF changes noted by a balance goniometer pre and post-ATA

Results

Twenty-three of 24-patients showed improvement in CFF following ATA with the majority in the ranges of 6-20 degrees. The one-patient that showed no improvement in CFF at the post-adjustment measurements had a significant scoliotic spine.

Discussion

Examing the validity of a clinical prediction rule (CPR) purported to identify patients with neck pain who are likely to respond to thoracic spine thrust manipulahation was studied [n=140]. The “results demonstrated that patients with mechanical neck pain who received thoracic spine manipulation and exercise exhibited significantly greater improvements in disability at both the short- and long-term follow-up periods and in pain at the 1-week follow-up compared with patients who received exercise only.”[3]

Conclusion

The CFF assessment appears to be a helpful method to monitor the functional improvement of the cervical spine before and after a ATA. The ATA may also appear to improve some cervicothoracic symptoms that accompany limitations in CFF.

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