CERVICAL HYPERLORDOSIS, FORWARD HEAD POSTURE, AND LUMBAR KYPHOSIS CORRECTION: A NOVEL TREATMENT FOR MID-THORACIC PAIN

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ABSTRACT

Objective: To describe a novel approach to correcting cervical hyperlordosis and forward head posture in the treatment of mid-thoracic pain using specific rehabilitative equipment

Clinical Features: A 27-yr-old male patient had a chief complaint of intense, episodic mid-thoracic pain. A posture examination revealed several abnormalities, including apparent thoracic humping or buckling, along with significantly rounded shoulders. Radiological study resulted in a finding of a 52° cervical lordosis and forward head posture (FHP) validated by 2 separate measurements.

Intervention and Outcome: Treatment included 10 visits in 24 days, consisting of spinal manipulative therapy (SMT) combined with a 4-lb headweight device and a figure-8 clavicle brace, followed by positional traction on an intersegmental traction table. Specific instructions for home care were provided to the patient. Post-trial radiographs showed a reduced cervical lordosis of 40° and a reduction in FHP of 12mm, according to 1 of the 2 FHP measurements. An incidental improvement was also recorded for the lumbar lordosis. Patient symptoms were alleviated by the end of the trial period.

Conclusion: This comprehensive approach appeared to correct specific posture abnormalities seen on x-ray, and had an apparent positive effect on the patient's chief complaint. Each procedure in this treatment method needs to be tested separately to determine which procedures had the greatest effect. (J Chiropr Med 2003;2:111–115)

KEY INDEXING TERMS: Cervical Hyperlordosis; Posture; Chiropractic Manipulation

INTRODUCTION

The effects of cervical kyphosis or hypolordosis have been previously described in the literature (1). However, comparatively little has been reported about the effects of cervical hyperlordosis. There is speculation that a cervical hyperlordosis may put increased stress on the posterior joint system, potentially leading to neck pain and other posterior joint problems (2).

Specific techniques have been identified that show reasonable effectiveness at restoring cervical lordosis (3–7). Unfortunately, there is little evidence to show if any techniques can effectively treat cervical hyperlordosis, or if those techniques designed to correct cervical kyphosis or hypolordosis are contraindicated in instances of cervical hyperlordosis.

One technique discussed by Cailliet (8) for cervical hyperlordosis treatment is placing a book atop the patient's head, to help the patient assume a more erect posture, thus taking stress off of the posterior joints.

Due to the relative failure of spinal manipulative therapy (SMT) alone as a treatment for altered sagittal spinal curves (3), I hypothesized that SMT combined with some form of active spinal rehabilitation would be more effective at reducing cervical hyperlordosis.

CASE REPORT

A 27-yr-old male had a chief complaint of sharp, stabbing mid-back pain that was exacerbated by certain trunk movements and alleviated only by over-the-counter pain relievers and bed rest. The patient is a plumber by trade, and reported that job tasks frequently increase the mid-back pain due to assuming awkward positions for extended periods. He had not previously seen any other health care provider for this problem, and came at the advice of his employer. The patient reported that the mid-back pain had been occurring for the previous 6 months, occurred episodically about 1–2 times per day, and was rated as a "6 or 7 out of 10 at their worst." The episodes would last for about 10 minutes, and had the potential to make the patient "drop to his knees."

An initial posture exam revealed a high right shoulder and an anterior left hip. In viewing the patient from the side, there was evidence of a significant amount of

0899-3467/03/1002-049$3.00/0
JOURNAL OF CHIROPRACTIC MEDICINE

thoracic humping and concomitant rounded shoulders. However, because visual posture examination is not reliable for determining the sagittal spinal curves (9), it was necessary to conduct a radiological examination to determine the patient's cervical and lumbar curve measurements, and compare these values to normal ranges (10). Thoracic films were not ordered since there was nothing in either the history or physical exam that warranted these films according to current radiographic guidelines (11). A palpatory examination revealed a significant amount of muscle hardness in the paraspinal musculature bilaterally around the T5-T11 levels. There was point tenderness over the T8-T9 area just lateral to the spinous processes bilaterally. This was the same area that was the origin of the patient's chief complaint. Physical examination produced no abnormal sensory, motor, or reflex findings. Sorenson's test and Lhermitte's test reproduced the patient's chief complaint. Kemp's test revealed a significant lack of rotation bilaterally, but produced no pain or discomfort. Maximal cervical compression and Spurling's test produced localized sharp pain on the ipsilateral side of rotation at the base of the neck, and produced the same finding on both sides.

The radiological examination revealed a cervical curve measurement of 52°, significantly higher than the normal range of 34–42° (10). The forward head posture, when measured from the sella turcica down to the anterior portion of the C4 disc, as outlined by Kapandji (11), measured 15mm. This value should be 0mm according to Kapandji. Due to the cervical hyperlordosis, the author also measured forward head posture using a vertical line from the posterior superior corner of the C2 vertebral body down to the posterior inferior corner of the C7 vertebral body. This method is outlined by Harrison et al (10). The initial measurement using this method was 20mm. The normal value for this measurement is 10mm (10). In addition, I also measured the relative position of the C7 vertebra using an angle similar to that of the atlas angle illustrated by Jackson et al (12). This angle is measured by drawing a line parallel to the disc plane of the C7 disc, and measuring that line against a line constructed horizontally, parallel to the bottom edge of the x-ray film. Initially, this angle measured 43°.

Procedures

The results of the radiological exam, with both static and stress images, helped to determine that this patient would use an anterior headweight device with 4 lbs of weight in the headweight device. This device and method have been previously reported (6,7). The patient was instructed to wear this headweight at home twice daily for 20 minutes each time. This program was followed until the follow up evaluation after 10 visits in 24 days. Each visit included SMT that consisted of an anterior thoracic adjustment designed to mobilize the upper thoracic spine. Additionally, a percussive adjusting instrument was used to mobilize all of the cervical spinal joints, so that the headweight would have a more immediate effect when worn following the adjustments (13). Following each SMT session, the patient wore the anterior headweight device combined with a "figure 8"-type clavicle brace for 7 minutes (See Figure 1). Patient was instructed to walk during this procedure.

Once this procedure was completed, the patient then laid on an intersegmental traction table for another 7 minutes. While on the traction table, high-density foam blocks were placed under the patient's cervicothoracic and thoracolumbar junctions, to help increase the traction effect of the table (Figure 2). The traction rollers in the table were locked so that they only came into contact with the thoracic spine, rather than have the rollers traverse the entire spine.

This routine was repeated exactly in this order for all 10 visits. After the 10th visit, follow-up radiographs were taken to calculate the amount of progress made during the 10-visit trial. The pre and post-trial lateral cervical radiographs were compared to see how much correction had taken place. The positioning procedures used here have been outlined by Jackson et al (14), and were used to minimize the chance of error due to patient positioning. In the post study, the cervical curve was reduced from 52° to 40°, which falls within the normal established range. In addition, the C7 angle was reduced

Figure 1. Shows the placement of the anterior headweight device and the clavicle brace. Patient wore this equipment for 7 minutes immediately following the manipulative procedures. 4lbs was used in the headweight.

Figure 2. Shows a demonstration of the fulcrum block procedure. The cervical block is placed under the patient's cervicothoracic junction, allowing the head to extend back over the sloped portion of the block (black arrow). The low back support is placed under the patient's thoracolumbar junction, posterior to the lowest palpable ribs (red arrow). The blocks are outlined in yellow. This procedure was performed for 7 minutes while laying on an intersegmental traction table.

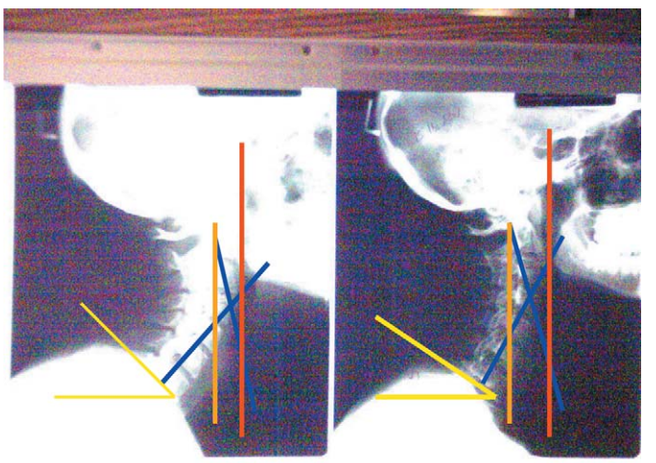

Figure 3. Shows the Pre (left) and Post (right) trial radiographs. The C7 angle, represented by the yellow lines, went from 43° pre to 29° post. The blue lines represent the cervical curve measurement from C2 to C7. The initial hyperlordosis was reduced from 52° to 40°. The red line is the forward head posture measurement as outlined by Kapandji (11). This measurement did not change from pre to post. However, the forward head posture measurement described by Harrison et al (10), (orange line), decreased from 20mm to 8mm post-trial.

from 43° to 29°. Interestingly, the forward head posture, when measured from the sella turcica, did not change from pre to post. However, when measured from the posterior superior C2 body corner, the forward head posture was reduced from 20mm to 8mm. Figure 3 shows the changes in the pre and post lateral cervical radiographs.

DISCUSSION

Initially, this patient was scheduled to undergo a treatment regimen of 12 visits over 4 weeks, followed by 1 visit per week for 90 days. However, at the beginning of the 3rd week of the trial, the patient informed the clinic that he was going to be called to active duty immediately, and that he wouldn't be able to finish his scheduled treatment plan. Therefore, I had to stop treatment after 10 visits, and re-examined the patient after only 10 visits.

The significance of the C7 angle as measured in this study is not fully understood. In the post-trial film, the C7 vertebra made a posterior rotation in the X plane (-θX). However, it was suggested by Takeshima et al (15) that the position of the C7 vertebra might be a predictive factor in the static alignment of the cervical spine. It is also important to discuss the seemingly contradictory results of each of the forward head posture measurements. In the present case, the sella turcica measurement did not improve from pre to post evaluation. In contrast, the C2 body corner measurement did improve by 12mm from pre to post study. In light of this evidence, it may be proposed that a cervical hyperlordosis is a reactionary process as a result of the significant thoracic buckling noted on the visual posture exam. The fact that the sella turcica measurement did not change may be due to the presence of an exaggerated mid to upper cervical curve, which may be necessary to satisfy the ocular righting mechanisms in a patient with thoracic buckling. As Takeshima et al (15) suggest, the static position of the C7 vertebra is associated with a more upright cervical spine. The change in the C2 body corner measurement of forward head posture in the present study is consistent with this association.

It is noteworthy to point out that in the pre and post lateral lumbar x-rays, the lumbar curve improved from a 5° kyphosis to a 14° lordosis. These measurements were made by drawing posterior tangent lines off the back of the L1 and L5 vertebral bodies. Ferguson's angle (sacral base angle) also improved from 4° to 18° post trial (Figure 4). Interestingly, these changes were made without any SMT performed on the lumbar spine. The

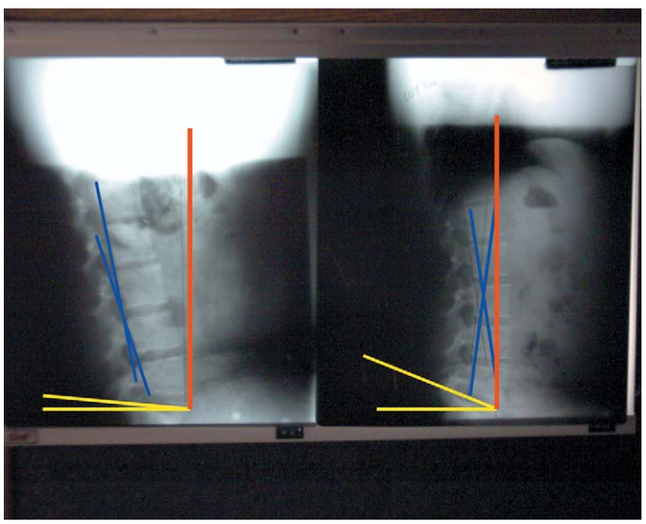

Figure 4. Shows the pre (left) and post (right) lateral lumbar radiographs. The yellow lines represent the sacral base angle (Ferguson's angle). This value increased from 4° to 18° post-trial. The blue lines represent the lumbar curve measurement from L1 to L5. This number also increased from a 5° kyphosis to a 14° lordosis after the trial period. The red line is the same gravity line as the red line in figure 3. According to Kapandji (11), this line should intersect the posterior third of the L3 vertebral body.

only treatment used on the lumbar spine was the use of a foam block placed under the thoracolumbar junction with the patient supine on an intersegmental traction table for 7 minutes per visit.

From a symptomatic standpoint, the patient averaged a Borg pain rating of 2.3 out of 10 in the 1st week of the trial. At the end of the 1st week, the patient experienced some neck discomfort, which was attributed to muscular pain likely caused by the rehabilitative procedures. In the 2nd week of care, the patient averaged a 1 out of 10 Borg rating. By the 3rd week, the patient was pain free. The patient also reported that he "noticed that he walked more upright throughout the day."

It is difficult to say which specific procedures had the most effect at correcting the cervical hyperlordosis, forward head posture, and lumbar kyphosis. The most appropriate follow-up would be to test the effects of the clavicle brace, headweight device, and traction table/foam block positional traction procedures separately. It is unlikely that the traction table/foam block positional traction procedure had a significant effect on the magnitude of lumbar lordosis restoration that was evident here. This type of traction procedure, which is passive in terms of patient participation, has not been shown to produce results in the present time period. Typically, passive-type traction procedures are tested over several weeks before their efficacy is determined (3,4,16).

The present article seems to illustrate the advantages of recruiting the reflexive, neurological control of posture to aid the treating physician in correcting certain types of postural disorders more quickly and efficiently. I suggest that physicians who specialize in posture correction should place more emphasis on neuromuscular control of posture. There already exists a vast amount of knowledge concerning the involuntary control of posture, which can aid the practitioner in correcting posture disorders (17–21).

CONCLUSION

Combining SMT with certain forms of traction, bracing, and neuromuscular re-education using a headweight device effectively reduced the presence of cervical hyperlordosis that seemed to be, at least partially, responsible for a patient's recurrent episodic severe mid-thoracic pain. This specific combination of manipulative and rehabilitative therapies, to my knowledge, has not been previously reported in the literature. This specific treatment regimen produced significant objective results on radiographic studies, as well as symptomatic improvement determined on a Borg scale over the course of the trial period. It can be concluded that this treatment protocol seems to effectively correct cervical hyperlordosis and lumbar kyphosis, on a short-term basis. A long-term follow up is desirable.

ACKNOWLEDGEMENT

I would like to thank Darin Weeks for modeling the rehabilitative procedures in the figures presented.

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