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Case Study

Nonsurgical correction of straight back syndrome (thoracic hypokyphosis), increased lung capacity and resolution of exertional dyspnea by thoracic hyperkyphosis mirror image® traction: a CBP® case report

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Abstract. [Purpose] To present the increase in thoracic kyphosis in a patient suffering from exertional dyspnea, reduced lung capacity, and spinal pains related to straight back syndrome (SBS). [Subject and Methods] A 33-year-old male patient was put on a CBP® corrective care program involving mirror image® traction procedures designed to increase the thoracic kyphosis. [Results] This patient had a 10° improvement in thoracic kyphosis in 16-weeks that was maintained 7-months later. There was a simultaneous reduction of pain, resolved exertional dyspnea, and a greater than 2 liter increase in lung capacity. [Conclusion] This case illustrates that nonsurgical improvement in thoracic kyphosis in a patient with SBS is possible and that this may positively influence lung capacity, health and function.

Key words: CBP, Mirror image, Straight back syndrome

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INTRODUCTION

Straight back syndrome (SBS) is the congenital loss of the normal physiologic kyphosis. It was first described by Rawlings in 1960[1, 2)] and can mimic congenital heart disease as biomechanically it decreases the distance between the heart and spine compressing and displacing internal organs including the heart[3)]. The incidence of SBS is unknown[4)].

Although surgical procedures have been described for this condition[5–7)], it is usually reserved for those patients with SBS who have dramatic hypokyphosis to the extent that the thoracic spine is lordotic with concomitant cardiopulmonary symptoms. In cases where SBS is a less extreme presentation of the deformity, as in true hypokyphosis, surgery is seldom performed[5)].

There is a paucity of data on the effectiveness of increasing the thoracic kyphosis by nonsurgical means; we could only locate two cases detailing the treatment of SBS patients in the literature[8, 9)]. The first was an adult female patient with scoliosis; over a 4 year period the patient had a 16° improvement in thoracic kyphosis after receiving a variety of treatments including deep tissue massage, outpatient psychological therapy, daily exercise focusing on mobilization of the chest wall, and manipulation[8)]. The other case involved a 19-year-old male who received thoracic hyperkyphosis traction and exercise as part of CBP® technique[9)]. This patient increased their thoracic kyphosis by 14° over a 12-week period that was maintained at 2 years and 9-months follow-up.

The current report details the successful increase in thoracic hypokyphosis and simultaneous increase in measured lung capacity and relief of exertional dyspnea, back and chest pains in a male adult with SBS.

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SUBJECT AND METHODS

On July 28, 2016, a male patient aged 33 presented with a variety of pains as well as exertional dyspnea; he would get easily winded from mild physical exertions. Recently, he had nearly failed a work fitness exam because of his decreased lung capacity.

Initial assessment revealed he had severe, frequent, sharp, aching and radiating pains, rated at levels up to 8/10 on a numerical rating scale (NRS: 0=no pain; 10=worst pain ever). He reported pain to be present in the chest, thoracic spine, left arm and shoulder, and cervical spine. This condition was caused by repetitive actions and trauma that was reported to be exacerbated recently. The patient also reported a generalized weakness in the upper extremities. The patient scored a 45% on the quadruple visual analogue scale (QVAS)[10], and a 27/70 on the back bournemouth questionnaire (BQ)[11]. Lung capacity testing revealed it to be 2.5 litres as measured with a Microlife, USA Model PF100 Peak flow and FEV1 Meter.

Radiography was taken on Aug 1, 2016. All images were assessed by the PostureRay® system (Posture Co., Trinity, FL, USA) that uses the Harrison posterior tangent method for lateral spinal curve analysis[12–14]. This method overlays a 'posterior tangent' line along the posterior vertebral body margins. These methods are reliable and repeatable as is posture[15, 16]. The lateral thoracic spinal curve from T3–T10 was measured to be 17.6° (normal≈34°[17]) (Fig. 1).

The patient was put on a CBP®[18, 19] corrective care program involving mirror image traction procedures designed to increase the thoracic kyphosis. The patient graduated in intensity in traction from simply laying prone over a thoracic block on the Denneroll™ table (Denneroll Pty Ltd., Wheeler Heights, NSW, Australia), to the addition of two pull straps located cephalad and caudad to the thoracic roll. Traction time was increased incrementally from 3 minutes per session over consecutive sessions towards and maintained at 15 minutes each treatment session (Fig. 2).

He was also given 'instrument adjusting' to stimulate and release trigger points along the paraspinal muscles. Additionally, the patient performed up to 200 repetitions per day of a neck extension exercises with a pro- lordotic resistance band (Stroops, Inc., Clearfield, UT, USA) where the patient was instructed to flex the thorax into hyperkyphosis as they extended the neck backwards with the band placed at mid-neck loading forward in a manner consistent with 3-point-bending.

The patient was treated for 36 treatments over a 16-week period before a re-assessment. Thereafter, the patient was seen for an unrelated complaint and an assessment was done at 11-months follow-up. At all assessments the patient's lung capacity was measured.

RESULTS

Upon re-assessment on November 28, 2016, the patient had completed 36 treatments. Lateral thoracic radiography revealed that there was a 10° improvement in kyphosis (27.5° vs. 17.6°) (Fig. 1). The patient reported that the pain in the chest had been completely resolved and that the other bodily pains had been significantly reduced. The patient also had improvements in QVAS (15% vs. 45%) and the BQ (9/70 vs. 27/70). The patient's lung capacity had increased from 2.5 l to 4.77 l.

Approximately 11-months after the initial assessment (June 19, 2017), the patient presented with an injury unrelated to previous complaints. Upon assessment it was determined that the increase in thoracic curve that was initially attained was maintained (25.9° vs. 27.5°) (Fig. 1), as was the improvements in lung capacity (4.85 l vs. 4.77 l). The patient reported that his bodily pains would flare up occasionally when he 'over did it' physically, and that the chest pain that was initially relieved had come back, though was mild and only occasional. The patient scored a 22% on the QVAS and a 19/70 on the BQ. The patient consented to the publication of his treatment results.

DISCUSSION

This case illustrates that hypokyphosis in SBS can be improved by nonsurgical methods. Further, the increase in thoracic kyphosis in this patient suffering from exertional dyspnea, decreased lung capacity and back pain with SBS was relieved in a relatively short amount of time.

This is the second case documenting the increase in thoracic hypokyphosis in a patient with SBS and related symptoms by CBP® methods. In the case by Betz et al.[9], 37 treatments were performed over 12-weeks, resulting in a 14° improvement. That is very similar to this case, a 10° improvement in 36 treatments over 16-weeks. As compared to the only other case by Brooks et al.[8], this case had a before and after of a 4 year time period and also a host of various treatments leading to confusion as to which treatment may have contributed to the correction. Also, the patient had scoliosis, complicating the matter even further.

Harrison et al.[17, 20] has determined that the thoracic spine closely resembles a portion of an ellipse, featuring a relatively straight thoraco-lumbar junction, continuing cephalad to an ever increasing curvature until the upper thoracic spine reflects its sagittal curvature to continue into an ideal cervical circular lordosis at T1–T2[21]. The normal thoracic kyphosis therefore, spans from T2–T12[17, 20]. In the majority of cases with hypo-kyphosis, efforts at increasing the thoracic kyphosis must be made at the mid and upper thoracic area. The mirror image® traction approach offers a direct way to accomplish this. The reason traction may be effective over different approaches lies in the visco-elastic properties of the spinal discs and liga-

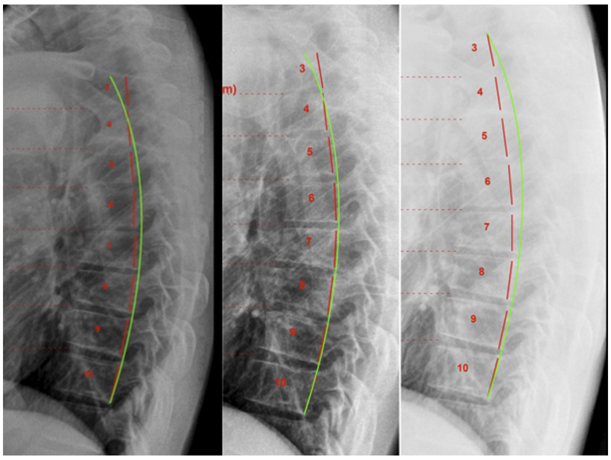

Fig. 1. Lateral thoracic radiographs
Left: Initial (Aug 1, 2016); Middle: Post-36 treatments over 16-weeks; Right: 11-month follow-up. Green line indicates normal thoracic kyphosis; red line indicates patient (CBP® Seminars, Inc.)

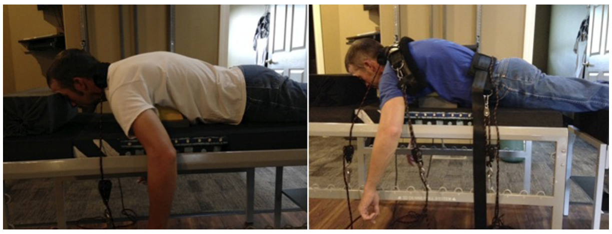

Fig. 2. Thoracic hyperkyphosis traction
Patient progressed in intensity of the mirror image® traction set-ups. See text.

ments[22]. This is why exercise and spinal manipulative procedures typically do not correct spinal alignment[23–26].

In this case the patient had their kyphosis increased from approximately 18° to 28°, however according to the literature, this leaves the patient still 6° away from the normal T3–T10 alignment of 34°[16]. Ideally the patient should have continued treatment to achieve optimal correction as timelines for postural correction from CBP® methods have been previously extrapolated from data from clinical trials for the neck and lower back[19, 27, 28]. In clinical practice, however, circumstances such as finances and others affect the commitment of the patient to end treatment prematurely despite the initial dramatic improvements in health and function.

This case is limited by being a single case. Future clinical studies should be done to further evaluate CBP® methods in the treatment of hypokyphosis and SBS.

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