POSITIVE OUTCOME WITH TOURETTE SYNDROME AND CHRONIC TIC DISORDER FOLLOWING CHIROPRACTIC INTERVENTION: A CHIROPRACTIC BIOPHYSICS® (CBP) CASE REPORT WITH A 13-YEAR FOLLOW-UP.

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ABSTRACT

Objective: To discuss the case of a patient diagnosed with Gilles de la Tourette syndrome (GTS) and chronic tic disorder that showed positive improvements following Chiropractic Biophysics® technique (CBP) interventions designed to correct/improve a cervical kyphosis.

Clinical Features: A 19-year old male was diagnosed with GTS and chronic tic disorder at age 14 by a medical general practitioner. He was treated unsuccessfully by both Haloperidol as well as previous spinal manipulative therapy. The tics were simple phonic, simple and complex motor, and were present “almost always” and overall impairment on the Yale Global Tic Severity Scale (YGTSS) was rated at 40%. A lateral cervical radiograph showed a cervical kyphosis with anterior head posture.

Intervention and Outcome: The patient was treated by CBP technique protocol and procedures. The patient received 81 treatments over the course of 12-weeks. At the 3-month re-exam, a change to a cervical lordosis and reduced anterior head posture was observed on follow up radiography. The YGGTS showed significant improvement in tics and were present “frequently” and overall impairment was rated at 20%. Additionally, the patient was able to self-reduce the needed dose of Haloperidol by 50%. A 13-year follow-up indicated the patient was able to discontinue use of medication permanently and had remained well.

Conclusion: The patient experienced significant reduction in symptoms and improvement in quality of life. Additionally, the MD prescribing Haloperidol concluded that the reduction in symptoms was significant enough to discontinue the medication. These changes in function may be related to the correction of cervical kyphosis. (*Chiropr J Australia 2017;45:368-376*)

Key Indexing Terms: Gilles de la Tourette syndrome; Chronic tic disorder; Cervical kyphosis; Chiropractic

INTRODUCTION

Tic and habit disorders are syndromes and a sub-category of neuropsychiatric obsessive-compulsive disorders (OCD) (1). These disorders have generally been considered chemical or neurophysiological in origin and are characterized generally by the inability to inhibit repetitive movements or physical movements. At the extreme, the disorder can be clarified as Giles de la Tourette syndrome (GTS) characterized by multiple motor and vocal tics (2). Its prevalence rate is about one percent worldwide (3). GTS also has common comorbidities, such as attention deficit hyperactivity disorder

(ADHD), obsessive-compulsive behaviours and disorder, and autistic spectrum disorders (2,3). Common coexistent psychopathologies include depression, anxiety and behavioural disorders such as oppositional defiant and conduct disorders (2,3).

Most patients as well as treating doctors view GTS as difficult to treat and that treatment necessitates severe side effects with reduced quality of life (4). The typical treatment approaches include psychotherapy, pharmacotherapy, and neurosurgery (4).

Little to no literature could be located discussing the relationship between spinal abnormalities and chronic tic disorders. This case is interesting and important because the prevalence of these disorders and co-morbidities such as ADHD are on the rise in developing countries. As conservative care providers, chiropractors may be able to assist in improvements in these cases.

We present the successful outcome in a 19-year old treated by Chiropractic BioPhysics® (CBP) technique, who had been medically diagnosed with GTS five years previously.

CASE REPORT

Clinical Features

A 19-yr-old male was diagnosed with Tourette Syndrome by a Canadian Medical Doctor at age 14. He reported having fallen from a chair at the age of twelve. Following this fall, he began to develop uncontrollable tics and muscle spasms. The spasms were mainly focused in his face, jaw and vocal cords. However, he also reported bilateral spasms of the muscles of his feet.

At age 14, he was diagnosed by a general practitioner using visual observation of the tics that he had a variant of GTS and was placed on Haloperidol. He reported some minimization of the tics following the medication but reported that the symptoms never completely disappeared. For a period of 1.5 years, from age 17 to 18.5, he reported a self-directed discontinuation of the medication. During that time, he states that his tics increased. Due to the increase in symptoms, he began taking the Haloperidol again, but reports that the results were minimal.

Additionally, he reported visiting a chiropractor in Canada where spinal manipulative therapy was the primary treatment protocol. He reported some improvement in the muscle spasms, but no significant changes in the quality or quantity of the tics. None of the previous physicians had performed any objective analyses of his tics or of their severity.

Upon initial presentation to one of our clinics, we administered the Yale Global Tic Severity Scale (YGCSS) (5). This outcome measure was developed by Leckman et al (6) and has been shown to be an effective indicator of the intensity of involuntary tics.

He reported no pain at the time of his admittance. He stated that he considered his health good, weighed 57kg and was 175cm tall. His cervical spine range of motion was assessed with a cervical range of motion device (C-Rom) and was found within normal

limits with no obvious restrictions in motion. The patient reported no discomfort or pain upon any motions of the trunk or neck.

The chief complaint was reported to be chronic tics described as motor and phonic tics. The motor tics were of two categories: 1) simple motor tics of mouth movements, facial grimaces, head movements, shoulder shrugs, abdominal tensing, and leg or foot movements and 2) complex motor tics of shoulder gestures, writing tics, dystonic postures, and tic-related compulsive behaviors. The phonic tics were simple phonic tics including sniffing/grunting and quick exhaling noises (with an inability to complete full sentences); no complex phonic tics were present. The tics were present “almost always” and overall impairment on the YGTSS was rated at 20/50 or 40%.

The patient’s current medical treatment consisted of 2mg of Haloperidol daily. These treatments provided little to no relief of the primary complaints. The patient noted that the vocal tics, physical tics, foot muscle spasms, and anxiety tics did not seem to begin until shortly after the initial traumatic fall. During the 3-year period, the patient discontinued the use of Haloperidol on a few occasions due to the unwanted side effect of impotence.

Postural examination (7) findings consisted of a significant right lateral head to thorax shift ($-T_x^H$) and anterior weight bearing of the head to thorax ($+T_z^H$). Palpation revealed muscle spasms bilaterally, from T2 up to the base of the occiput, as well as pain and tenderness upon palpation of the C1 and the occipital region.

Radiographic studies (Figure 1) revealed a severe reversal of the cervical lordosis, a cervical kyphosis measuring at +12° by the Harrison posterior tangent method of analysis (8) (127% loss of lordosis (9)). The atlas plane line was 0° (normal = -29°(9)) and 46mm of forward head posture (normal=0-15mm(9)). The primary diagnosis was multiple abnormal postural permutations (subluxation), with acquired neck deformity and associated muscle spasms.

INTERVENTION AND OUTCOME:

CBP protocol (10-12) was used including mirror image adjustments, exercises, and cervical extension compression 2-way traction (13). Spinal adjustment forces were applied via diversified, drop table, and toggle maneuvers. CBP protocol and therapy consisted of specific chiropractic adjustments while placing the patient in their postural mirror image position prior to, and during the application of any adjusting force; in this case drop table adjustments were done in the prone position with the head piece elevated and the patient looking forward to extend the neck (i.e. mirror image of their presenting posture).

Because of the severity of the condition, and the limited time schedule of the patient, a schedule of five visits per week was arranged. This consisted of a total of 38 adjustments during the initial 8-week period. All visits included adjustments, cryotherapy, and cervical extension traction (Pope 2-way (7)). On the 15th visit, the patient was

instructed to begin extension cervical traction at home. The goal time was to build up to 20 minutes per day.

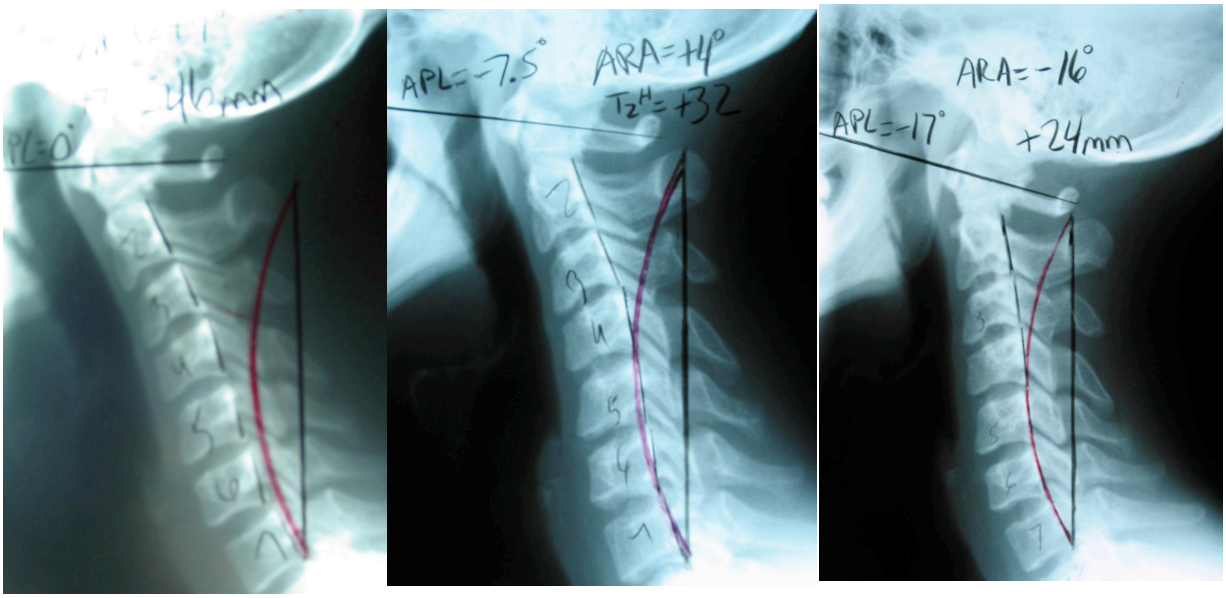

Figure 1. Lateral cervical radiographs. Left: Initial showing severe forward head position and upper cervical kyphosis; Middle: 8-week post; Right: 12-week post.

A 3-month re-exam was performed after another 43 treatments (81 treatments overall). The patient chose to be treated twice daily as he was tolerating the treatments well, because of the severity of his condition, and because he had only allotted a time period of 12-weeks for treatment (patient was visiting from Canada). It was determined that there were continued improvements in the alignment of the cervical spine (Figure 1). Overall, the forward head reduced from 46mm to 32mm (8-weeks) to 24mm (12-weeks), the cervical lordosis improved from +12° (kyphosis) to +4° (4 weeks) to -16° (lordosis) at 12-weeks. The APL improved from 0° to -7.5° (8-weeks) to -17° at 12-weeks.

There was also improvement on the YGTSS. 12-weeks after starting care, the simple motor tics included: shoulder shrugs, abdominal tensing, leg or foot movements. Complex motor tics included shoulder gestures, writing tics, and tic-related compulsive behaviors. Simple phonic tics included sniffing and quick exhaling noises from the throat. Tics were present “frequently” and overall impairment was rated at 10/50 or 20%, a 50% reduction over the 12-week period. Additionally, the patient was able to self-reduce the needed daily dose of Haloperidol by 50%.

The patient moved to Canada and sought out a local chiropractor and continued treatment for approximately 10 years (2003-2013). The chiropractor did not do CBP treatment, but traditional spinal manipulative therapy. The patient continued to perform home traction for approximately four years (2003-2007), but could not recall the

frequency of home traction or chiropractic treatments. When he did the traction, he would always do 20 minutes duration. He could recall that in 2007 he was able to discontinue his medication use permanently: “It was in '07 that my condition improved enough that I was finally able to stop taking medication for good.” Communicating with the patient 13-years after the initial presentation revealed that he remained well and pharmaceutical free.

DISCUSSION

The central nervous system (CNS) is the master control system of the human body and ultimately controls and coordinates all body and cellular function. Since the CNS is housed inside the skull and spine, it can be subjected to consequent adverse mechanical tensions (14). There have been many studies documenting mechanical stress and strains exerting tension onto the nerves, spinal cord and pons-cord tract with spinal movements and positions on animal as well as human models (i.e. cadavers). These studies demonstrate that normal ‘physiologic’ neural tension can become ‘pathologic‘ neural tension, which may compromise the macro and micro-vasculature as well as neural conduction. (14-24)

Our patient presented with a cervical kyphosis. A recent study by Bulut et al. (15) determined that the presence of a cervical kyphosis was associated with decreased vertebral artery hemodynamics including smaller artery diameter, flow volume, and peak systolic velocity. The vertebral artery is the major blood supply to the cervical spinal cord and brainstem. Further, overstretched neural tissue as with even normal movements for someone with a cervical kyphosis can cause pathologic tension as Stein found that “in a deformed kyphotic cervical spine, even a ‘normal’ amount of movement in the cervical spine may cause compression of the spinal cord.” (25) This is because the spinal cord adopts the length of the bony canal (26).

Having a cervical kyphosis as well as the combination of other postural abnormalities, such as in this case, a right lateral head translation changes the spinal shape (S-shape on AP view) (27) and would result in even greater stresses and strains to be exerted onto the spinal cord with normal dynamic movements (28). When there is increased neural tension, there is increased neurologic dysfunction (29,30).

Alternatively, it has been shown that gradual decompression of nerve roots can restore the intrinsic blood flow (24). Since the patient reported a traumatic fall at age 12, we propose that the cause of the abnormal spinal configuration was a result of trauma. Through the restoration of normal biomechanical structure and curvature, these abnormal stresses and strains were removed from the spinal cord and neural elements, which led to the improvement in function in this patient.

Improved neurologic function following CBP extension cervical traction has been recently documented in the trial by Moustafa et al (31). They found improvement in the latency and amplitude of dermatomal somatosensory evoked potentials (DSSEPs), and central

somatosensory conduction time (N13-N20) in patients treated with cervical extension traction as well as a 'multimodal program' (transcutaneous electrical nerve stimulation, hot packs, thoracic spine manipulation, soft tissue mobilization, strengthening exercises) compared to a group who just received the multimodal program without the cervical extension traction. They speculated that the increased lordosis and reduced forward head posture resulted in the improved neurologic function at 10-weeks and one-year after treatment.

There exists a large amount of literature on GTS and related variants. This literature is generally pharmacological and behavioral in nature. Many theories of causality and subsequent treatment have been put forth. However, because chiropractors are not authorized in most states to prescribe drugs, the pharmacological information has little bearing for chiropractors. The chiropractor who treats GTS patients should familiarize themselves with the current diagnostic and treatment protocols utilized by physicians. Medication may have an effect on treatment outcomes and may be an important factor in proper management of this condition, however, not without its side effects.

We assessed the patient with standard testing procedures such as C-ROM and orthopedic tests, however, condition specific questionnaires should be used in general practice. We used the YGTSS questionnaire, which is recommended for GTS, as it is a better assessment of a patient's tic severity than that of a clinician's brief assessment of a patient's OCD (5). The limitation to this case is that it is just a single case report, so conclusions are limited.

CONCLUSION

This case study demonstrates that spinal correction using the CBP approach may have effects much greater than relief of musculoskeletal conditions. Altered spinal biomechanics associated with abnormal posture may cause significant neurological stress and malfunction. This is particularly evident when considering the effects on the brainstem and the autonomic nervous system. However, because this is a case report, further research is needed to determine the true effects of CBP protocol on patients suffering with GTS.

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