Vectored Upper Cervical Manipulation for Chronic Sleep Bruxism, Headache, and Cervical Spine Pain in a Child

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Abstract

Objective: To discuss the management of chronic sleep bruxism in a 6-year old girl.

Clinical Features: The patient had morning headaches and cervical spine pain. Due to abnormal tooth wear, bruxism had been previously diagnosed and was verified by observation during sleep. She also had abnormal postural and palpatory findings, indicating upper cervical joint dysfunction.

Intervention and Outcome: Bilateral rotary cervical stretching/mobilization and a vectored high-velocity, low-amplitude adjustment were performed in the upper cervical spine, using the atlas transverse process as the contact point. There was complete relief of the chronic subjective symptoms concomitant with remission of the objective signs of joint dysfunction.

Conclusions: Cervical, particularly upper cervical, spine muscle-joint dysfunction should be considered as a potential etiology in chronic childhood sleep bruxism. (J Manipulative Physiol Ther 2003;26:e16)

Key Indexing Terms: *Bruxism; Pediatrics; Chiropractic; Cervical Vertebrae; Trigeminal Nerve*

Introduction

Sleep bruxism is defined as grinding of teeth characterized by rhythmic patterns of masseter activity and audible sounds that are usually nonreproducible during the conscious state.[1] Sleep bruxism and tooth grinding are reported in 14% to 20% of children under 11 years of age,[2] with an average of 5 episodes per night.[1] Frequency of grinding increases up to the ages of 7 to 10 years old and then decreases with age,[1] often resolving with eruption of the secondary dentition.[3]

Sleep bruxism has been recognized as a clinically relevant problem for decades, but a definitive understanding of its pathophysiology remains elusive.[2] Sleep bruxism is thought to result mostly from inputs originating in the brainstem due to physical or emotional stressors which produce activation of masticatory muscles during sleep.[4] A list of suspected physical problems related to sleep bruxism includes occlusal discrepancies, central nervous system disorders, genetics, systemic factors, allergies, partial arousal from sleep, and cervical spine dysfunction (ie, forward head posture).[1] Psychological factors, referred to generically as stress, are often listed as a likely cause of sleep bruxism; however, studies have cast question on this.[1,5]

Symptoms associated with sleep bruxism include headaches; pain in the neck, back, shoulder, or chest; stiffness and pain in the morning; and tenderness in the temporomandibular joints.[1,4] Attrition of the teeth and/or faceting, particularly atypical faceting, have been reported as the most reliable dental symptoms of bruxing.[1] Sleep bruxism can cause prolonged injurious biomechanical loading of the temporomandibular joint combined with increased jaw muscle activity, which may be significant factors initiating pathological changes in this structure.[4]

Treatment of sleep bruxism, other than dental splints to protect the teeth, includes physical therapy to correct forward head position and cervical spine dysfunction, with the goal of allowing the craniomandibular complex to function without noxious input from suspect cervicospinal neuromuscular joint dysfunction.[1]

Case Report

A 6 year-old-girl complaining of neck pain, headache, and sleep bruxism was brought by her mother for examination. The girl had begun to complain of morning neck pain and headaches over the past 2 months. Pain was rated on a Visual Analogue Scale (VAS) at 8/10; frequency was ap-

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proximately 75% of the time. The bruxism had been noted for 2 years, with a current frequency of 5 to 7 nights per week, 10 to 12 episodes per night. The mother had been made aware of the possibility of bruxism by a dental exam, which discovered abnormal wearing of the teeth. The bruxing was attributed to stress by the dentist, and a splint was recommended. Additional prior treatment included 2 adjustments by a chiropractor using the Toftness technique 4 weeks prior to her visit to this office; those visits were unsuccessful for symptom reduction. There was no recollection of previous cervical or related spinal trauma.

Static palpation in the sitting position revealed a hard muscle knot and a tender point along the right C2 lamina. Passive C2 spinous motion was asymmetric to the left. In an unloaded position (supine), passive C2 spinous motion was symmetric. General postural analysis revealed distortion, including a supine right leg-length alignment asymmetry and pelvic unleveling (left crest high) in the standing position. Based on these findings, a diagnosis of a subluxation/muscle-joint dysfunction of the upper cervical spine with a misalignment of the atlas to the left and anterior was made.

Based on their association, the cervical pain and headache were thought to be related to the nightly bruxing. It was unclear, however, if the findings of upper cervical subluxation/muscle-joint dysfunction were related to the long-standing bruxism. A quick search of the literature (MEDLINE, CINAHL, and Index to Chiropractic Literature [ICL]) using the terms *bruxism* and *manipulation* or *chiropractic* turned up no hits. Based on previous experience with upper cervical muscle-joint dysfunction in cases of temporomandibular joint dysfunction, which can involve bruxism, a decision was made to render treatment on an experimental basis. Consent from the parent was obtained. Treatment included very gentle axial rotation, range-of-motion, mobilization, stretching of the cervical spine, right and left, with the patient supine. This was followed by a linear/vectored (nonrotary) high-velocity low-amplitude (HVLA) manipulation of the atlas. For this treatment, the patient rested on her right side on a table with a mastoid support (no-drop) headpiece. The left atlas transverse process, contacted with the pisiform of the doctor's hand, was given a light, shallow thrust in a vector opposite the suspected left anterior relative fixation.

Follow-up visit 2 days later revealed no signs of postural distortion and only slight tension/tenderness in the muscles of the right C2 lamina. The mother reported the daughter had only 1 episode of bruxing the night following the adjustment. No adjustment was deemed necessary on the follow-up visit. A second follow-up visit 2 weeks later also found the patient clear of postural distortion and upper cervical muscle tension/tenderness. The mother related there had been no episodes of bruxism or complaints of neck pain and headache. Examined 4 months later, there had been no recurrence of any symptoms or signs of upper cervical muscle-joint dysfunction.

Discussion

This case study appears to show a relationship between putative upper cervical muscle-joint dysfunction and chronic sleep bruxism in a young child. Given the temporal association between the manipulative treatment and cessation of the chronic symptoms, spontaneous remission is less likely. A positive symptomatic reaction to the clinical encounter and not the treatment is also possible. However, such a positive psychosomatic reaction was not obtained with the prior dental or chiropractic therapeutic approaches.

Molina et al[4] note that severe bruxers may present with increased nociception input to the trigeminal system. The trigeminal system has been found to connect with the gray matter in the upper cervical cord (C1 and C2), and appears to be widespread in terms of both sensory and motor reflex activity.[6] Bogduk[7] calls this continuation of the gray matter of the spinal tract of the trigeminal nerve and the dorsal horns of the upper 3 cervical spinal cord segments the trigeminocervical nucleus. He writes, "As such, the trigeminocervical nucleus is the essential nociceptive nucleus of the upper neck, head and throat. Whatever the actual innervation of structures in this region, noxious stimuli from them will be mediated by the trigeminocervical nucleus."[7]

Recent hypotheses to explain myofascial and joint dysfunction theorize afferent activity of muscle chemonociceptors driving the gamma motor system in a positive feedback loop causing muscle hypertonicity and increased spindle signal.[8,9] There is some evidence for this pathophysiological process in the cervical spine.[10,11] If such chemonociceptive input from muscle-joint dysfunction was located in the upper cervical spine, it may provide the nociceptive input necessary to the trigeminal system to cause sleep bruxism.

Input from the small intrinsic muscles of the upper cervical spine are thought to be responsible for activation of the tonic neck reflexes,[12] which have been shown to cause global postural distortion and leg-length alignment asymmetry.[13,14] Further, it has been theorized that afferent input from upper cervical muscle-joint dysfunction causes pathologic activation of the tonic neck reflexes.[15] In addition, there appears to be a closely organized relationship between tonic neck reflex activity and trigeminal reflex activity.[16] Tonic neck reflexes have been shown to have a significant influence on the temporalis muscle,[17] an elevator of the jaw.

While admittedly speculative, upper cervical muscle-joint dysfunction (subluxation) causing pathologic nociceptive afferent activity could affect the trigeminocervical tract and, in turn, the masseter and temporalis muscles causing sleep bruxism, as well as the tonic neck reflexes, causing the pelvic torsion and supine leg-length alignment asymmetry which were noted concomitantly in this case.

Conclusion

This case study demonstrated a rapid and complete recovery of chronic sleep bruxism, headache, and cervical

spine pain in a child after upper cervical vectored manipulation. The possibility of upper cervical muscle-joint dysfunction as a cause of sleep bruxism should be explored.

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