

# Osteopathic Manipulative Treatment in the Management of Pediatric Headache and Orthodontic Intervention: A Case Report

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CASE REPORT

## Abstract

The incidence and frequency of pediatric headache has increased over the past 3 decades, affecting as many as 88% of children and adolescents.<sup>1</sup> Currently, there are no approved acute treatments for recurring headache or migraine in childhood, and few medications for the management of pediatric headache have been studied in controlled trials. In addition, an insufficient number of reports in the current literature provide examples of conservative management for pediatric headache. Here, the author describes a case of a 10-year-old girl with a history of unremitting headache and orthodontic intervention. Her symptoms resolved following removal of the orthodontic intervention in conjunction with osteopathic manipulative treatment (OMT). The present case suggests further study involving osteopathic evaluation and OMT should be considered as a safe and effective option for conservative management of secondary pediatric headache.

## Introduction

Headache is one of the most common health complaints of children and adolescents.<sup>2,3,4</sup> The incidence and frequency of headache in childhood and adolescents has increased at an alarming rate over the past 30 years. One study looking at long-term trends in the incidence of headache in schoolchildren showed the risk of frequent headaches more than doubled between 1974 and 2002.<sup>5</sup> The prevalence of headache is estimated to be 10% to 20% in the school-age population.<sup>3,5</sup> Frequent headaches have a significant impact on a child's quality of life, including decreased school functioning, decreased socialization, and decreased home functioning.<sup>6</sup> Headache is the third most common cause of school absenteeism among illness-related causes.<sup>7,8</sup>

Headaches are generally classified as either primary or secondary. In a primary headache disorder, such as in migraine or tension-type headache, the headache is thought to be intrinsic to the nervous system and not attributed to another disorder.<sup>2,4,8</sup> In a secondary headache, the headache is the symptom of a specific etiology (eg, medication overuse, intracranial hemorrhage), identifiable structural abnormality (eg, brain tumor) or metabolic abnormality (eg, acute febrile illness).<sup>2,4,9</sup> Few medications for the management of

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pediatric headache have been studied in controlled trials.<sup>6,8,10</sup> As a result, in reviewing the pediatric, headache, and neurologic literature, there are currently no approved acute treatments for recurring headache or migraine for children younger than 12 years of age.<sup>6,7,8,10,11</sup> Despite limited data for the safety and efficacy of these medications, many have been tried.<sup>7</sup> Prophylactic therapies that have been used for migraine and other headaches in children or adolescents include antidepressants, eg, tricyclic antidepressants, nonselective reuptake inhibitors and serotonin-selective reuptake inhibitors; antihistamine/antiserotonergics; antiepileptics, eg, dival-

(continued on page 16)

*(continued from page 15)*

proate sodium, gabapentin, and topiramate; beta-blockers, alpha-2 adrenergic agonists; calcium channel blockers; and botulinum toxin type A.<sup>2,6,11</sup>

In this report, a case of secondary pediatric headache caused by an orthodontic intervention resolved following removal of the orthodontic intervention and use of osteopathic manipulative treatment (OMT). Relevant medical literature related to orthodontic intervention, headache and the use of osteopathic manipulative medicine as it relates to this case is reviewed.

## Report of Case

### Presentation and Examination

A 10-year-old girl presented for evaluation of a 2-month history of headaches. The patient's mother stated that the patient had a history of headaches before the 2-month period; however, the headaches were usually mild and resolved spontaneously. The patient's recent headaches were much more intense and not resolving.

The week the patient presented, she had headaches in the morning and evening "to the point of tears." The patient had been evaluated previously by her pediatrician, who offered diazepam as a treatment option. The patient's mother denied the treatment and brought her instead to the Osteopathic Manipulative Medicine Clinic.

The patient stated the headaches were located in the posterior occipital region bilaterally with tension down the cervical spine. She had no history of major injuries. Physical education was the patient's only activity. During the time of a headache, aggravating factors included loud noises, and alleviating factors included heat and a quiet, dark space.

On further questioning, the patient's mother stated the patient had worn headgear for approximately 1 year in preparation for braces. The patient usually wore the headgear each night, but had not been wearing the headgear over the past several days due to the headaches.

On presentation to the clinic, past medical history included headaches and seasonal allergies. On review of systems, the patient denied vomiting, fever, blurred vision, other vision changes, or syncope at headache onset. The patient also denied tobacco, alcohol, or illicit drug use. On presentation, the patient's blood pressure was 100/66 mm Hg; pulse rate, 88 beats per minute; weight, 67.6 pounds; and height, 54.5 inches.

Physical examination revealed a healthy appearing young girl with a body mass index of 16. Head and face were symmetric, normocephalic and atraumatic. External inspection of ears and nose was without lesions or masses. Mucous membranes were moist.

Osteopathic structural examination revealed occipitoatlantal joint extended, rotated left, side-bent right; C3 flexed, side-bent and rotated right; T3-5 rotated right, side-bent left; the right innominate rotated anteriorly and inferiorly; the sacrum in a left-on-right backward torsion pattern; and the cranium in a right lateral strain pattern.

### Treatment

After obtaining verbal informed consent from the patient's mother, the patient was treated with OMT on the day of presentation to the clinic.

OMT included muscle energy to the thoracic region and sacrum, strain-counterstrain to the cervical region, and osteopathic cranial manipulative medicine (OCMM). The patient tolerated the treatment well without complication.

At the completion of the visit, the patient was instructed to keep off the headgear for several days, after which time, she could return to wearing the headgear. She was also asked to return in 1 week for reevaluation and to bring the headgear in with her at this visit.

*(continued on page 17)*

*(continued from page 16)*

On return to the clinic 1 week after presentation, the patient stated the headaches were notably improved without the headgear. After not wearing the headgear for 3 days following treatment, she wore the headgear on a Tuesday night and had a significant headache the following day, such that she was unable to go to school. Tylenol did not help the headaches and nonsteroidal anti-inflammatories upset the patient's gastrointestinal system.

At this follow-up visit, the musculoskeletal examination findings revealed a left-on-left forward sacral torsion, and again, a right lateral cranial strain pattern. The lateral cranial strain was treatable with OCMM; however, when the patient placed the headgear on, the lateral cranial strain immediately returned and remained present despite removal of the headgear less than 1 minute later.

The lateral cranial strain was again treated to resolution with OCMM. A discussion ensued with the patient and the patient's mother, as it was strongly encouraged for the patient to pursue another option for orthodontics over the headgear as it was apparent that the patient was unable to tolerate the headgear at this time. The patient had an appointment with her orthodontist the following week and the patient's mother stated she and her husband were quite willing to entertain alternative options for moving forward without the headgear secondary to the severity of headaches in their child.

The following week, the patient and her father returned to the clinic. The patient had not worn the headgear through the week and her headaches remained entirely resolved. The family had met with the orthodontist, who said the patient had made enough progress of jaw motion with the headgear and the patient could cease further wear of the headgear. She was seen 1 month later without a recurrence of the headaches.

## Discussion

In the above case, the patient's headache was preceded by initiation of early headgear treatment in preparation for further orthodontic interventions. In reviewing the orthodontic literature, there is much debate over the appropriate initiation of treatment time.<sup>12,13</sup> Studies report a considerable amount of orthodontic treatment is often instituted prior to age 11 years, although there have been few reports assessing the effectiveness of orthodontic interventions at and prior to 11 years of age.<sup>13</sup> One study by Pirttiniemi et al aimed to determine the long-term effects of early headgear treatment on craniofacial structures in children aged 7.6 years.<sup>12</sup> In the study, 34 children were randomized to the headgear arm of the study; however, cephalometric values between the early headgear group and the control group did not differ significantly, suggesting

there may not be strong enough evidence at this time to support early use of headgear.<sup>12,13</sup>

Within the orthodontic literature, there also appears to be a lack of studies evaluating orthodontic interventions and its influence on pain and discomfort, including headaches.<sup>14</sup> A study by Feldmann et al reported that 95% of orthodontic patients report experiencing pain during the treatment, with 25% still reporting pain after the first week, but there are few randomized controlled trials that quantify and compare the perception of pain between different orthodontic techniques.<sup>14,15</sup> "Do you ever have a headache?" and "If yes, how often do you have a headache?" were 2 self-reported questions from a questionnaire provided to 3 arms of orthodontic treatment, 1 of which was headgear.<sup>14</sup> The results of the study found very few significant differences between patients' perceptions of pain, and the results for headache were not well delineated.<sup>14</sup>

Osteopathic manipulation looks to explore the relationship between the presenting symptom of headache and secondary causes (eg, the potential effects of headgear) on the cranium and other somatic structures of the patient. Membranous articular strain, or cranial strain patterns, can occur as either physiologic in origin, such as is caused by daily life, or pathologic-type strain pat-

*(continued on page 18)*

(continued from page 17)

terns, such as those caused by dental work, external force, or other trauma.<sup>16,17</sup>

A lateral cranial strain pattern is defined as a palpatory pattern of a strain of the sphenobasilar symphysis displaced with the basisphenoid moving to 1 side and the basiocciput moving to the other.<sup>18</sup> Lateral and vertical strain patterns are not considered physiologic and are often a result of physical trauma.<sup>17,19</sup> In addition, these lateral and vertical strain patterns have symptoms that are often more severe and are unlikely to resolve spontaneously.<sup>17,19</sup>

Despite removal of the orthodontic intervention, it appeared following initial treatment that the patient's lateral strain pattern was not resolving on its own without the addition of osteopathic manipulation. In addition, as described in the case history, the patient would likely have been subject to further continued trials of medication, despite the lack of data for approved acute treatments for recurring headache in the pediatric population.

## Conclusion

Despite the increasing incidence and frequency of pediatric headache, there are no reports in osteopathic literature or otherwise to investigate the effects of OMT on pediatric headache. Trials and use of medications are not currently approved and may not be effective in addressing the root cause of headaches in children.

The present case suggests further study should be considered for the use of OMT as a cost-effective and therapeutically-effective approach in the management of secondary pediatric headache.

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