

Safety in chiropractic care for the pediatric patient: Can we rest on our reputation?

By Joyce Miller DC, Ph.D.

The top priority in chiropractic care for the pediatric patient, in fact, the only priority, is the safety of our care for that child. When I have spoken to a wide scope of clinicians and health care providers on this topic, I realized that they could not hear any details about our care until they were assured of the safety of our care. A hospital midwife familiar with our service and who referred many infants to our university-affiliated clinic* stated,

“Chiropractic care may not help EVERY baby,
but it will not hurt ANY baby.”

She based this statement upon her experience of years of cooperative care between the hospital and chiropractic clinic. It was very reassuring to hear that statement from a colleague. However, as clinicians who manage the most precious entity in the world, newborns, infants and children, we cannot rest on our past performance but must stay constantly updated.

The purpose of this editorial is to provide the briefest of reviews of the safety record of chiropractic manual therapy for children along with suggesting some reminders for maintaining safety within our practices. The goal is to improve confidence in the safety of our care, based on more than our personal experience, although that is an important element as well.

To be fair, I must start with a disclaimer. I cannot guarantee that this investigation is definitive because this is an editorial and not a systematic review, so it is a given that the search cannot be considered exhaustive, but based upon opinion (as well as word count) as to what is included or not.

Once upon a time, in what now seems to be ancient history, there were very few but very compelling reports in the peer-reviewed literature of harm to children treated by chiropractors. Table 1 lists specific published adverse events in chiropractic pediatric practice.¹⁻⁴

Description of event	Reference
1. 1959- 12 YOA girl with congenital occipitalization resulted in hospitalization	Vohra et al., 2007
2. 1978 - 7 YOA male with recurrent unilateral headaches, often following gymnastics, DC adjusted cervical spine in flexion and extension. Child suddenly became ill with severe occipital bifrontal headache, vomiting and left facial weakness. DC resumed cervical manipulation the following day, again accompanied by severe headache, vomiting and diplopia. Child hospitalized and radiographic studies found defect in distal basilar artery and occlusion of left vertebral artery in the middle of body of C2.	Zimmerman et al., 1978
3. 1983 — treatment of a 12-year-old girl with osteogenic imperfecta resulted in paraplegia	Vohra et al., 2007
4. 1992 — 4-month-old male with torticollis, first noticed 1 week after birth and termed congenital. At 16 weeks, taken to chiropractor. Baby was not able to extend his head when prone. Manipulation included flexion, extension, axial loading and unloading. On the day after treatment, baby was difficult to rouse from a nap and was limp, pale and moaning. Parents took him back to the chiropractor who manipulated again. He immediately began to moan and groan, developed a temperature and was taken to hospital with 39.3 fever, tachypnea (40) and tachycardia (160). He later had a generalized seizure. He was diagnosed with a spinal cord astrocytoma from C3-T8. He was on ventilation for 3 months; at 18 months of age, he was able to use his arms, but never his legs, resulting in paraplegia.	Shafir and Kaufman, 1992
5. 1940-1997: 19 cases of missed diagnosis or delayed medical treatment with three adverse events between 1940 and 1969	Vohra et al., 2007
6. 1992-1997: 16 cases of delayed treatment without adverse event	Vohra et al., 2007
7. 2012: 16 day old baby presented to chiropractor with colicky crying. Chiropractor adjusted the infant with an instrument. Five days later, the baby was presented to a pediatrician for “unusual bulges in the back.” X-rays found 2 posterior rib fractures.	Wilson et al., 2012

Table 1. Total of 8 adverse events (1940-2012) after chiropractic care reported in peer-reviewed literature.⁴

Table 2 shows audits that have been done of specific practice notes along with percentage of side effects.⁵⁻⁷

Table 3 shows systematic reviews of manual therapy for children and their conclusions.⁸⁻¹¹

Table 4 shows parent reports of side effects, in multiple chiropractic practices in two different countries.^{12,13}

Side effects are divided into three categories: (1) mild (transient and requiring no healthcare), (2) moderate

(requiring additional health care) or (3) severe (requiring hospital care).¹⁴

Mild side effects have been reported in chiropractic care for children in approximately 1% of cases. Mild side effects include increased crying for up to 24 hours after treatment, slight restlessness and most commonly, increased sleep.¹³ These are not considered outside of the norm in routine health care. Any event requiring additional medical care is considered an adverse event, and these have been exceedingly rare.

Number of side effects/number of patients	Auditor/Location/year
1 side effect/250 million patient visits	Pistolese/USA/1998
1 side effect for 7,303 patient visits	Jensen/EU/2003
0 side effects in 483 pediatric patient files	Coote/AECC Clinic UK/2003
1% of cases, >7000 pediatric patient treatments	Miller and Benfield/AECC Clinic UK/2008
1% of cases, >300 pediatric patient files	Rawson/AECC Clinic files, UK/2009
1% of cases in >300 pediatric patient files	Alcantara/ICPA files, USA/2011

Table 2. Side effects in chiropractic care for children found in clinical audits.^{5,6,7} An audit is research done on information that was gathered for a different reason. The problem with this is that it is secondary research and it is possible that the side effects may not be included in the record. For example, parents may have just quit care and not reported the side effect.

Conclusion of review	Auditor/Location/year
Serious adverse events from spinal manipulation (performed by chiropractors, osteopaths, physiotherapists, or medical manipulators) were 'exceedingly rare'	Todd, et al., 2015
Systematic analysis of the effectiveness and harms of spinal manipulation found "gentle, low-velocity spinal mobilizations seem to be a safe treatment technique."	Driehuis et al., 2019
Side effects of manual therapy are rarely reported	Parnell Prevost, et al., 2019
The incidence of mild adverse events ranged from 0.3% (95% CI: 0.06, 1.82) to 22.22% (95% CI: 6.32, 54.74). The risk of moderate and severe adverse events is unknown in children treated with SMT. It is unclear whether SMT increases the risk of adverse events in children < 10 years	Corso et al, 2020

Table 3. Systematic reviews since 2015 of safety of manual therapy for children.⁸⁻¹¹

Parent report of side effects or adverse events	Size and type of study (author)
There were no adverse events reported after chiropractic care in responses from 26,600 parents	Open government large survey in Victoria, Australia (Keating, 2021)
Eleven mild side effects reported in a population of 2001 infant patients treated by chiropractors	Prospective study of outcomes in 16 chiropractic practices in the UK (Miller et al., 2019)

Table 4. Side effects or adverse events reported by parents after chiropractic care.^{12,13}

The few adverse events reported in the literature occurred from one to eight decades ago (Table 1). Although a few authors have suggested that adverse events are under-reported, it is unlikely that parents are standing by and watching children being hurt and not speaking out. In fact, there are virtually no reports of legal suits against chiropractors from the pediatric age group of patients. It is an extrapolation, but my thought process suggests that chiropractors are staying educated and updated on recognition of red flags, gentle treatment procedures and safe practices in our youngest population of patients, and thus, continue to maintain safety in practice.

Potential harm in pediatric patients are the same as in all patients and usually stated in four categories:¹⁴

1. Failure to diagnose correctly
2. Delay of correct treatment (usually indicating delay of referral of an ill patient)
3. Misapplication of technique: too much force, poor skills, incorrect technique for the patient causing an unexpected effect
4. Accident — possibly involving office equipment not suitable for the size or age of patient or an unintended use

The incidents reported in Table 1 precisely demonstrate these four categories. What went wrong? In case 1, there was failure to correctly diagnose; manual treatment resulted in headache, unsteady gait, poor coordination and neck pain. The 12-year-old girl was hospitalized after chiropractic treatment and subsequently diagnosed with congenital occipitalization.

In case 2, the chiropractor failed to stop treatment and refer the patient after the 7-year-old developed headache, facial weakness and vomiting after treatment. After continuing chiropractic care, the child was admitted to hospital for treatment, but retained persistent right-sided dysmetria with reduced quadrantanopia (blindness in visual field) as long-term effects.

In case 3, the chiropractor applied inappropriate treatment to a child with osteogenic imperfecta, where manipulation is contra-indicated.

In case 4, the chiropractor failed to recognize signs of 4-month-old ill child, delayed referral for correct treatment, but instead applied a second treatment (after an adverse event) which resulted in life-long paraplegia.

Between 1940 and 1997, there were 35 cases of delayed treatment or referral for correct treatment resulting in three adverse events, which were not further defined. In 2012, a chiropractor likely applied an incorrect treatment with

too much force to a 16 day-old neonate. Rib fractures were subsequently diagnosed by a pediatrician after the mother noticed “odd bumps” in the baby’s back.

These cases come under a Legal Standard of Care, indicating that doctors of chiropractic (DCs) have the same ethical duty to recognize our own limitations and when necessary, recommend more appropriate type of care. The courts have determined the standard of care for DCs is the same that apply to physicians: “that degree of care, diligence, judgment and skills which is exercised by a reasonable chiropractor under like or similar circumstances.” As such, DCs must ensure that they have the necessary knowledge, skills and training to treat the patient’s condition, comply with regulatory and institutional policies and are legally authorized to provide the treatment proposed in the jurisdiction in which they practice.

A key rule in safety is to know when to stop treatment and to refer. Anytime a patient gets worse or fails to get better is the right time to stop treatment and to refer. Applying another treatment after an adverse event is always contra-indicated.

It is prudent to think about common issues in daily practice so that we don’t miss difficult cases. Failure to diagnose is a common issue and usually stems from inadequate history or examination that would identify illness resulting in diagnostic errors which delays correct treatment. A high index of suspicion is appropriate in all practice and the younger the age of the patient, the higher the index of suspicion should be raised. In our teaching clinic, we instituted helpful guidelines:

- Determine that it isn’t a serious or life-threatening condition before determining what condition it is; do a careful diagnosis, with thorough differentials, before instituting any therapy.
- Determine risk/benefit ratio before performing any procedure.
- Document heart rate, respiratory rate and temperature each visit to assess health of child
- In cases where research evidence is unavailable, the best way forward is a short (3-4 treatments) therapeutic trial. If improvement isn’t verifiable after the first or second treatment, reconsider the appropriateness of care. Always be willing to refer.
- The course of therapy must “beat” the natural history of the disorder; if the condition of the child worsens or stays the same, refer for a different type of care.

These simple guidelines will remind the chiropractor to take a pro-active stance to incorporate safe practice strategies into daily practice. It goes without saying that the safety and protection of all patients is our highest goal and we are

grateful for these types of discussion to keep this foremost in our minds.

The conclusion is the same as our previous discussion in 2009.¹⁴ At this moment in time, based on the published research literature, it appears that manipulation, when given by a skilled chiropractor with years of training,

carried out with low forces recommended for pediatric care, has few side effects for the healthy infant and child and their recorded incidence is exceedingly low.

Using fungible forms such as those presented by Miller and Weber in this issue is a helpful way to avoid mis-diagnosis.

*AECC University College Clinic, Bournemouth England

References:

1. Vohra S, Johnston BC, Cramer K and Humphreys K. Adverse events associated with pediatric spinal manipulation: a systematic review. *Pediatrics*. January 2007, 119 (1) e275-e283; DOI: <https://doi.org/10.1542/peds.2006-1392>.
2. Zimmerman AW, Kumar AJ, Gadoth N, Hodges FJ 3rd. Traumatic vertebrobasilar occlusive disease in childhood. *Neurology* 1978;28:185-188.
3. Shafir Y and Kaufman BA. Quadraplegia after chiropractic manipulation in an infant with congenital torticollis caused by a spinal cord astrocytoma. *J of Pediatrics* 1992;120(2):266-269.
4. Wilson PM et al. Posterior rib fractures in a young infant who received chiropractic care. *Pediatrics* 2012;130:e1359.
5. Pistolese RA. Risk Assessment of Neurological and/or Vertebrobasilar Complications in the Pediatric Chiropractic Patient. *J Vertebral Subluxation Research* 1998; 2 (2): 73—78.
6. Miller J and Benfield K. Adverse effects of spinal manipulative therapy in children younger than 3 years: a retrospective study in a chiropractic teaching clinic. *Journal of manipulative and physiological therapeutics* [online]. 2008; 31(6): 419-423.
7. Alcantara J, Ohm J, Kunz D. Treatment-related aggravations, complications and improvements attributed to chiropractic spinal manipulative therapy of paediatric patients: a survey of parents. *Focus on Alternative and Complementary Therapies* 2007 12 (Supplement 1):4.
8. Todd A, Carroll M, Robinson A, and Mitchell E. Adverse events due to chiropractic and other manual therapies for infants and children: A review of the literature. *J Manipulative Physiol Ther* [online]. 2015; 38 (9): 699-712.
9. Corso et al. The safety of spinal manipulative therapy in children under 10years: a rapid review. *Chiropractic & Manual Therapies* (2020) 28:12 <https://doi.org/10.1186/s12998-020-0299-y>
10. Parnell Prevost, C, Gleberzon B, Carleo B, Anderson K, Cark M, and Pohlman KA. Manual therapy for the pediatric population: a systematic review. *BMC Complement Altern Med*, 2019, vol.19(1), 60. <https://doi.org/10.1186/s12906-019-2447-2>
11. Driehuis F, Hoozeboom TJ, Nijhuis-van der Sanden, MWG, de Bie RA, and Staal JB. 2019. Spinal manual therapy in infants, children and adolescents: A systematic review and meta-analysis on treatment indication, technique and outcomes. *PLoS One*, 14(6), e0218940. <https://doi.org/10.1371/journal.pone.0218940>
12. Keating G. Parent reports of chiropractic care for children: A preliminary report from 22,043 parents in Australia. *J Clinical Chiropractic Pediatrics* 2021, vol 20, No. 1, 1731.
13. Miller JE, Hanson HA, Hiew M, Lo Tiap Kwong DS, Mok Z, and Tee YH. Maternal Report of Outcomes of Chiropractic Care for Infants. *J Manipulative Physiol Ther*, 2019 42(3): 167-176. <https://doi.org/10.1016/j.jmpt.2018.10.005>
14. Miller J. Safety of Chiropractic Manual Therapy for Children: How Are We Doing? *J Clinical Chiropractic Pediatrics* 2009 (Dec); 10 (2): 655—660.