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A recent article in the Canadian National Post (May 8, 2018) entitled “Pediatricians alarmed by chiropractic treatments for babies that 'border on the fraudulent'” has received widespread condemnation by many chiropractors and parents alike given the amount of misinformation and misinterpretation that the article presented about the chiropractic care of children. As such, a rebuttal to the article is much needed to properly inform the general public and specifically parents and medical physicians alike who may not be aware of the safety and effectiveness of the chiropractic care of children. Unlike the article from the National Post this rebuttal is based on an evidence-informed perspective that respects the needs and wants of parents for the care of their child, the published research evidence and the clinical expertise of chiropractors in the care of children.

One of the very early studies examining the utilization of alternative therapies by children was published in 1994 by Spigelblatt and colleagues\(^1\) from the University of Montreal. These medical researchers found that, of the various practitioner-based alternative therapies, chiropractic was the most commonly sought alternative care for children by parents to address “medical reasons” such as respiratory, ENT and musculoskeletal problems. The factors influencing choice of alternative therapies by parents for their child were (in order of popularity) word of mouth, fear of drug side effects, chronic medical problems and to a certain extent, dissatisfaction with conventional medicine. In terms of patient satisfaction, 59% of those parents interviewed indicated an improvement in their child’s condition and were “highly satisfied” with their child’s care. In 2008, Barnes and colleagues\(^2\) examined the use of complementary and
alternative medicine (CAM) use among U.S. adults and children based on the 2007 National Health Interview Survey (NHIS), conducted by the Centers for Disease Control and Prevention's (CDC’s) National Center for Health Statistics (NCHS). Barnes and her colleagues from the NCHS found that of the practitioner-based CAM therapies, chiropractic or osteopathic manipulation were the most highly utilized by parents for their children. Motivation for care was to address back or neck pain, head or chest colds, anxiety or stress, other musculoskeletal problems, and ADHD/ADD. According to Black and colleagues this data did not change in the follow-up 2012 NHIS survey that confirmed again the popularity and high utilization of chiropractic for children.

“Chiropractors say their adjustments on newborns are gentle, with no popping, cracking or crunching. Instead, pressure is applied to a specific vertebra with about the same amount of force used to check a tomato’s ripeness, as they like to say.”

The forces applied by a chiropractor in clinical practice was measured by Walter Herzog and colleagues from the University of Calgary’s Human Performance Laboratory. The investigators found that the thrust forces (i.e. the difference between the preload and corresponding peak forces) applied by a chiropractor in the care of children <5 years of age ranged from 13-50N (on average) for the cervical, thoracic spine, and lumbar/SI spine. As a context, consider the following force measures involving birth. Ashton-Miller et al. found the intrauterine pressure applied to the fetal head during expulsion of the fetus was 16 N at rest, 54 N during a uterine contraction, and 120 N during a volitional push. A vacuum device applied to the fetal head applies an additional traction force of up to 113 N, typically with up to four pulls, each coinciding (and additive to) a uterine contraction and push. Pettersson and colleagues recently examined the traction force employed during vacuum extractions and found that the median peak forces for minimum, average and excessive vacuum extraction in the clinical setting were 176 N,
225 N, and 241 N, respectively. In 34% of the cases, a force in excess of 216 N was employed. Relatively speaking, the forces applied during the chiropractic adjustment of newborns are a fraction of these forces and not capable of causing fractures or dislocations of the spine and extremities of newborns and infants. In instances when obstetric forceps are used, the additional traction force can reach up to 200 N. While chiropractors are cognizant of the magnitude and direction of forces of the chiropractic adjustments they employ in the care of children and adults, there should be great concern from within and outside the medical profession on the forces applied via vacuum-assisted births or the use of forceps and their consequence leading to birth trauma. The subject of safety of the chiropractic care of children will shortly be addressed.

“But some doctors are worried that chiropractors are using “scare tactics” to claim that up to 80 per cent of newborns need a spinal adjustment to treat the “trauma” of entering the world. Newborns experience “nerve interference” or a misaligned cervical spine from the birthing process, even when delivered via caesarean section, and should get treatment as soon as possible, chiropractors say. While others claim chiropractic manipulations can “peel away” the symptoms of autism and help non-verbal toddlers speak.”

Indeed, chiropractors and parents alike should be concerned about birth trauma. Enlightened medical doctors are aware of the consequences of birth trauma that would not reach the threshold for what medical doctors are commonly trained to require a consultation. Over 50 years ago, Abraham Towbin, MD7-8 raised the issue of childbirth and birth trauma with injuries to spinal cord and brainstem typically escaping medical diagnosis. Commenting that spinal cord or brain stem injury was found in 10-33% of neonatal deaths autopsied; he raised the significance of this type of birth trauma and the need for wider consideration of this form of nervous system damage and its sequelae in infants who survive. Over 50 years ago, Dr. Viola Frymann, MB, BS, DO, FAOO (an American Doctor of Osteopath and in terms of scope of practice) examined the relationship between disturbances in 1250 newborn infants and anatomic-
physiologic disturbances of the craniosacral mechanism.\textsuperscript{9} In terms of mode of delivery, 62.60\% (N=728) utilized forceps, 4.12\% (N=87) and 33.28\% (N=387) were spontaneous with 87 (6.96\%) not recorded. Of the 1250, 758 (60.64\%) had an occipital strain pattern. Not surprisingly, 76.24\% of the 1250 infants was determined to have a strain pattern of the sphenobasilar symphysis. In terms of the specific mechanisms leading to birth trauma, it is well established that the decreased height of the occipital condyles and the relatively “flatter” orientation of the axial angle of the C\textsubscript{0}–C\textsubscript{1} articulation results in a greater propensity for the lateral masses of the atlas to subluxate laterally (i.e., bone out of place).\textsuperscript{10-11} Maneuvers and forces acting on the infant's spine (particularly the atlas with respect to the axis vertebrae) during the birthing process can cause abnormal biomechanics, abnormal muscular and neurological function. According to Grostic\textsuperscript{12}, the result is neurological insult and mechanical irritation of the spinal cord via the dentate ligaments along with irritation of spinal nerves through vascular compromise. The medical doctor Gutmann described this resultant neurological insult to the upper cervical spine as, “blocked atlantal nerve syndrome”.\textsuperscript{13} A child with this syndrome can present with dysregulation of brainstem and motor regulatory systems as well as an inclination to upper respiratory infections. Examination findings can also include torticollis, disturbance in postural development, disturbed and asymmetrical motor responses including breastfeeding difficulties, scoliosis, hip joint impairment and dysplasia, and growing pains. According to Gutmann\textsuperscript{13} the resultant muscular fixation and blockage in the atlanto-occipital articulation should be addressed with spinal adjustments. Given this small sampling of the literature on the negative sequela of birth trauma, there is no question among chiropractors that more than 80\% of newborns will require a spinal adjustment after birth.
“It’s often an ‘us’ against ‘them’ perspective and I don’t think it needs to be,” said Dr. Douglas Mack, an assistant clinical professor at McMaster University. “But when they overstate what is outside of their realm, quite honestly that borders on the fraudulent.”

I respectfully disagree with the comment by Dr. Douglas Mack that “It’s often an ‘us’ against ‘them’ perspective…” In the current healthcare milieu, it’s about integrative medicine that draws upon the best of both conventional and alternative therapies and is characterized by mutual respect and shared management that emphasizes wellness and healing of the entire person (bio-psycho-socio-spiritual dimensions). Antiquated anti-chiropractic attitudes as expressed by the National Post article have no place in the care of infants and children in the 21st century.

Simply put, integrative medicine is about collaborative care of patients. This necessarily requires that all healthcare providers are respectful of each other’s roles and their theoretical/clinical framework of care. Insofar as infants and children are involved, chiropractors have within their scope of practice to take care of children. And based on the best available evidence, parents want chiropractic care for their children.

“Studies suggest spinal manipulations in adults can help with acute low back pain and neck pain. However, chiropractors also claim adjustments can treat a wide array of childhood problems, including colic, constipation, ear infections, digestive disorders, hyperactivity and bed wetting. Other controversial claims include: children who receive chiropractic care are “superior” in health to those who don’t; spinal adjustments can help learning disorders and dyslexia; and chiro adjustments alleviate food and other allergies.”

There is a plethora of research evidence in support of the chiropractic care of children and beyond the scope of this article to fully address. Beyond low back pain and neck pain, infants and children derive benefit from childhood problems such as colic, constipation, ear infections, etc. As an example, let us examine the care of children with this one childhood condition – infantile colic. Simply defined, infantile colic is a diagnosis of exclusion and characterized with an excessively crying infant. In a systematic review of the scientific evidence
for medical and conventional therapies for infantile colic, Hall and colleagues\textsuperscript{15} found that there was little scientific evidence to support the use of commonly prescribed medications such as Simethicone, Dicyclomine hydrochloride and Cimetropium bromide or for that matter lactase, increased fiber intake or behavioral interventions. Unfortunately, an excessively crying baby places them at risk for shaken-baby syndrome and physical abuse.\textsuperscript{16-17} Mothers with a colicky infant experience physical and psychological symptoms along with significant marital tension and disruption in their social contacts.\textsuperscript{18} Dobson and colleagues\textsuperscript{19} evaluated the results of studies designed to address efficacy or effectiveness of spinal manipulative therapies for infantile colic in infants less than six months of age. Regardless of the study limitations in design, Dobson and colleagues\textsuperscript{19} found that parents of infants receiving spinal manipulative therapies reported fewer hours crying per day (based on contemporaneous crying diaries) than parents whose infants did not receive spinal manipulation and this difference was statistically significant.

Healthcare in the 21\textsuperscript{st} century is predicated on value-based care rather than fee-for-service. The focus of care shifts from volume to value with redefined incentives for reimbursements that requires all healthcare providers approach patient care from a holistic patient-centered perspective. Recently, Alcantara and colleagues\textsuperscript{20} examined the quality of life of children experiencing a course of chiropractic care based on self-reports. The chiropractic researchers found that motivation for care was for both symptom care and wellness care (i.e., symptomatic or asymptomatic). Using reliable and valid surveys from the Patient Reported Outcomes Measurement Information System (PROMIS)\textsuperscript{21}, Alcantara and his colleagues examined the response of 881 parents (747 females, 134 males; mean age = 42.03 years) and 881 children (467 females and 414 males; mean age = 12.49 years). The parents were highly educated and presented their child for mainly wellness care. The mean number of days and patient visits
from baseline to comparative quality of life measurement was 38.12 days and 2.74 (SD = 2.61), respectively. After controlling for the effects of motivation for care, patient visits, duration of complaint, sex, and pain rating, significant differences were observed in the probability of experiencing problems (vs. no reported problems) across all quality of life domains. Based on child reports, the children in the study were less likely to report any symptoms of depression, anxiety, fatigue, and pain interference after a course of chiropractic care.

“The American Academy of Pediatrics has warned that children may be at risk of very rare, yet serious, complications from spinal manipulation. A 2007 study led by University of Alberta researchers who reviewed 13 published studies found 14 injuries to children who received chiropractic treatments. Nine of them were serious, and two were fatal. One child died from a brain hemorrhage, the other after a suspected neck fracture. Ten of the injuries were attributed to chiropractic care.”

Such warnings from the American Academy of Pediatrics have no merit whatsoever. The study by Vohra and colleagues\textsuperscript{22} has been offered as a testament to question the safety of the chiropractic care of children. Let’s look at the Vohra study from a scientific perspective. Vohra and colleagues performed a systematic review of the literature on documented adverse events associated with pediatric spinal manipulation. Examining the literature that spanned 105 years (for example, MANTIS database from 1900-2005), these authors found 14 cases of direct adverse events with 10 cases attributed to chiropractic. This should come as no surprise for the readers as chiropractors perform spinal adjustments or spinal manipulation more often than any other profession. We are looking at 10 cases of documented adverse event attributed to chiropractors in a span of 105 years. Putting this in perspective, Lee and colleagues\textsuperscript{23} estimated that approximately 30 million pediatric visits were made to chiropractors in the United States in 1997. In a more comprehensive study on the chiropractic care of children, Alcantara and colleagues\textsuperscript{24} estimated that approximately 89 million pediatric visits were made to chiropractors
some 10 years later. So with millions upon millions of pediatric chiropractic visits to chiropractors, the American Academy of Pediatrics are concerned about complications from spinal manipulation. Utilizing a practice-based research network to collect real-life data on patient safety, Alcantara and his colleagues examine the prevalence of adverse events based on chiropractor and parental responses over the care of children spanning 12 visits. The investigators found no treatment-associated complications (for example, iatrogenesis) based on the chiropractic and parent responders. The chiropractor responders indicated three adverse events per 5,438 office visits (i.e., prevalence of 0.06%) from the treatment of 577 children (i.e., prevalence of 0.52%). The parent responders indicated two adverse events from 1,735 office visits (i.e., prevalence of 0.11%) involving the care of 239 children (i.e. prevalence of 0.84%). Both chiropractor and parents responders indicated a high rate of improvement with respect to the children's presenting complaints, in addition to salutary effects unrelated to the children's initial clinical presentations. Commonly reported benefits of chiropractic care unrelated to the child’s initial presenting complaint as reported by parents were improved immune function, improved sleep and better demeanor. Given this data on the safety of the chiropractic care of children, let us examine the relative safety of chiropractic when compared to medical care.

Gastroesophageal reflux is a common phenomenon in infants with the medical diagnosis of gastroesophageal reflux disease (GERD) being commonly made based on the history and physical examination. Despite this, gastric acid inhibitors such as proton pump inhibitors are widely and increasingly prescribed by medical physicians, often without objective evidence or investigations to guide treatment. Several studies have shown that these medications are ineffective at treating symptoms associated with reflux in the absence of endoscopically proven esophagitis. Previously assumed safety of these medications is now being challenged with
evidence of potential side effects including GI and respiratory infections, bacterial overgrowth, adverse bone health, food allergy and drug interactions. Cohen and colleagues reviewed the reported adverse effects (AE) of pharmacological agents used in the treatment of pediatric GERD in clinical trials. With the use of proton pump inhibitors and specifically Esomeprazole, Cohen and colleagues found, based on a cumulative sample size of all reviewed studies of 764 pediatric patients (i.e., 0 to 17 years of age) involving 12 clinical trials, a prevalence of 266/764 infants or a prevalence of AE of 34.8% that included at least one of the following AE: diarrhea, abdominal pain, fever, eczema, nausea, vomiting or regurgitation, pharyngitis, irritability, flatulence, somnolence, constipation, arthralgia and headaches, the most commonly reported AE. One can only imagine the number of children experiencing adverse events from prescribed and over-the-counter medication with questionable effectiveness. In the study by Vohra and colleagues, the 10 documented adverse events involved 5 minor adverse events (i.e., stiffness and soreness without needing medical care) with 2 AEs improperly categorized by Vohra and her colleagues. Of 4 clinical scenarios deemed by Vohra and her colleagues as associated with chiropractic care, the children had a history of trauma to the nervous system and/or had a pre-existing condition prior to attending chiropractic care. Vohra and her colleagues irresponsibly failed to discuss these as possible confounder or competing explanation to the children’s neurological complaints. This also places into question the veracity of the peer-review process of the journal of Pediatrics in failing to address this issue. For example, Vohra and her colleagues offered the case report by Zimmnerman and colleagues as suffering from complete occlusion of the left vertebral artery at the middle of the body of C2 vertebral body. Vohra and her colleagues associated this with the chiropractic care the child received. However, upon closer examination of the case report, the 7-yr-old boy suffered from
recurrent unilateral headaches. The headaches occurred on either side without prodrome, once to twice per week often following gymnastics exercises in which he attempted mid-air somersaults, landing on the occiput and cervical spine. Further lacking any appraisal skills, Vohra and her colleagues cite the case report by Shafir and Kaufman29 of a 4-month-old boy taken to chiropractor and becomes a quadriplegia. What Vohra and her colleagues failed to consider was that magnetic resonance imaging revealed a mass within the infant’s spinal cord from the medulla superiorly and occupying the entire canal from the mid-cervical to the lower thoracic region. Pathologic examination revealed this mass to be mostly necrotic tissue due to a spinal cord astrocytoma.

“The CPS recommends that “parents should be made aware that there is a lack of substantiated evidence for the theory of subluxated vertebrae as the causality for illness in children.””

In the context of our previous discussion on birth trauma alone, the attitude by the Canadian Pediatric Society about chiropractic is an antithesis to integrative care. Such sentiments from the Canadian Pediatric Society is reminiscent of the famous US trial Wilk versus the American Medical Association. As voiced by Michael Pedigo, DC30 – one of the plaintiffs of the Wilk versus the AMA noted: “Evidence at the trial showed that the defendants (the American Medical Association) took active steps, often covert, to undermine chiropractic educational institutions, conceal evidence of the usefulness of chiropractic care, undercut insurance programs for patients of chiropractors, subvert government inquiries into the efficacy of chiropractic, engage in a massive disinformation campaign to discredit and destabilize the chiropractic profession, and engaged in numerous other activities to maintain a medical physician monopoly over health care in this country.” Despite anti-chiropractic sentiments from within the medical profession, chiropractic continues to be highly utilized by the general public in Canada, the
United States and the rest of the world. And as Barnes and colleagues noted, parent CAM users are five times more likely to use CAM for their children. Such disparaging comments from the Canadian Pediatric Society and others with similar attitudes have not dissuaded parents to take their children to chiropractors.

More worrying to the Canadian Paediatric Society (CPS) is the risk of a chiropractor attempting to treat a serious problem requiring medical treatment by a real medical doctor. In the 2007 study, two children died because of delayed treatment for meningitis.

This cause for concern is based on the study by Vohra and her colleagues using a Letter to the Editor by Turow that allegedly documented two children with meningitis resulting delayed diagnosis and/or care due to attending chiropractic care. “Allegedly” because the publication had no merit in terms of its veracity. The use of a Letter to the Editor was a violation of the inclusion criteria set forth by Vohra and her colleagues for what articles to include in their review of the literature. This was not only highly unethical on the part of Vohra and her colleagues but irresponsible. Again, the issue is raised on how the peer-review in the journal of Pediatrics could have missed such a blatant disregard and violation of the study methodology. Based on the research evidence, chiropractic for children is safe and effective.

As for the opinions of others cited in the article in the National Post, I find their comments lacking of any substance worth addressing as they demonstrated a complete “disregard for the evidence and scientific truth” on the chiropractic care of children. It is well documented that parents that utilized CAM and specifically chiropractic for their child are highly educated and can discern “fact from fiction” and make decisions for the best healthcare for their child. As it stands, parents trust their child’s chiropractor with chiropractic being highly utilized
as care option for children that suffer from neurological disorders, gastrointestinal disorders, cancer and musculoskeletal complaints to name a few.

References


