Keeping Kids Safe in Cribs

Familial Ligament Laxity

Autism: Genetic vs Epigenetics

Uterine Prolapse After Childbirth
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Research by and Formulated for Dr. Dan Murphy, D.C., D.A.B.C.O. for Nutri-West

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Recent Research Findings

- Premature babies fed when hungry go home sooner
- 1 in 5 teenagers has high levels of cholesterol
- Training of birth attendants in developing countries increases babies’ survival
- Autism spectrum disorders climb among 8-year-olds
- Maternal physical characteristics and lifestyle habits associated with growth of fetus in first trimester and subsequent outcomes

Crib Safety
ICA Pediatric Council’s Safety Review of the Month

Familial Ligament Laxity
Peter N. Fysh, BAppSc(Chiro), DC, FICCP and Megan Duchek, BA

Case Study: Resolution of Cyclic Vomiting Syndrome Following Chiropractic Care
Stephanie O’Neill-Bhogal, DC, DICCP

Autism: Genetic vs Epigenetics
Laura Hanson, DC, DICCP, NDT

The Clinical Presentation of Uterine Prolapse After Childbirth
Sharon Vallone, DC, FICCP

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Table of Contents

2
Recent Research Findings

5
Crib Safety

10
Familial Ligament Laxity

15
Case Study: Resolution of Cyclic Vomiting Syndrome Following Chiropractic Care

19
Autism: Genetic vs Epigenetics

23
The Clinical Presentation of Uterine Prolapse After Childbirth

28

The Council on Chiropractic Pediatrics is a specialty membership group for doctors of chiropractic caring for infants, children and pregnant women. It is under the umbrella of the International Chiropractors Association, one of the oldest chiropractic organizations in the world with headquarters in Virginia, USA. The Council’s primary goal is to provide doctors of chiropractic with advanced educational opportunities in pediatrics and pregnancy so they have the skills and knowledge to provide the best care possible for this special patient population. Educational opportunities include a recognized 3-year postgraduate program leading to Board Certification with a Diplomate in Clinical Chiropractic (DICCP). The Council also provides continuing education with conferences and seminars, networking opportunities and other resources to enhance the professional development of the DC in practice.

The Council encourages and helps advance chiropractic pediatric research by holding research symposiums around the world where practitioners/authors have a platform to present and discuss their findings. The Council also publishes the only peer-reviewed pediatrics journal in the profession, the Journal of Clinical Chiropractic Pediatrics.

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**Premature babies fed when hungry go home sooner**

Many parents and health care providers attempt to establish a regular feeding pattern of newborns. In fact the current standard of practice for premature babies in hospitals is scheduled interval feeding. A new review of studies however reveals that feeding in response to the infant’s own hunger cues might result in earlier discharge from the hospital. This review appears in the second issue of *The Cochrane Library* (McCormick FM, Tosh K, McGuire W. Ad libitum or demand/semi-demand feeding versus scheduled interval feeding for preterm infants. *Cochrane database of Systematic Reviews* 2010, Issue 2).

In their search the researchers found eight pertinent studies which included between 13 and 150 preterm infants. Six studies took place in the United States and two in Canada. The researchers focused on randomized controlled trials that compared demand or semi-demand feeding with scheduled feeding in preterm infants who were transitioning from tube feeding to oral feeding.

Demand feeding means feeding the infant in response to their hunger cues and satiation cues, such as releasing the breast or bottle and refusing it when they are full. In semi-demand feeding caregivers assess the infant at regular intervals and feed the infant if hunger cues are present. If the infant is sleeping soundly the infant will receive a tube feeding when scheduled.

“As preterm infants mature to about 34 weeks old — approaching what would have been full term — it might be time to ease away from rigid schedules,” suggests co-author William McGuire, professor of child health at the Center for Reviews and Dissemination at Hull York Medical School, England. “Maybe we should be more holistic and baby responsive, especially in regard to feeding. Maybe the babies know what they want and need better than we do.”

The reviewers suggest that “Feeding preterm infants in response to their hunger and satiation cues rather than at scheduled intervals might help in the establishment of independent oral feeding, increase nutrient intake and growth rate and allow earlier hospital discharge.”

Jay Gordon, MD, attending pediatrician at Cedars Sinai Medical Center and associate clinical professor of pediatrics at UCLA Medical School, said that this review showed the paucity of truly good feeding studies in which mothers and infants were allowed or encouraged to establish breastfeeding ‘rhythm’ early in life. “My personal experience” he said, “is that even the most caring neonatologists exhibit extreme tunnel vision about feeding and illness outcomes later in a baby’s life. I’m certain that they care, they just exhibit a strong bias towards short-term rather than long-term outcomes.” Gordon added that he would like future studies to specify whether infants are receiving breast milk or formula. “Excellent studies have established that not breastfeeding increases the number of ear infections, hospitalizations and even first year deaths.”

**1 in 5 teenagers has high levels of cholesterol**

A study by the US Centers for Disease Control and Prevention (CDC) and published in their *Morbidity and Mortality Weekly Report*, has found that one out of every five teenagers in the US has high cholesterol levels.

The study surveyed 3,125 young people whose blood test results were collected by the National Health and Nutrition Examination Survey from 1999 to 2006. The data included measurements of Low Density Lipoprotein (LDL or “bad” cholesterol), High Density Lipoprotein (HDL or “good” cholesterol) and triglycerides.

The study found that 20.3 percent of teens between the ages of 12-19 had “abnormal” blood lipid levels, which included low levels of HDL or “good” cholesterol, high levels of LDL or “bad” cholesterol, and high levels of triglycerides, which can also clog arteries.

The percentage of teens with abnormal blood lipid levels varied by weight, ranging from 14.2 percent of those whose weight was normal, to 22.3 percent among those who were overweight, to 42.9 percent among those who were obese.

The study’s leader, Dr. Ashleigh May, an epidemic intelligence service officer with CDC described the results as very concerning. Earlier research found that the obesity epidemic has been accompanied by an increase in a host of health problems in youths that were previously found only in adults. Although the latest government data suggest that the
obesity epidemic might be leveling off, at least one-third of youth are still overweight or obese, and the heaviest boys continue to get heavier. In this study it was found that more boys than girls had the “abnormal” lipid levels.

The study backs up a recommendation made by the American Academy of Pediatrics in 2008 that children and adolescents should have blood tests if they are overweight, smoke, have high blood pressure or if there is a family history of elevated cholesterol levels. The guidelines were controversial because they recommended cholesterol-lowering drug treatment for children as young as eight years old.

Another recent study out of the University of Michigan concluded that screening all overweight or obese children would identify approximately 50% of children with abnormal cholesterol levels, but would also lead to unnecessary testing of up to 30% of children.

The ICA Council on Chiropractic Pediatrics recommends parents teach children from an early age the benefits of following a healthy eating regime with plenty of fruits and vegetables and encourage them to participate in physical activities.

### Training of birth attendants in developing countries increases babies’ survival

In developing countries, where millions of babies die in the womb or soon after birth, research has shown that providing training in newborn care and resuscitation to birth attendants significantly increases the likelihood of a baby’s survival.

The study was conducted in six developing countries — Argentina, the Democratic Republic of Congo (DRC), Guatemala, India, Pakistan and Zambia. Researchers from the University of North Carolina at Chapel Hill School of Medicine took part in the study in the Democratic Republic of Congo in partnership with the Kinshasa School of Public Health.

Four categories of birth attendants were included in the study: physician, nurse/midwife, traditional birth attendant and a category that included family members and unattended deliveries. Traditional birth attendants, typically non-professional, lay midwives, were by far the most common, attending 40 percent of deliveries in the entire study and nearly 75 percent of deliveries in the DRC. Nurse/midwife was the next largest group at 30 percent, followed by family/unattended/other (17 percent) and physician (13 percent). The birth attendants were trained using the Essential Newborn Care (ENC) program of the World Health Organization and the Neonatal Resuscitation Program of the American Academy of Pediatrics.

The Essential Newborn Care course includes training in routine newborn care, resuscitation of babies who have stopped breathing, breastfeeding, keeping the baby warm, “kangaroo care” (skin-to-skin contact between mother and baby), care of the small baby, and common illnesses. The Neonatal Resuscitation Program provides more advanced resuscitation training than the basic training that is part of the ENC course.

“The successful application of this intervention has the potential to prevent the deaths of thousands of babies worldwide each year, said Carl Bose, MD, a professor at UNC’s Department of Pediatrics and a co-author of the study. This is a simple intervention and this study demonstrates that it can be effectively taught to traditional birth attendants who deliver most of the babies born in developing countries such as the DRC. Worldwide each year, approximately seven million babies die in the womb or soon after birth, and 98 percent of these perinatal deaths occur in developing countries,” he said. “This is a simple intervention and this study demonstrates that it can be effectively taught to traditional birth attendants who deliver most of the babies born in developing countries such as the DRC.”

The results of the study show a statistically significant reduction in stillbirths of about 30 percent, from 23 stillbirths per 1,000 before the intervention to 16 after intervention. Although there was not a reduction in deaths among newborns during the first seven days of life, Bose said there was a reduction in the total number of stillbirth and newborn deaths, often referred to as perinatal mortality. The
Recent Research Findings...

Birth Attendants from page 4

 reduction in perinatal mortality was about 15 percent, Bose said.

The study, “Newborn-Care Training and Perinatal Mortality in Developing Countries” was published in the Feb 18, 2010 issue of The New England Journal of Medicine (Volume 362:614-623).

Autism spectrum disorders climb among 8-year-olds

A new study shows that one in 110 American 8-year-olds is classified as having autism spectrum disorder (ASD), a 57 percent increase over four years ago. This is according to a new study by researchers at the University of Alabama at Birmingham (UAB) School of Public Health and the Centers for Disease Control (CDC). The findings were published December 18, 2009 in CDC’s Morbidity and Mortality Weekly Report (MMWR). The study also found that boys are 4.5 times more likely than girls to have ASD, a finding that confirms earlier studies.

The study discusses possible factors that might contribute to the increase in ASD cases. They include a broader definition of autism disorders and a heightened awareness of ASD by parents, doctors, educators and other professionals.

The data comes from the Autism and Developmental Disabilities Monitoring (ADDM) Network, a collection of 11 sites in Alabama, Arizona, Colorado, Florida, Georgia, Maryland, Missouri, North Carolina, Pennsylvania, South Carolina and Wisconsin. ADDM reviewers are uniformly trained to review and confirm cases; some children included in the study have documented ASD symptoms but never received a diagnosis.

The ADDM sites were not selected based on any statistical pattern, but the 300,000 children included in the study represent 8 percent of the nation’s 8-year-olds.

“This is a dramatic increase in the number of kids classified as autistic or documented on the spectrum of similar disorders,” said Beverly Mulvhill, PhD, a UAB associate professor of public health and co-author of the study. “It is not entirely clear what is causing the rise, but we know major collaborative efforts are needed to improve the understanding and lives of people and families impacted,” she said.

Maternal physical characteristics and lifestyle habits associated with growth of fetus in first trimester and subsequent outcomes

Factors such as maternal high blood pressure and high hematocrit levels (the proportion of blood that consists of red blood cells) are associated with a greater likelihood of restricted fetal growth during the first trimester, with restricted growth linked to an increased risk of preterm birth and low birth weight, according to a study published in the Feb 10 issue of the Journal of the American Medical Association. (Mook-Kanamori DO, Steegers EA, Eilers PH, et al. Risk Factors and Outcomes Associated with First-Trimester Fetal Growth Restriction. JAMA 2010; 303 (6):527-534).

“Human growth and development rates are highest during the first trimester of pregnancy, when essential fetal organ development is completed. Adverse first trimester fetal exposure might have permanent consequences for fetal and postnatal health,” the authors write. “The influences of maternal physical characteristics and lifestyle habits on first-time fetal adaptations and the postnatal consequences are not known.”

Dennis O. Mook-Kanamori, MD, MSc of the Erasmus Medical Center in Rotterdam, Netherlands and colleagues examined the association of several maternal physical characteristics and lifestyle habits in 1,631 mothers with first trimester fetal growth and the associations of first trimester fetal growth restriction with the risks of adverse birth outcomes and accelerated postnatal growth until the age of 2 years. Mothers were enrolled in the study between 2001 and 2005. First trimester fetal growth was measured as fetal crown to rump length by ultrasound between the gestational age of 10 weeks and 13 weeks 6 days.

The researchers found that maternal age was positively associated with first trimester fetal crown to rump length and that higher diastolic blood pressure and higher hematocrit levels were associated with shorter crown to rump length. Compared with mothers who were non-smokers and optimal users of folic and supplements, those who both smoked and did not use folic acid supplements had shorter fetal crown to rump lengths.

They also found that “compared with normal first trimester fetal growth, first trimester growth restriction was associated with increased risks of pre-term birth (4.0 percent vs. 7.2 percent), low birth weight (3.5 percent vs 7.5 percent), and small size for gestational age at birth (4.0 percent vs. 10.6 percent).” Shorter first trimester crown to rump length was associated with accelerated growth rates in early childhood.

The authors concluded that further studies are needed to assess the association of first trimester growth variations on the risks of disease in later childhood and adulthood.
Parents and caregivers naturally assume that a crib is one of the safest places to put their child to sleep realizing that the child may be awake at certain times when unattended. Unfortunately cribs are not as safe as we think they are. Cribs that are not made or designed properly, assembled incorrectly, cribs with hardware that is defective or made of plastic, and old cribs that are no longer stable or missing hardware, can pose serious dangers to infants and toddlers. According to Consumer Reports, crib defects contribute to “more than 11,000 serious crib and mattress-related injuries each year and an annual average of 32 fatalities for children under five. There are far more deaths associated with cribs and mattresses than with any other type of
Crib Safety

nursery product and 25 percent of those deaths resulted from the use of cribs with broken or missing components.” (http://consumerreports.org)

Crib makers are currently subjected to a combination of mandatory and voluntary safety standards set by the Consumer Product Safety Commission (CPSC) and voluntary standard setting organizations. The mandatory stan-

dards of the Consumer Product Safety Commission however do not include durability or third-party testing, and the voluntary standards test the durability of the mattress supports and crib side rails, but do not test for strength of spindles or slats or for the strength and durability of hardware.

These cribs (recalled only after two babies died and several were injured) came apart because of defective hardware and bad design. Pictures show how a baby can become entrapped and suffocate, or be severely injured when a gap is created between the mattress and the side.

Millions of cribs have been recalled over the years after reports of babies being strangled or injured in cribs. In August of 2008, Congress passed legislation requiring CPSC to take action to toughen standards for cribs and other juvenile products. But the process has been slow. Concerns about the safety of cribs has recently escalated with more reported deaths and injuries of babies in malfunctioning drop side cribs and the resulting flurry of additional recalls.

In January of this year the House Subcommittee on Oversight and Investigation convened a hearing on crib safety in Washington, DC. Testifying at this hearing were the Juvenile Products Manufacturers Association (which certified cribs that have been recalled), newly appointed CPSC Chairman Izzet Tannenbaum, Nancy Kowles, Executive Director of Kids in Danger (a consumer advocacy group), and Susan and Robert Cirigliano, parents of little Bobby who died at six months because of a faulty drop side crib.

Following the hearing, CPSC chairman stated that some time this summer CSPC would be posting a notice of rule-making with the new regulations on cribs to be in place by the end of the year. Drop side cribs seem to pose the greatest danger and according to Tennenbaum, the CPSC will take a hard look at drop side cribs in their rule-making and possibly banning them completely. The Commission has received more than 20 reports of kids getting either suffocated or suffering bruises and broken limbs due to falling out of these cribs when the drop side detached. The CPSC’s action on tougher standards is long overdue.

Since 2007 more than 5.7 million cribs and bassinets have been recalled. In October 2008, CPSC recalled 1.6 million cribs made by Delta Enterprise of New York because of injury to babies as a result of hardware problems and design flaws. In November 2009 2.1 million Stork Craft drop side cribs were recalled after four infants died as a result of being strangled or suffocated between the slats. The recall involved 1.2 millions cribs distributed in the United States (147,000 with the Fisher-Price logo) and almost one million in Canada. In January 2010, nearly 635,000 drop side and fixed-front rail cribs made by Dorel Asia were recalled after the death of a 6-month-old boy and multiple reports of injuries.

In February, the CPSC announced the recall of another drop side crib manufactured by Generation 2 Worldwide and ChilDESIGNS following the suffocation of three infants when the drop side detached and they became trapped between the mattress and the drop side. This is not the first time that deaths have occurred with ChilDESIGN cribs. Generation 2 went out of business in 2005 but their name appears on a label affixed to the crib’s headboard or footboard. Some labels identify the place of manufacture as Dothan, Ala., others as China. The name ChilDESIGN appears on the teething rail of some of the cribs. CPSC has issued a warning to parents who own these cribs that they are hazardous to their child’s safety and urge them not to use these cribs or try and repair them on their own.
What is also important to remember is that a newborn infant will soon grow and become active in a few months. It is therefore critical that the crib is sturdy and durable for at least 2 years.

How to Buy a Crib: Safety Checks

- A baby will spend a lot of time in a crib and though many new parents want a crib that will match the baby’s room décor, the primary consideration should be safety, not color or style. What is also important to remember is that a newborn infant will soon grow and become active in a few months. It is therefore critical that the crib is sturdy and durable for at least 2 years.

- Start shopping for a crib several months before the baby is due. Most stores only keep floor samples and cribs may have to be ordered. Consider the time for delivery and assembly if the crib is not pre-assembled. Check the crib recall list before you start shopping. Even if a crib is certified by the Juvenile Products Manufacturing Association (JPMA) it does not mean that it is absolutely safe because the safety standards at this time do not encompass all features of a crib. Some of the cribs that have been recalled were certified by JPMA.

- Check out the crib carefully in the store. Shake it, see how everything fits. If anything rattles or parts look loose or the crib does not sit evenly on the floor look for another brand or model. If it is a floor sample, do not assume that the one you order will be better.

- Most cribs are designed with slats. Slats should be close together so the baby’s head cannot pass through. The distance between the slats should be no more than 2 3/8 inches apart.

- Look at the design of the crib. If it does not have slats but has cutouts, are those cutouts large enough for the baby to put his head through or get his finger caught or pinched. Though paint today has to be lead-free, it is better to have a crib without any paint finish so there is no possibility of the baby putting peeling paint into his/her mouth.

- The less hardware the crib has, the better. It means less moving parts and less chance of hardware coming loose or a part (such as the sliding rail) being put on backwards.

- Drop side cribs built for the convenience of putting babies in the crib and taking them out, are the most problematic and unsafe. The drop side hardware can fail for one reason or another causing the drop side to detach from the crib. When it does, it creates a space where a child can become entrapped and suffocate. Most major retailers are already considering not carrying such models and the CPSC has stated that it might ban them altogether during their rule-making process. The safest crib is one that has four fixed sides.

- If the crib has to be assembled, make sure that it is done right and no shortcuts are taken, such as leaving out even one missing screw. Missing screws or parts assembled backwards have been the cause of many crib injuries.

- The mattress should fit snugly into the crib. If there is space to slide two fingers between the mattress and the side of the crib, the mattress is too small. This can pose a danger to the baby. He/she can easily get trapped in that space and if the mattress slides even further to one side the entrapped baby can suffocate.
Buy a firm mattress. Test it yourself, do not depend on the label’s description. Too soft mattresses or other soft bedding such as comforters, bumper pads, sleep positioners, pillows and stuffed toys are not suitable for babies as they pose a risk of suffocation and/or SIDS.

Most cribs have mattress supports. Lower the mattress support once the baby starts sitting up. Make sure the mechanism for this is full-proof and cannot shift with a baby’s movement or when jumping up and down on the mattress.

Some parents like to have casters on a crib because it is easy to move around. But casters can cause the crib to roll when a baby that is mobile jumps up and down in a crib while he/she is unattended. If you must have casters make sure they are made of metal and not plastic.

Check all screws and hardware regularly and tighten them if necessary.

Do not buy cribs made before 2000 as the safety standards were even more lenient than they are now. Do not buy second hand cribs over the internet that you cannot test before purchase. In many families cribs are handed down from generation to generation. Many parents may want to use these family heirlooms for sentimental reasons but before putting your child in it, check it out carefully. Is it still structurally sound? With time parts may have come lose, there may be splinters not visible to the naked eye, and if built before 1978 the finish may have lead which is hazardous to your baby’s health.

When you buy a new crib fill out and mail the product registration card immediately. This will enable the company to contact you directly if the product is recalled.

When you have your crib place it in a position where is no other furniture (table or lamp) nearby that can topple over or against it, or the baby can reach through the slats. Do not put it near a window or near any draperies that can accidentally blow over the crib or a baby can reach and pull toward him/her when standing up.

Whether you choose a new crib or a hand-me down, evaluate it carefully so when you put your precious bundle in it you will be assured they are safe and secure.

### Crib Safety

<table>
<thead>
<tr>
<th>Recall Date</th>
<th>Cribs Affected</th>
<th>Company/Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 2010</td>
<td>ChildDesigns Generation 2</td>
<td></td>
</tr>
<tr>
<td>January 2010</td>
<td>Dorel Asia Cribs</td>
<td>Dorel Asia SRL</td>
</tr>
<tr>
<td>December 2009</td>
<td>Amy Baby Motion Beds</td>
<td>Amy Baby USA</td>
</tr>
<tr>
<td>December 2009</td>
<td>Lajobi Cribs</td>
<td>Lajobi Cribs</td>
</tr>
<tr>
<td>November 2009</td>
<td>Stork Craft Dropside Cribs</td>
<td>Stork Craft</td>
</tr>
<tr>
<td>July 2009</td>
<td>Simplicity Drop Side Cribs</td>
<td>Simplicity and SFCA, inc.</td>
</tr>
<tr>
<td>June 2009</td>
<td>Bonavita Cabana Drop Side Cribs</td>
<td>LaJobi, Inc.</td>
</tr>
<tr>
<td>June 2009</td>
<td>Bonavita “Hudson” and Babi Italia “Pinehurst” Drop Side Cribs</td>
<td>LaJobi, Inc.</td>
</tr>
<tr>
<td>April 2009</td>
<td>Jardine Cribs</td>
<td>Jardine Enterprises</td>
</tr>
<tr>
<td>April 2009</td>
<td>SunKids Convertible Cribs</td>
<td>Suntech Enterprises, Inc.</td>
</tr>
</tbody>
</table>

### Sources
- [http://www.kidsindanger.org](http://www.kidsindanger.org)
- [http://www.babycenter.com](http://www.babycenter.com)

Cribs recalled between April 2009-February 2010
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For questions email: pediatricscouncil@chiropractic.org or mrangnath@chiropractic.org
Familial Ligament Laxity (FLL) is also called joint hypermobility syndrome and is an inherited connective tissue disorder in which the ligaments demonstrate generalized increased elasticity throughout the body. This condition is present among chiropractic patients and needs to be identified so that appropriate care and management techniques can be utilized.

This paper will discuss the following:

- The frequency with which this condition is encountered
- The need to consider FLL in the diagnosis of any chronic pain syndrome
- Evaluating the degree of ligament laxity using the Beighton criteria
- Other conditions associated with ligament laxity
- The increased incidence of injury in patients with this condition
• The effect of FLL on joint stability and joint cavitation
• The effect of FLL on the newborn spine
• The effect of FLL in sporting injuries
• How to modify spinal adjusting techniques in affected patients

Studies of various populations has estimated the prevalence of generalized joint hypermobility associated with ligament laxity to be between 5 and 30 percent.2-6 Patients with this condition demonstrate increased joint range of motion beyond that which would be considered within the normal range.

Familial Ligament Laxity
These patients are sometimes said to be “double jointed” but in reality the excessive range of motion through which their joints will move is caused by increased ligament elasticity associated with an increase in the amount of type III collagen present in their ligaments.

The hypermobility syndrome due to ligament laxity appears to be familial in many cases and has a clear-cut female predominance, with symptoms first becoming evident in children or young adults. These individuals have spinal and extremity joints that “pop” or cavitate easily. They demonstrate an aptitude for activities such as gymnastics, dancing, and swimming, but may have an increased susceptibility to dislocations, traumatic joint pain, tendinitis, and overuse injuries.

In newborns, specific problems associated with joint hypermobility include congenital hip dysplasia and congenital hypotonia or “floppy baby syndrome”.

While the medical significance of this condition is important in differentiating benign joint hypermobility from potentially serious connective tissue disorders, such as Marfan syndrome and Ehlers-Danlos syndrome, the chiropractic significance relates more to evaluating joint injuries and selecting appropriate management protocols and adjusting techniques.

Patients with FLL demonstrate some interesting traits associated with skin, lungs and the vascular system. Type III collagen has a deficiency in cross linkage fibers therefore permitting greater extensibility relative to type I. An excess of type III collagen occurs with Ehlers-Danlos syndrome, osteogenic imperfecta, Caffe’s disease and has also been linked with aortic aneurysms.

FLL is a hereditary condition and similar increased joint flexibility is almost always present in one of the parents of an affected child. It can range from the more common subtle type of laxity, seen in patients who can crack their knuckles to the potentially more severe, pathological types of laxity that can lead to recurrent joint dislocation. FLL has also been shown

Characteristics of FLL
If you have ever encountered a patient who can “crack” their knuckles, twist their body parts to “pop” the joints in their back, or neck, then you’ve probably encountered a patient with FLL.

These patients may demonstrate many of the following characteristics:
• They have increased joint range of motion
• They demonstrate increased foot pronation
• Females have minimal or no abdominal stretch marks after a pregnancy
• They have fewer wrinkles in the skin, especially noticeable on the face
• They demonstrate great flexibility at gymnastics
• As swimmers they are particularly good at the butterfly stroke
• They have chronically tight muscles especially around the spinal joints
• They are especially good at yoga which stretches these tight muscles
• They have chronic sacroiliac joint instability, particularly post-partum
• They are prone to frequent ankle sprains, particularly when playing sports that require jumping such as basketball and volleyball

While the medical significance of this condition is important in differentiating benign joint hypermobility from potentially serious connective tissue disorders such as Marfan syndrome and Ehlers-Danlos syndrome, the chiropractic significance relates more to evaluating joint injuries and selecting appropriate management protocols and adjusting techniques.
Familial Ligament Laxity

to predispose to the early onset of degenerative joint disease due to increased joint movement creating joint wear. It has also been shown to be associated with nerve compression disorders, chondromalacia patellae, excessive anterior mandibular movement, mitral valve prolapse, uterine prolapse and varicose veins.

The more severe types of ligament laxity are seen with:

- Ehlers-Danlos syndrome
- Marfan’s syndrome
- Rheumatoid arthritis
- Osteogenesis imperfecta
- Systemic lupus erythematosus
- Polio
- Down’s syndrome
- Morquio syndrome
- Cleidocranial dysostosis or myotonia congenita

**Beighton Criteria**

Evaluation of the degree of ligament laxity can be assessed by using the Beighton criteria. In this system, joint hypermobility is evaluated by the ability to successfully perform a series of joint maneuvers that rate joint flexibility on a 9-point scale. These maneuvers include:

1. Passively extending the little finger to more than a 90-degree angle
2. Passively touching the forearm with the thumb, while flexing the wrist
3. Hyperextending the elbow more than 10 degrees beyond neutral
4. Hyperextending the knees more than 10 degrees (genu-recurvatum)
5. Bending forward with the knees straight and placing the palms of the hands flat on the floor

For each of the first four tests score 1 point for the ability to perform the test on each side, right and left, and with 1 point added for successful completion of the forward bending test. A diagnosis of FLL is made if the patient scores at least 4 out of 9 points.

**Effects of FLL**

In the pediatric patient, since increased joint flexibility can lead to a greater incidence of injury, parental counseling is required. The use of modified spinal adjusting techniques to accommodate for this extra flexibility is recommended.

A baby with this condition may demonstrate cavitation of the spinal joints simply when held under the arms and lifted into the air. Parents may be quite concerned by this phenomenon and should be assured that it is a normal condition for their baby and further, is a condition that the baby has inherited from one or both of them.

**Good Effects of FLL**

The joint hypermobility associated with FLL confers some distinct advantages upon participants in certain sporting and general fitness activities.

**Gymnastics** — Individuals with increased ligament laxity are generally able to perform gymnastic movements with ease, particularly those that require lumbar hyperextension. Because of this, a higher percentage of such individuals will likely be encountered in gymnastic classes.

**Yoga** — Individuals with FLL generally can perform yoga movements with greater ease than their “stiff-jointed” counterparts. They enjoy yoga, because they are good at it.

Since yoga is a “competitive sport” in which participants take casual glances at each other participants’ performances, stiff-jointed participants may be more prone to injury by over-stretching their relatively less-elastic joints. They need to be reminded that they are unlikely to ever become as good as their FLL friends.

Further, it is especially important for yoga teachers to be aware of the existence of FLL and to be aware that not all participants’ bodies are created equal and that not all participants should have the same flexibility goals.

**Swimming** — Individuals with FLL may excel at swimming due to the increased mobility of their shoulder joints. The butterfly stroke is one at which FLLs appear to be most competitive and often report to be their “favorite stroke”.

**Effect of Ligament Laxity on Sporting Injuries**

Ligament laxity has been shown to predispose to a higher incidence of...
Ankle Sprain

Sports that require jumping, such as basketball or volleyball, appear to lead to a greater incidence of ankle sprains in FLL individuals. Sports such as tennis, which require sudden sideways movements, also demonstrate higher incidence of ankle sprains.

Several factors may account for this. Firstly, a tendency toward pronation is common in FLL individuals and since the ligaments supporting the bones of the feet are more lax, the foot arch tends to collapse in the weight-bearing position. Note: pronation will not be evident in a non-weightbearing position. Secondly, the excessive movement of the joints of the feet and ankles due to FLL is known to cause degenerative joint disease, and it may also damage the proprioceptive mechanism leading to faulty foot biomechanics.

Knee Injuries

Laxity of the knee ligaments contributes to a higher incidence of injury. This has been demonstrated by numerous studies. Laxity of the supporting ligaments of the knee, particularly the cruciate ligaments, contributes to sprain and or rupture when the foot is planted and the weight-bearing knee is subjected to anterior shearing forces. This occurs with greater frequency in females than it does in males.

Sporting Injury Statistics

The United States National Collegiate Athletic Association (NCAA) keeps one of the most comprehensive databases of sporting injuries statistics. These statistics reveal strong gender biases in sporting injuries.

Research in the field of high school and collegiate sports indicates that:

- Boys suffer more sports injuries, particularly from football
- Girls are more prone to knee and ankle sprains and back injuries from soccer, basketball and volleyball
- Girls playing soccer have ACL injuries at a rate five times higher than boys

Effect of Puberty on Ligament Laxity

Muscle development with increasing strength is an important factor in the stabilization of hypermobile joints. The differences in muscle development seen between males and females during adolescence may account for the greater incidence of injury in girls playing soccer.

Effect of Estrogen — Estrogen is a contributing factor due to increasing levels of estrogen occurring in girls at this time. Since estrogen increases ligament elasticity and adds body fat rather than muscle, female joints are generally more unstable and prone to injury than are their male counterparts.

Effect of Testosterone — In boys, the increase in testosterone occurring in adolescence is responsible for them building muscle which can better support the joints, resulting in reduced injury levels when competing in the same sports as girls.

Reducing Joint Injuries in High School and College Sports

Researchers studying this question have suggested that the problem lies with training methods and the lack of emphasis on conditioning in female sports. Because of their inability to build muscle at the same rate as boys, girls need to do more conditioning in their training routines. A couple of laps of the field and a few stretches is not enough conditioning to minimize the incidence of injury. A combination of stretching, strengthening and balance control is necessary.

How Can Patients with FLL Best Be Helped?

Treatment modalities include patient education, activity modification, stretching and strengthening exercises for the affected joint, and spinal and extremity joint adjustments.

Chiropractic care can help:

- Firstly, by recognizing that core muscle strength, balance and coordination are key components that play a protective role in spinal and joint stability. Without this, backs, hips, knees and ankles are at risk for injury.
- Secondly, by recognizing that patients with FLL are at further...
increased risk from their pre-existing, inherited joint weakness. Therefore, encouraging conditioning exercises for these patients is essential. Core strength is critical to spinal strength and stability.

- Next, by making sure that the feet and ankles are checked regularly. Diminished proprioception may predispose to more frequent ankle and knee injuries. Joint subluxations in the feet and ankles are common, which can place more stress on the knees, hips and lower back. Make sure that children are wearing shoes that have good arch supports as this can help minimize these problems.

Selecting Spinal Adjusting Techniques for FLL Patients

The increased ligament laxity seen with FLL can make spinal adjusting more difficult. The increased range of motion of the spinal joints in these patients changes the end-range position at which the adjustive thrust is applied. Therefore, utilizing an adjusting instrument, such as an activator, or adjusting with a light, prone drop technique may be more effective. For cervical adjustments, utilizing the seated position may be more appropriate since this adjustment requires less rotation of the patient’s neck to reach the pre-stress point prior to the adjustment.

References

3. Harreby M, Nygaard B, Jessen T et al.


Peter N. Fysh, BSc(App), DC, FICCP is an internationally recognized author, speaker and educator in chiropractic pediatrics. Professor Emeritus of Palmer College of Chiropractic-West he is a full-time practitioner in San Jose, California. One of the founders of the ICA Council on Chiropractic Pediatrics Dr. Fysh currently serves as chair of the International College of Chiropractic Pediatrics, the examining body for the Diplomate in Clinical Chiropractic Pediatrics (DICCP).

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Laxity of the knee ligaments contributes to a higher incidence of injury. This has been demonstrated by numerous studies. Laxity of the supporting ligaments of the knee, particularly the cruciate ligaments, contributes to sprain and or rupture when the foot is planted and the weight-bearing knee is subjected to anterior shearing forces. This occurs with greater frequency in females than it does in males.
Introduction

Cyclic vomiting syndrome (CVS) is characterized by recurrent, discrete episodes of nausea and vomiting separated by intervals of normal health. An underlying cause is often not apparent. Onset is most common during preschool or early school years though CVS may begin at any age, from infancy onward.

There is notable overlap between CVS and abdominal migraine in the literature. It has been suggested that CVS is not only related to migraine but may actually be a juvenile form of migraine. Though there are other differentials to consider, abdominal migraine is the most common diagnosis in those with cyclic vomiting.

This case study will explain the treatment approach and outcome for a seven-month-old infant with suspected CVS.

History

A seven-month-old female was presented for chiropractic evaluation by her mother, who reported the infant had three episodes of violent retching and vomiting during the past month; each episode would last about an hour.

The infant had also been more irritable during the past month and the mother reported that she had been refusing all solid foods since the first episode of retching and vomiting. Therefore, the infant was being exclusively breastfed at the time of the initial visit, leading to recent weight loss which was concerning the mother. There was no history of injury or recent illness — the mother denied the occurrence of fever, diarrhea or the presence of any other signs of infection. A recent medical examination had revealed no abnormalities, however, a consult with a neurologist had been recommended. The mother believed that their pediatrician wanted to rule out the possibility of seizures. No consult had been scheduled at the time of the initial visit as the mother wanted the infant to be evaluated by a chiropractor first.

The pregnancy was uneventful with the mother in good health prior to conception. No birth complications were reported; the infant was full-term and delivered vaginally.

The infant had been exclusively breastfed for the first 5 months and tolerated solids well when they were first introduced. The mother had no concerns regarding the infant’s sleep habits, though she reported that the infant had been very fussy since birth and this had increased during the past month.

A review of family history revealed no significant findings.

Examination

A complete physical examination was performed. The physical exam revealed that the seven-month-old weighed 15 pounds and was 26 inches long. The infant appeared thin. Charting her height and weight using data from the National Center for Health Statistics (2001), it was determined that she was in the 50th percentile for height but only the 15th percentile for weight. She was very irritable throughout the exam and visibly uncomfortable when lying supine.

The head and neck exam revealed hypertonicity of the suboccipital musculature, this finding was increased on the right. Heart and lung sounds were unremarkable. An abdominal examination revealed no abnormalities. The abdomen was soft and free of any palpable masses. Neurological tests, including a cranial nerve exam, were essentially negative. Reflexes were appropriate for her age, gross motor movements and
Resolution of Cyclic Vomiting Syndrome Following Chiropractic Care

developmental milestones were also age-appropriate.

A chiropractic evaluation was performed. Bilateral mastoid fossa temperatures were taken using an infrared temporal artery thermometer. The right was 0.2 degrees Fahrenheit lower than the left. We were unable to assess supine leg length due to a lack of cooperation. It was noted again that the infant could not comfortably lay supine with her head midline. She consistently turned her head to the right to find a position of comfort. Both active and passive cervical flexion were markedly decreased and appeared to be painful. Intersegmental motion palpation revealed decreased occipital glide on the right, decreased right lateral flexion of the occiput relative to C1, and decreased left rotation of the occiput relative to C1.

Intervention and Outcome

The infant was adjusted using Diversified technique modified for her age and size. Contact was taken at the posterior superior aspect of the right mastoid with the lateral aspect of the doctor’s right index finger. The doctor’s left thenar pad was placed just anterior to the infant’s left ear, over the zygoma, while the left atlas transverse was stabilized by the doctor’s left index finger. The infant’s head was laterally bent toward the side of contact and rotated approximately 45 degrees away from the side of contact. A low-amplitude, high-velocity thrust was applied with an S-I, R-L, P-A line of correction.

 Immediately after the adjustment, it was noted that the infant was able to lay supine comfortably with her head midline. The mother also commented that the infant was noticeably calmer.

The infant was evaluated again one month later. At the second visit, the mother reported that the infant’s irritability had resolved immediately after the adjustment and she had returned to eating solid foods shortly after. The mother reported no reoccurrence of the episodes of retching or vomiting since the last visit and the infant was gaining weight.

Chiropractic assessment revealed no significant findings on the second visit. The infant was able to lay supine comfortably, without any postural distortions. Cervical flexion was within normal limits and caused no apparent discomfort to the infant. Suboccipital musculature was relaxed and there was no notable intersegmental motion restriction.

The infant was released from care. The mother planned to return to her local chiropractor for wellness care.

Discussion

Though the relationship between migraine and CVS is still unclear, research suggests that the two are related. There are many similarities between them including severity of symptoms, timeline, and triggers. Many children with CVS either have a family history of migraine or develop migraines as they grow older and it has been suggested that there is a spectrum of disease: CVS — abdominal migraine — migraine.

Due to the similarities between CVS and migraine, recommended medical management of CVS includes antimigraine medication along with lifestyle changes. Chiropractic care has also been shown to be effective in managing migraine with improvement in migraine frequency, duration, disability and medication use.

An increasing number of researchers believe that headache pain, including migraine, may be related to structures in the neck. In the late nineties, researchers identified direct anatomical connections between the bony structures of the upper cervical spine, specifically occiput, C1, C2 and the dura mater. These discoveries have helped advance our understanding of the mechanisms resulting in migraine headaches as well as explain why upper cervical adjustments have been found to benefit patients suffering migraines. It has been postulated that specific chiropractic adjustments to the cranio-cervical structures alleviate the sequelae of muscle spasm, nerve irritation, myodural traction and ultimately, the dural inflammation that causes migraine pain.

Due to the similarities between CVS and migraine it is reasonable to suspect that the same neuromusculoskeletal mechanism behind migraine may also be present in CVS. Subluxation of the upper cervical spine contributing to myodural traction and dural inflammation may be the cause of CVS in some patients.

Conclusion

Considering the anatomical relationship between the upper cervical spine and the dura, as well as the link between myodural traction and migraine disorders, it seems reasonable that the occiput adjustment had a direct impact on relieving dural irritation ultimately leading to the resolution of the patient’s symptoms.
Future research should look into the connection between upper cervical subluxation and the CVS — abdominal migraine — migraine spectrum.

References


Stephanie O’Neill-Bhogal, DC, DICCP graduated from Palmer College of Chiropractic in 2002 and received her Diplomate in Clinical Chiropractic Pediatrics (DICCP) in 2005. She has a private practice in Davenport and is also on the faculty at Palmer College teaching pediatrics.
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The fetus plays an active role in its own dynamic constructive process acquiring information about its environment and using this information to guide development. Epigenesis is where genetics and the environment interface. In this article we will look at the relationship between pregnancy, gestational stress, and post-natal development. According to Guyton and Hall, “it is mental, chemical, or physical stress that usually excites the sympathetic system; it is frequently said that the purpose of the sympathetic system is to provide extra activation of the body in states of stress: this is called the sympathetic stress response.”

Science today has harnessed this “extra activation” or inhibitory state as a key player in epigenetic change. A study from 1992 conducted by epidemiologists Hale and Barker, found a disproportionate number of obese, diabetic and hypertensive adults had been born premature or small for gestational age. This is a hallmarking period of research when the use of the term “prenatal imprinting or programming” came into being. Prenatal imprinting is defined as “the process whereby a stimulus or insult at a sensitive or critical period of development has a long term effect which is termed programming.”

Indicators used in the epidemiological assessment of genetic and environment effect on the fetus is birth weight. Birth weight is correlated with later adult onset of disease.

What does this have to do with Autism? More than we think. Scientists today propose that if you are approximately above the age of 30 you are at risk of receiving an adult-onset disease diagnosis of any of the following: cardiovascular disease, autoimmune disease, diabetes, obesity, depression and even cancer. However, if you are under the approximate age of 30 you are not getting wired up correctly and have a host of symptoms affecting immune function, gastro-intestinal function, behavior, social skills, and ability to adapt to your environment.

**Characteristics of autism**

Autism is said to be a developmental disorder of language and...
social development. Autistic children have a tendency to “avoid” direct eye contact, withdrawal from physical activity, failure to recognize facial and visual cues. These children have a “lack” of awareness of others or are unable to process and display an appropriate behavioral response while interacting with others. They are unable to “display” joy or sadness. Autistic children typically continue to demonstrate early developmental motor activities, such as gaze-fixation or stemming, which now, because of their age appear inappropriate. They are soothed with ritualistic behavior and respond fearfully in new situations or environments. Their dietary habits crave the “beige diet”.

The characteristics of autism continue as research unfolds an epidemic rise in the diagnosis of autism and other “spectrum” overlaps. The other disorders include ADHD, OCD, Tourette’s, PDD, Asperger, schizophrenia, and other neurodevelopmental disorders. When working with developmentally delayed children, it is more common than not to see children with several diagnoses from different doctors.

The rate of autism is climbing; a pure genetic link would typically show a decline in new cases rather than a rise. The wave of autism began in the 80’s and typically a person diagnosed with autism is not likely to marry and reproduce, which would explain why a decrease is expected.

So is autism purely genetics or is there another reason? No research so far has been able to find a precise cause for autism. As we all know, scientific research takes a long time to fulfill the necessary requirements to become “acceptable peer-reviewed data”. Research is absolutely necessary and this author strongly encourages the chiropractic community to embrace this calling. However, time is of the essence and at some point the clinician must leap in and manage the cases presented to them. Many theories guide the clinician to understand the complexities of early neurocognitive development.

Prenatal influences on the fetus

Author Fred Previc states: “[t]he increasing acceptance of the role of prenatal influences on genetically regulated brain development and the corresponding challenges to genetics estimates by the placental findings together suggests that prenatal factors should be considered more important than previously suspected in the etiology of many (emphasis added) disorders. The prenatal womb or “biodome” creates a habitat, typically holding one, for the fetus. The earlier medical premise viewed this habitat as an incubator not an interacting dynamic orchestra. What goes on in the womb is revealed as the child matures post-natally.

Earlier works in studying autistic children suggest brain volume differences or under functioning regions affecting the cerebellum, brain stem, amygdala, thalamus, basal ganglia, limbic system, and prefrontal cortex. Asymmetrical excessive white matter has been found in the frontal lobes, cerebellum, and associated areas of higher processing. Head circumference of the

The impact on genes may be significantly modified by epigenetics response to the environment in utero and post-natal development. Autism is perhaps related to chronic inflammation, oxidative stress, or hypoperfusion due to gestational maternal stress. A relationship is suggested between gestational stress and the potential epigenetic change in the developing fetus.
newborn was reported in the lower growth percentiles from 1 to 2 months with increase in measurement at 6 months to 2 years and another decline in growth during mid-adolescence.

Neuro-imaging of the brain showed chronic inflammation in the areas of excessive growth. The frontal lobes have the greatest size increase, however, the nerve cells which are responsible for decision-making are smaller and “underpowered”. In other neurodevelopmental disorders, generalized or symmetrical alterations in brain development were revealed in the cerebral hemispheres and caudate nuclei, less grey matter in the frontal-striatal and cerebellar regions, with symmetrical differences in white matter.

The impact on genes may be significantly modified by epigenetics response to the environment in utero and post-natal development. Autism is perhaps related to chronic inflammation, oxidative stress, or hypoperfusion due to gestational maternal stress. A relationship is suggested between gestational stress and the potential epigenetic change in the developing fetus. Epigenetics refers to the interaction of genetic and environmental factors in causing behavioral traits. Gestational stress is induced by anything mechanical, chemical, or emotional which yields a negative response to adverse external stimuli. Stress during pregnancy affects the hypothalamic-pituitary-adrenal (HPA) axis, thus controlling stress hormone levels. Stress during sensitive developmental windows has been linked to the adult onset pathology.1, 2

The physiological effect of the stress response stimulates the hypothalamus to secrete adrenocorticotropic releasing hormone (ARH). This hormone stimulates the pituitary gland to secrete adrenocorticotropic hormone (ACTH). This hormone in turn stimulates the adrenal, or the suprarenal glands to secrete the stress hormones — namely adrenaline and cortisol. In the fetus, glucocorticoids inhibit tissue expansion and growth at the same time as maturation and cellular differentiation.7

Increased cortisol levels in early gestation produces symmetrical growth deficiency. Increased cortisol levels in later gestation produces asymmetrical growth deficiency. The alteration of growth may be a direct result of cortisol levels or an indirect result of unavailable nutrients or blood supply which results in a sacrifice of fat stores or cells of the liver and pancreas.

The altered nutritional components maintain the blood supply to the brain, which maintains head circumference and adrenal blood supply. The stress response prepares the fetus to prepare for low food supply by being smaller; “(h)ormones are environment-dependent organizers of the neuroendocrine system.”7

The historical markers of a couple will lay the blueprint for their future offspring. Ideally, couples should “plan” to have a child and prepare their bodies over the course of approximately one year, prior to conception. The present statistical information shows that there is an increased likelihood that 1 in 58 will be diagnosed autistic or somewhere in that spectrum. We, as doctors of chiropractic should seek to improve global awareness of health in our communities and raise the level of consciousness in our patients of the need to prepare their bodies for birth.

References:
**Educational materials for prenatal, infant care**

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**Prenatal Chiropractic Protocol**

This 1 hour DVD developed by Dr. Carol J. Phillips contains suggested protocol filmed live during a workshop and demonstrates how a chiropractor who incorporates craniosacral/myofascial therapy might approach a pregnant patient.

Demonstrations include:
- Standing — standing sacral release
- Supine — fetal palpation, pubic symphysis adjustment, lower extremity myofascial release, supine cervical adjusting, anterior thoracic adjustment
- Prone — prone sacral adjustment, psoas release, spinal palpation
- Seated — rib palpation and adjustment, myofascial release of upper torso, seated cervical adjustment, cranial and spinal cord release, upper extremity evaluation

Cost: $90.00

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**Craniosacral/Myofascial Workshop**

This 6 hour DVD by Dr. Carol J. Phillips will enhance your sense of touch and your ability to follow a fascial unwinding with easy to follow exercises that will give you the kinesthetic experience necessary to become proficient at working with the craniosacral system. Topics of interest include working with the human energy field, entrainment, preventing and treating back labor, tissue memory, the ion effect, the sucking response and much more. Technique oriented tips will show you how to enhance structural balance within the body and cranium. Cost $175.

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**Prenatal Yoga**

This 90-minute DVD on prenatal yoga to accommodate all levels of fitness during pregnancy by modifying typical yoga poses. Patients who have been practicing yoga will appreciate the challenging modifications while beginners will receive detailed instruction.

Christine Anderson, DC, DICCP, who developed the video, says the regular practice of yoga during pregnancy prepares women for the challenges they will face during childbirth — physically, emotionally and spiritually. Viewers can flow through the entire 90 minute practice or perform individual sessions through the chaptered program.

This DVD makes an excellent addition to your lending library and it’s something all your pregnant patients will appreciate. Cost: $20.00 for 1 DVD or $150.00 for a set of 10.

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A 46-year-old, 12 week post partum female presents in the chiropractic office with the chief complaint of gradual onset of disabling low back pain over the last five weeks postpartum. A 32-year old, 16 week post partum female presents with a sense of fullness in the lower abdomen and vagina making it uncomfortable to sit up and breast-feed her newborn daughter. A 27-year-old eight week post partum female presents with groin pain on the right side with movement of the right leg (walking, sitting to standing, ...
turning over in bed or attempting to sit cross legged). A 37-year-old, 28 week postpartum female presents with chief complaint of pain when having sexual intercourse. What could these four women have in common?

In each case the chiropractor should obtain a detailed history and comprehensive physical examination to rule out an assortment of pathologies ranging from sprain or strain to herniated disc, a uterus that failed to involute or a retained placenta. All must be ruled out and if appropriate, referred for diagnostic imaging, appropriate lab work or collaborative care to an appropriate healthcare provider (like their midwife or obstetrician). But a commonly, sometimes overlooked diagnosis of soft tissue pathology presenting as a musculoskeletal complaint (and be contributory to a subluxation complex) in a chiropractor’s office would be the occurrence of a prolapsed uterus.

A uterus is prolapsed when it has shifted from its original position. It occurs when the connective tissue that keeps the uterus in the correct anatomical position loses its support and the uterus, in its entirety drops into the vagina. This is distinctly different from the medical emergency that can occur within the first 24 hours after birth when the uterus involutes or turns inside out on itself. There are varying degrees of uterine prolapse, depending on how far the uterus has descended. A grade-1 prolapse is the mildest and most frequently diagnosed; grade-2 prolapse would indicate that the uterus is at the hymenal ring; a grade-3 prolapse would be at the introitus (or ‘entrance’ to the vagina), and a grade 4 would indicate that the uterus is outside of the vagina. Although referral for vaginal examination to their midwife or obstetrician would be standard procedure, many self aware patients will have already palpated the cervix intra-vaginally or have “looked” with a hand mirror and visualized the descending cervix.

The incidence of pelvic organ prolapse is higher in older women, increased parity, women who are obese, who have pulmonary problems that result in a long-lasting cough, frequent constipation or the occurrence of pelvic organ tumors (including fibroids of the uterus). Increased occurrence has also been cited having had a forceps or vacuum extraction delivery, history of a connective tissue disorder (like rheumatoid arthritis or lupus), estrogen deficiency (either from a natural menopause or surgical removal of the ovaries resulting in a surgical menopause), a prior pelvic surgery where the normal muscular support of the uterus was disrupted, pelvic floor dysfunction (ranging from simple weakness to quadriplegia) and chronically increased intra-abdominal pressure (for example from strenuous physical activity over time, such as jogging).

Some symptoms of pelvic organ prolapse include the most common symptom of pressure against the vaginal wall, a feeling of fullness in the lower abdomen, a sense of something falling out of the vagina, groin pulls or low back pain, urinary incontinence or retention, constipation or painful sexual intercourse. The patient may notice an exacerbation of the symptoms after standing for a long time or at the end of the day. The symptoms may be worsened by repeated coughing, lifting, or straining.

Pelvic organ prolapse (POP) is not always chronic and progressive, and spontaneous regression is common for low-grade prolapse, according to the results of a longitudinal study pub-
lished in the January 2004 of the *American Journal of Obstetrics and Gynecology.* POP beyond the vaginal introitus is found in fewer than 5% of cases. Spontaneous regression is common, especially for grade 1 prolapse.

Uterine prolapse during gestation is an infrequent clinical problem, though moderate degrees of descent of the uterus are common before pregnancy, especially in multiparas. If not severe, pregnancy-associated prolapse often partially or completely resolves in the mid-trimester as the fundus grows and the uterus becomes an abdominal organ, drawing the cervix upward. In such cases, symptomatic prolapse usually recurs in the third trimester, or, on occasion, it is first observed at this time. The etiology of uterine prolapse during pregnancy is multifactorial. It requires a combination of previous traumatic injuries to the upper fascial suspensory system, damage to the muscular supporting structures of the pelvic diaphragm, and a degree of neurogenic myopathy or nerve injury at various levels, likely in combination with overstretching or laceration of the musculoconnective tissues of the pelvic floor.

Although pelvic organ prolapse can exist before pregnancy (sometimes the only indicator being painful menses, sometimes may be involved in infertility) and can, as described above, also occur during gestation, pelvic organ prolapse is most often linked to strain during childbirth. Pelvic organs are supported by soft tissue of the abdomen. The same soft tissue often addressed during pregnancy as it directly influences the integrity of the pelvic alignment and function as the gravid uterus expands over 10 months. During pregnancy, this patient may present with a variety of musculoskeletal complaints (groin, vaginal or pubic symphysis pain, low back pain, etc) or fetal malposition, often the result of in-utero constraint.

During childbirth these same soft tissues are affected by hormone production and are often over stretched. If they don’t recover the appropriate tone in the post partum period, they cannot support the pelvic organs.

The main types of pelvic support problems and the pelvic organs that can be problematic are the bladder (systocele), the rectum (rectocele), vaginal vault prolapsed — vagina and small intestine (enterocele), and the uterus (uterine prolapse). Although each problem occurs in different pelvic organs, they often occur at the same time. In this article we will focus on the occurrence of uterine prolapse after childbirth.

Conditions that result in both reversible and permanent injuries to the maternal pelvic supports include dystocia in labor, vaginal delivery, obstetric lacerations, multiparity, age, genetic propensity, and, perhaps, the mode of delivery. Passage of the baby through the birth canal produces most of the damage. Descent of the presenting part elongates the levator ani muscle complex by up to 50% and traumatizes the pelvic nerves by stretch and direct pressure. Various spontaneous lacerations or episiotomy extensions account for additional injuries to perineal structures. Thus, important pelvic connective tissues are often simply torn, lacerated, denervated, or otherwise disrupted by the process of parturition. The issue is not whether vaginal delivery results in injuries to the pelvic support tissues. The question is the degree of the injury and the extent to which spontaneous postpartum healing or specific muscle-strengthening exercises performed in the puerperium may ameliorate this damage.

The traditional treatment options for post partum patients vary depending on the severity of the prolapse. If the prolapse is mild, usually the woman will be advised to perform pelvic floor exercises (Table 1). Some physicians recommend hormone replacement therapy. For women who have a moderate prolapse, a pessary may be used. A pessary is a device that the woman inserts into her vagina that essentially maintains the uterus position in the abdomen. This is an option for women who do not want surgery or are not good surgical candidates. If the prolapse is severe, as in the case of a protrusion from the vagina, then surgery is an option. This surgery can range from repairing the tissue that supports the prolapse uterus to a hysterectomy. Even with surgery, as many as 30 percent of women can have a recurrence of the prolapse.

The chiropractor experienced in working with pregnant patients is uniquely positioned to support the patient with a prolapsed uterus. Correction and maintenance of the integrity of the lumbopelvic alignment and the
lumbosacral innervation to the abdominal organs is critical to the long term recovery of the pregnant patient suffering from a prolapsed uterus.

The pelvic organs are held in place by three types of support:

1. Layers of connecting tissue called endopelvic fascia
2. Thickened parts of the fascia called ligaments
3. A paired group of muscles that lie on either side and around the openings of the urethra, vagina, and rectum

The female pelvic viscera are held in position by a suspensory network of musculoskeletal tissue and support structures that must remain intact and interact. Lumbopelvic joint function depends on the integrity of the muscular, fascial, and neurologic components of these various tissues. Substantial injury to one or more of these systems can result in a loss of support and result in a degree of prolapse that may prove permanent if untreated.

As stated earlier, the reproductive organs are suspended in sheets of connective tissue imbedded with nerves and vasculature that feed the structures of the pelvis and cervix. Torsion of the uterine and ovarian ligaments (amongst them all attaching at some point to the internal surface of the pelvis, the broad ligaments, the round ligaments, the uterosacral and pubovesical ligaments, as well as the musculofascial structures of the pelvic floor (including the urogenital diaphragm and the pelvic diaphragm), which principally consists of the levator ani muscle and its divisions can result from biomechanical distortion and subluxation of the osseous components of the pelvis where those muscles and ligaments attach. Patients may not be responsive to other traditional therapies (like hormone replacement or exercise) if the biomechanical problems are not addressed.

For example, injury to the pelvic floor from childbirth may require relaxation of the injured muscles (by adjusting the pelvis and restoring normal neurologic function and may require, in addition, applying soft tissue techniques like myofascial release or techniques like Mayan massage) before an individual can effectively retrain the pelvic floor muscles through Kegel type exercises.

A recent study by Noguiero de Almedia, Sabatino and Giraldo (2010) demonstrated that high-velocity and low-amplitude manipulation of the sacrum was associated with an increase of phasic perineal contraction and of basal perineal tonus in women and may be helpful in the future study of the treatment of women with perineal hypotony.

Normal pelvic anatomy permits the fundus of the uterus to move relatively freely in the sagittal, vertical, oblique, and anteroposterior planes. In retroversion, the uterus is tipped posteriorly and may be fixed in this position by the presence of adhesions that not only fix the position of the uterus but may interfere with normal motion of the osseous structures of the pelvis. The adhesions can be addressed with myofascial release technique or acupuncture, for example, while joint dysfunction is addressed through chiropractic adjustments of the lumbar vertebrae, sacrum, innominates, pubic symphysis or sacroiliac joints. Taking this same clinical presentation, another situation what would promote retroversion of the uterus would be that of chronic subluxation of the sacrum in counternutation. The retroverted position of the uterus could result from traction of the broad

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Table 1: Kegel Exercises

Kegel exercises tone the pelvic muscles. These muscles surround the openings of the urethra, vagina and rectum.

- To find one’s pelvic floor, squeeze the muscles used to stop the flow of urine. This movement pulls the vagina and the rectum up and back. Patient may try to stop her stream of urine while she is over the toilet to identify her pelvic floor muscles, but she should not perform Kegels by always stopping and restarting her follow of urine. This can cause a urinary tract infection if done repeatedly. If she is still unsure, she can insert a finger into her vagina and squeeze as if she were trying to stop the urine from coming out. If she is using the correct pelvic muscles, she should be able to feel the muscles work as they squeeze around her finger.
- Hold for 10 seconds, then release
- Should be done 10-20 times in a row at least 3 times a day

Patient should not squeeze the stomach, thigh or buttock muscles or hold her breath while doing these exercises.

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Chiropractic Horizons | Page 27

The chiropractor experienced in working with pregnant patients is uniquely positioned to support the patient with a prolapsed uterus. Correction and maintenance of the integrity of the lumbopelvic alignment and the lumbosacral innervation to the abdominal organs is critical to the long term recovery of the pregnant patient suffering from a prolapsed uterus.

Taking the whole patient into account when the postpartum patient visits the chiropractic office will improve patient outcome for the chiropractor treating pregnant and postpartum patients.

References


Sharon Vallone, DC, FICCP is an experienced chiropractic practitioner with a private practice in Hartford, Connecticut. Her special interest is caring for pregnant patients and children with special needs. A Diplomate in Clinical Chiropractic Pediatrics (DICCP), Dr. Vallone was made a Fellow in 2007 because of her contributions to the profession with her voluntary services in the field of chiropractic pediatric care. Vice Chair of the ICA Council on Chiropractic Pediatrics, she serves as co-editor of the *Journal of Clinical Chiropractic Pediatrics* and is an instructor on the ICA Pediatric Council’s DICCP program in the US and Australia/New Zealand.

By Joyce Miller BSc, DC, FACO, FCC

Research providing evidence for the use of chiropractic for clinical problems of children is scarce, even though parental usage of chiropractic care for their children is common. The most frequent problems of infancy presented to chiropractors are chronic, enigmatic disorders (such as suck dysfunction, excessive crying and sleep disturbance) that have no known effective allopathic treatment. In the child over one year of age, the most common presentations to chiropractors are also problems that have no known “cure,” most commonly asthma, otitis media, constipation, headache and backache. In the absence of mainstream health care that is known to be efficacious for children, parents often seek care from complementary and alternative medicine (CAM) practitioners. Traditionally, it was said that chiropractors were the most frequently sought form of CAM care. This study has not been redone so it is not currently known whether chiropractic care is the most popular CAM therapy for children in 2009. It is also speculative whether chiropractic care is alternative rather than mainstream. However, if the definition of alternative care is “any form of therapy not taught in a medical school,” then the choice of chiropractic care is an alternative to conventional types of treatment for common pediatric conditions.

The type of care most commonly provided by chiropractors is spinal manipulative therapy (SMT), but care may involve other types of therapy including nutritional and lifestyle advice as well as soft tissue and other manual therapies. These therapies are steeped in tradition rather than sound evidence. The goal of this work was to identify research on the safety and effectiveness of chiropractic care for the pediatric patient and to place this in context of wider health care for this special population, in order to suggest a way forward.

Background

There is a trend showing that parents seek alternative health care for their children. Some of this care is recommended by allopaths, with one study showing that more than 50% of pediatricians reported referring patients for CAM therapy. In the Anglo European College of Chiropractic (AECC) clinic, the younger the patient, the more likely the medical referral with 55% of infants overall being referred by a health care practitioner with 68% of crying babies and 98% of dysfunctional suck cases being referred by medical practitioners. As such, there is a movement toward multi-disciplinary care for the pediatric patient. Some types of CAM may be considered more favorably for inter-disciplinary care than others. Cohen and Kemper who write thoughtfully about CAM for pediatric patients note that the most common negative side effects for children using CAM are related to herbs and dietary supplements and that side effects from chiropractic care are rare.

A primary concern of the allopathic community is that parents may abandon effective care for a serious childhood condition and use CAM instead. Chiropractors are in a unique position to avoid this scenario. Chiropractors are educated to recognize, diagnose and refer any serious or life threatening condition of any patient of any age. Although chiropractors would provide pain control, for example, for a child with a serious condition, they would not do this in a vacuum, but only if the child were also receiving appropriate medical care as well. This type of care is called integrated and uses the expertise of each practitioner to provide the best possible care for the child to help improve quality of life as well as life extension. This seems to be the type of multi-disciplinary care that pediatricians support stating that integrated care tends to serve the child and family’s needs better than a single therapy.

Against this backdrop, what is the evidence available for chiropractic care for the pediatric patient?

Methods

Databases searched were PubMed, Mantis, Index to Chiropractic Literature, Scopus, CINAHL and Cochrane Library. Search restrictions were English language, human subjects, peer reviewed journal. Publications were
searched prior to January 2009. Hand searches followed through references and bibliographies of articles found. Search terms used were “chiropractic” AND “Paediatric,” “manipulation” AND “Paediatric,” “chiropractic” AND “paediatric” “musculoskeletal OR “non-musculoskeletal” OR “visceral,” Any randomised controlled trials found of chiropractic care for any paediatric condition were included. Paediatric was defined as the age between 0 and 16 years.

Levels of evidence were defined.\(^{13}\) (Figure 1)

**Results**

There is one updated systematic review of chiropractic care of pediatric health conditions reviewing the literature between January 2004 and June 2007.\(^ {14}\) Another systematic review was published on the effect of chiropractic care for patients with non-musculoskeletal conditions and included some pediatric conditions.\(^ {15}\) In addition, Ann-Britt Nilsson undertook a review of evidence for specific types of pediatric cases that present to chiropractors; some of those collated results are presented in Tables 1-3.\(^ {16}\)

At the time of this writing, efficacy research into chiropractic SMT includes 5 systematic reviews, 11 randomised controlled trials, 4 observational studies and 180 descriptive case studies that included 4,358 children. In general, trials suffer from small numbers and low quality, particularly lack

<table>
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<tr>
<th>Author</th>
<th>Design</th>
<th>Intervention</th>
<th>Outcomes</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Klougart et al</td>
<td>Prospective outcomes</td>
<td>Fingertip SMT (n=316)</td>
<td>Crying (hours)</td>
<td>75% drop in 14 days 94% improved in 14 days</td>
</tr>
<tr>
<td>(1989)</td>
<td>based</td>
<td></td>
<td>Parent interview</td>
<td></td>
</tr>
<tr>
<td>Wiberg et al</td>
<td>RCT single blinded</td>
<td>Fingertip SMT (n=25)</td>
<td>Crying (hours)</td>
<td>70% drop in 5 days 20% drop in 5 days</td>
</tr>
<tr>
<td>(1999)</td>
<td></td>
<td>Dimethicone (n=16)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mercer &amp; Nook</td>
<td>pilot RCT single</td>
<td>SMT (n=15) Detuned ultrasound (n=15)</td>
<td>Parent diary</td>
<td>93% resolved, 2 wks Not reported</td>
</tr>
<tr>
<td>(1999)</td>
<td>blinded</td>
<td></td>
<td></td>
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<tr>
<td>Olafsdottir et</td>
<td>RCT double blinded</td>
<td>Fingertip SMT (n=46)</td>
<td>Symptom score</td>
<td>Improvement in 70% (SMT) Improvement in 60% (control)</td>
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<td>(2001)</td>
<td></td>
<td>Holding 10 min (n=40)</td>
<td>Crying (hours)</td>
<td>40% drop in 8 days (SMT) 43% drop in 8 days (control)</td>
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<tr>
<td>Koonin et al</td>
<td>pilot RCT Unblinded</td>
<td>SMT (n=15) AM (n=15)</td>
<td>Parent questionnaire</td>
<td>87% total recovery 13% total recovery 93% total recovery</td>
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<tr>
<td>(2003)</td>
<td></td>
<td>SMT + AM (n=15)</td>
<td></td>
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<tr>
<td>Browning and</td>
<td>RCT single blinded</td>
<td>SMT (n=23) OSD (n=22)</td>
<td>Crying (hours)</td>
<td>Drop by 3.1 hrs/day in 14 d. 82% resolved in 6 weeks</td>
</tr>
<tr>
<td>Miller (2007)</td>
<td></td>
<td></td>
<td></td>
<td>Drop by 2.5 hrs/day in 14 d. 67% resolved in 6 weeks</td>
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</tbody>
</table>

SMT=Spinal Manipulative Therapy; AM=Allopathic Medication; OSD=Occipital Sacral Decompression

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**Figure 1: Hierarchy of evidence**

**Table 1. Summary of leading studies involving chiropractic treatment of infantile colic (Ann-Britt Nilsson, 2008).**
of randomization which would allow the trial results apply to the general population. Systematic reviews have been completed only on the most common infant problem presented to chiropractors, the crying baby, and have concluded that infants cry less after being taken to chiropractors but there is no evidence that it is specifically SMT that decreases the severity or duration of crying. It is well known that absence of evidence is not evidence of absence. Virtually all the trials show improvement with chiropractic care; however, because of the low level research, there are few trials that can say this with clinical certainty. One systematic review\(^ 17\) on safety and one retrospective study\(^ 18\) show that there is scant evidence of harm coming to children under chiropractic care (Table 4).

Discussion

The state of the evidence of health benefits for specific therapies for common pediatric conditions is poor. This is true not only for chiropractic care but for mainstream medical care, as well. Over half of pharmacological interventions used in hospitals for pediatric patients are off-label or unlicensed.\(^ {19,20} \) Even though consid-

Table 2. Summary of reports involving chiropractic treatment of otitis media (Ann-Britt Nilsson, 2008).

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<tr>
<th>Author</th>
<th>Design</th>
<th>Intervention</th>
<th>Outcomes</th>
<th>Result</th>
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<tbody>
<tr>
<td>Fallon (2008)</td>
<td>RCT Quasi-randomised</td>
<td>Chiropractic SMT</td>
<td>Recurrence rate</td>
<td>90 days: 0%</td>
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<tr>
<td></td>
<td></td>
<td>Medical care</td>
<td>Parent satisfaction (0-5)</td>
<td>90 days: 62.9% 4.25 3.17</td>
</tr>
<tr>
<td>Fallon (1997)</td>
<td>Case series (n=332)</td>
<td>SMT (D, G, STE)</td>
<td>Otoscopy Tymanography</td>
<td>Normalised in 7.65 days Normalised in 9.26 days</td>
</tr>
<tr>
<td>Froehle (1996)</td>
<td>Cohort, retrospective (n=46)</td>
<td>SMT (A, SOT, AK)</td>
<td>Absence of signs &amp; symptoms according to parent, MD or DC</td>
<td>93% episodes improved</td>
</tr>
<tr>
<td>Fysh (1996)</td>
<td>Case series (n=5)</td>
<td>SMT (fingertip, STE)</td>
<td>Pneumatic otoscopy</td>
<td>100% improvement (3 days-8 wks)</td>
</tr>
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</table>

SMT=Spinal Manipulative Therapy; D=Diversified technique; G=Gonstead technique; STE=Soft Tissue Effleurage; SOT=Sacro Occipital Technique; AK=Applied Kinesiology; A=Activator technique; M.D.=Medical doctor; D.C.=Doctor of chiropractic.


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<th>Intervention</th>
<th>Outcomes</th>
<th>Result</th>
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<tbody>
<tr>
<td>Hayden et al (2003)</td>
<td>Prospective outcomes study</td>
<td>SMT (95 %) PMT (43%) AM (8%)</td>
<td>•Pediatric VAS</td>
<td>Important improvement 62%</td>
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<td></td>
<td></td>
<td></td>
<td>•Subjective rating</td>
<td>Much improved 87%</td>
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SMT=spinal manipulative therapy; PMT=passive manual therapy; AM=active management

Table 4. Summary of reports on Safety of Chiropractic Treatment.

<table>
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<tr>
<th>Author</th>
<th>Design</th>
<th>Time frame</th>
<th>No. Pts/txs</th>
<th>Result</th>
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<tbody>
<tr>
<td>Vohra, et al 2005</td>
<td>Systematic Review</td>
<td>38 years</td>
<td>1,140,000,000,000 (estimate)</td>
<td>14 adverse events</td>
</tr>
<tr>
<td>Miller and Benfield</td>
<td>Retrospective File review</td>
<td>3 years</td>
<td>687 children receiving 5,242 treatments</td>
<td>No adverse events</td>
</tr>
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No=number; Pts=patients; txs=treatments
Chiropractic treatment of any particular pediatric condition, then a therapeutic trial is an appropriate way forward. Robust research is required to provide evidence of effectiveness.

References


Joyce Miller, DC, DABCO is the Senior Clinic Tutor at the Anglo European College of Chiropractic (AECC) in Bournemouth, UK and oversees their busy infant and child clinic. She is also the lead tutor of AECC’s Masters program in pediatrics. A graduate of Northwestern College of Chiropractic, Dr. Miller is board certified in chiropractic orthopedics.
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