Back To Chiropractic CE Seminars

Pediatric Chiropractic ~ 4 Hours

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This course counts toward your California Board of Chiropractic Examiners CE.
(also accepted in other states, check our website or with your Chiropractic State Board)

The California Board requires that you complete all of your CE hours BEFORE the end of your Birthday month. We recommend that you send your chiropractic license renewal form and fee in early to avoid any issues.

Exam Process: Read all instructions before starting!

1. You must register/pay first. If you haven't, please return to: backtochiropractic.net

2. Open a new window or a new internet tab & drag it so it's side-by-side next to this page.

3. On the new window or new tab you just opened, go to: backtochiropractic.net website.

4. Go directly to the Online section. DON'T register again.

5. Click on the Exam for the course you want to take. No passwords needed.

6. Follow the Exam instructions.

7. Upon passing exam, you'll be able to immediately download your certificate, and it'll also be emailed to you. If you don't pass, you must repeat the exam.

Please retain the certificate for 5 years. DON'T send it to the state board. If you get audited and lose your records, I'll have a copy.

I'm always a phone call away... 707.972.0047 or email: marcusstrutzdc@gmail.com

Marcus Strutz, DC
Back To Chiropractic CE Seminars

Introduction to Pediatric Chiropractic

Liesel Orend DC LAc CACCP

About me…

My fascination with pediatrics is personal… it started when my son regressed into Autism at 20 months, and I had to figure out how to get him back. I learned a lot during this process, and eventually decided to go back to school, receiving my Doctor of Chiropractic in 2014, and my Masters in Acupuncture and Oriental Medicine in 2016, both from Southern California University of Health Sciences.

I continued my pediatric education by completing the ICPA certification program and receiving my CACCP. I've completed the Peak Potential Institute's SOT® Pediatric Practitioner Certificate Program, and also have extensive training in pediatric craniosacral therapy through the Upledger Institute, as well as pediatric visceral manipulation through the Barral Institute.

This class is meant to provide an introduction to pediatric chiropractic. It is by no means comprehensive, but I hope that it inspires you to learn more!

General Considerations

The fundamental goals of chiropractic are the same for children as they are for adults

But children are not simply small adults; their developing bodies have unique needs and issues

As chiropractors, it is our responsibility to understand this if we want to treat children

History of Pediatric Chiropractic

Children have been treated by chiropractors since its inception

"One adjustment in the child is worth fifty in the adult"

- from a 1918 patient brochure from Eastern College of Chiropractic, Newark, N.J.

Early Pediatric Clinics

Several clinics held notable places in chiropractic history:

Dr. Leo L. Spears of Denver, Colorado, first provided chiropractic care for children at a free clinic during the Great Depression.

It has been recorded that at times he saw up to 900 children a week without charge.

Kentuckiana Children’s Center

Dr. Lorraine Golden opened the Kentuckiana Children's Center for Education, Health and Research, Inc.,in 1954.

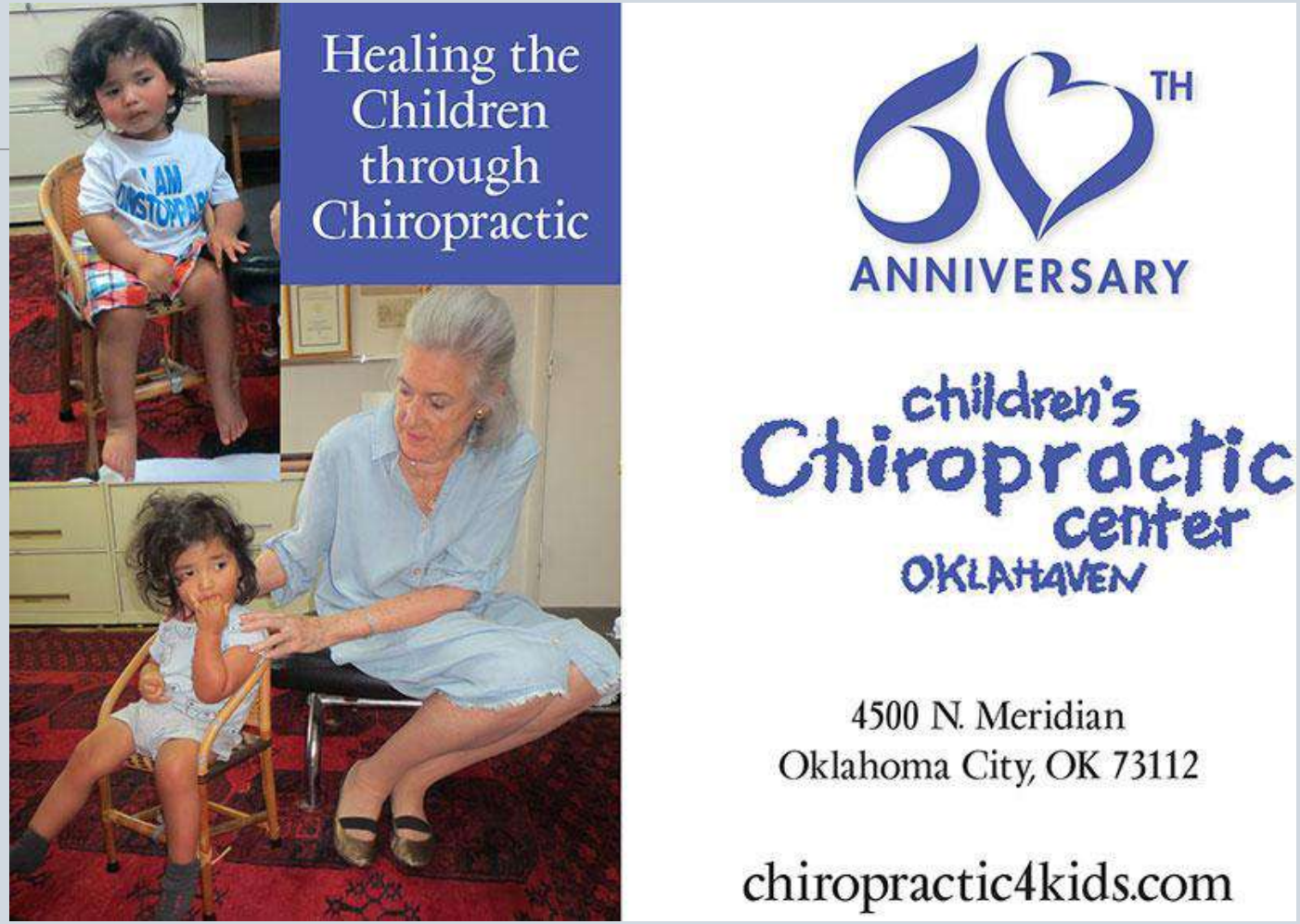
It serves "special needs" children, using chiropractic as a foundation, but including other disciplines.

Dr. Golden directed the center until 1998, and passed away in 1999, but the clinic remains open.

Oklahaven

1963, the Children's Chiropractic Center was established in Oklahoma City.

Dr. Bobby Doscher has served as director since 1977. It remains open, specializing in the treatment of “neurologically disorganized children”.



https://chiropractic4kids.com/

Dr. Larry Webster
1937-1997

Dr. Webster was a well known and much loved pediatric chiropractor. He graduated from Logan Chiropractic College in 1959, and practiced in Missouri. He developed the Webster Technique to address sacral subluxations in pregnant women. He also served as clinic director and pediatric instructor at Life Chiropractic College for many years.

He is the founder of the International Chiropractic Pediatric Association (ICPA), which now offers membership, training in Webster Technique, and full pediatric chiropractic training programs.

https://icpa4kids.com/about/our-story/larry-webster-dc/

Pediatric Care in Chiropractic Practice

What does a pediatric chiropractic practice look like?

- Many chiropractors treat children as part of a family practice
- Others specialize in the treatment of babies and children
- Others have practices that focus on perinatal care, and therefore see a good number of babies
- Others focus on children with special needs, or neurodiverse children

How is a pediatric chiropractic practice structured?

What techniques do pediatric chiropractors use?

A study from 2010, The Chiropractic Care of Children, aimed to explore these questions…

ALCANTARA J, OHM J, KUNZ D. THE CHIROPRACTIC CARE OF CHILDREN. J ALTERN COMPLEMENT MED. 2010 JUN;16(6):621-6. DOI: 10.1089/ACM.2009.0369. PMID: 20569028; PMCID: PMC3151461.

The Chiropractic Care of Children

Joel Alcantara, D.C., Jeanne Ohm, D.C., and Derek Kunz, B.S.

A total of 548 licensed chiropractors (332 females: 216 males) completed the survey.

Approximately 86% of the responders practiced in the United States with the remaining from Canada (13%) and elsewhere (1.0%).

The responders have been in practice an average of 8.02 years (median = 6 years; mode = 6 years) with alma maters from Life University (17%), the Palmer University System (16%), Parker College of Chiropractic (7%), and Cleveland (Kansas City) College of Chiropractic (4%).

A majority of the responders (*N* = 340; 62%) were trained in the ICPA Pediatric Certification program, a 180-hour postgraduate program on pediatric chiropractic. Approximately 14% (*N* = 79) completed or were currently enrolled in the ICPA Pediatric Diplomate program, a 360-hour postgraduate course with an emphasis on specialty care for children.

Practice Characteristics and Fee Structure

- The responders attended to an average of 133 patient visits per week
- Patient visits for those less than 18 years of age averaged 28 visits per or 21% of the average weekly patient visits.
- The average cost of an initial visit (i.e., initial consultation/examination and care) was $127, with a follow-up visit averaging $42.
- Insurance reimbursement averaged 53% while an average of 44% was derived from cash.
- Specific to the care of children, the proportion of income derived from insurance reimbursement averaged 36% while out-of-pocket reimbursement averaged 60%.
- With respect to referral patterns on the chiropractic care of children, 58% (*N* = 320) of the respondents indicated as having a specific medical or osteopathic physician to refer patients.
- Eighty percent (*N* = 440) of the responders indicated having advised parents to seek medical care for their child when appropriate.
- 29% (*N* = 161) of the responders indicating ever receiving a referral from such practitioners.

Practice Activities

When asked to characterize the care rendered to children, the responders indicated performing "chiropractic adjustments" (100%; *N* = 548) followed by "wellness care" (90%; *N* = 494), the use of herbal remedies (44%; *N* = 244), exercise and rehabilitation (42%; *N* = 235) and prayer healing (6%; *N* = 36).

The chiropractic techniques commonly utilized to perform the chiropractic SMT were:

- Diversified Technique[9] (87.02%; *N* = 503)
- Activator Methods[10] (69%; *N* = 382)
- Thompson Technique[11] (60%; *N* = 331)
- Cranial-Sacral Technique[12] (40%; *N* = 220)
- Gonstead Technique[13] (32%; *N* = 180)
- Sacro-Occipital Technique[14] (29%; N = 159)
- Chiropractic Biophysics Technique[15] (13%; *N* = 73)

Wellness care	378	16.67
Ear, nose, and throat	354	15.61
Digestive	295	13.00
Musculoskeletal problems	214	9.44
ADD/ADHD	112	4.94
Headaches	111	4.89
Immune enhancement	105	4.63
Asthma	83	3.66
Scoliosis	81	3.57
Injury: sports	78	3.44
Injury: other	77	3.39
Allergies	55	2.43
Postural improvement	53	2.34
Postbirth checkup	52	2.29
Behavioral infants	49	2.16
Neurosensory disorders	46	2.03
Torticollis	42	1.85
Injury: birth	37	1.63
Asthma/allergies	35	1.54
Injury: motor vehicle collision	11	0.49

Conditions

Wellness care was the most common motivator for seeking chiropractic care.

The top three specific conditions that were indicated:

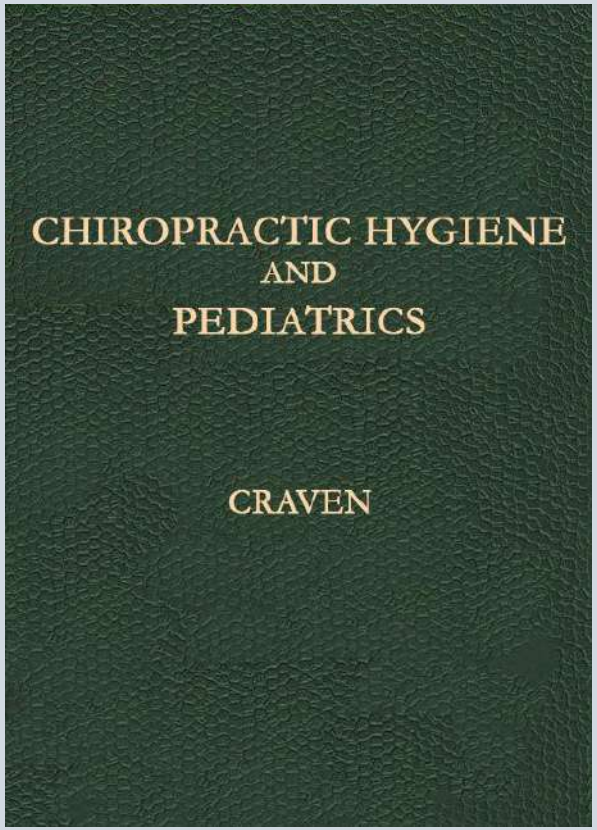
- ear, nose, and throat (i.e., otitis media),
- digestive disorder
- musculoskeletal problems

Education in Pediatric Chiropractic

Chiropractic College Curriculum

Early Pediatric Chiropractic Textbook:

Chiropractic Hygiene and Pediatrics by John H. Craven was published in 1924.



Chiropractic colleges began including pediatrics in their curricula once a textbook was available, mostly in the late 1920's and 30's.

Now all chiropractic colleges offer some pediatric education.

Specialization in Pediatric Chiropractic

In the United States, two organizations offer formal, post-graduate training in pediatrics that lead to certifications and diplomates

International Chiropractic Pediatric Association (ICPA):

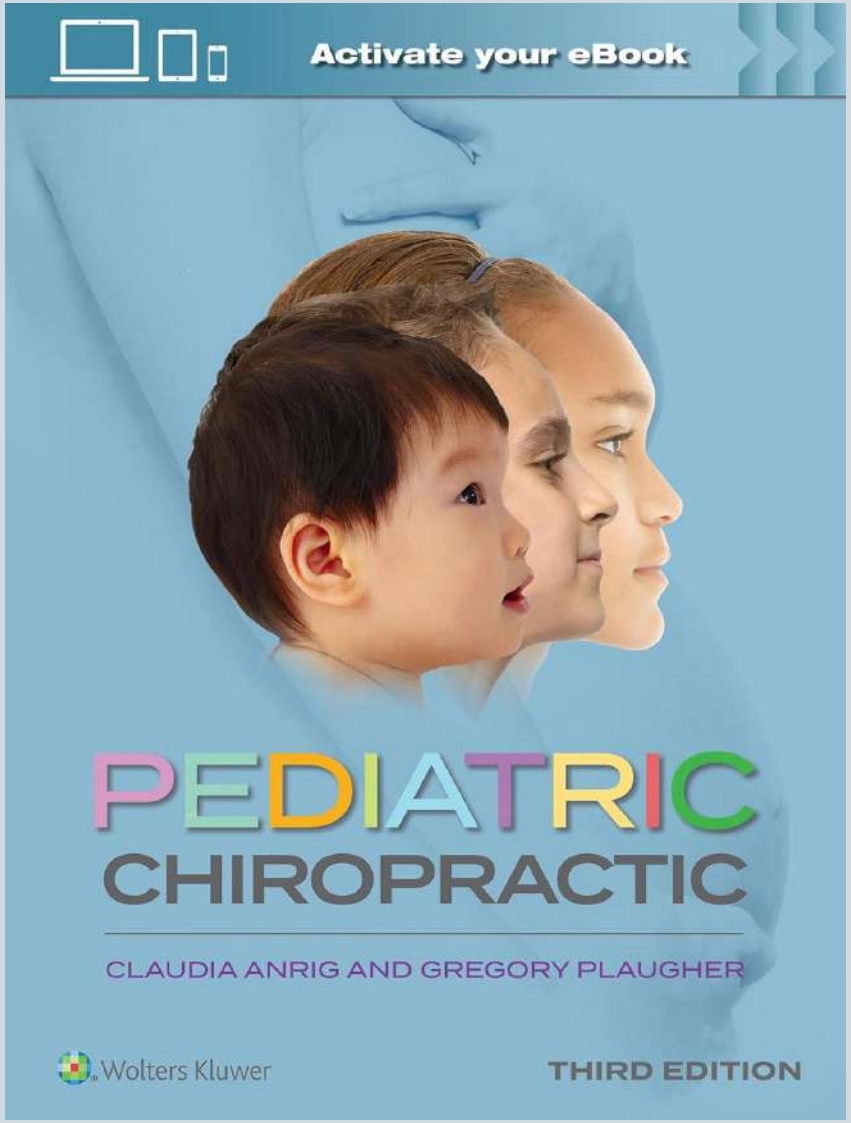
- The International Chiropractic Pediatric Association is an organization that focuses on promoting and advancing the field of pediatric chiropractic care. It provides education, training, and resources for chiropractors who work with infants, children, and pregnant women. The ICPA is dedicated to enhancing the health and well-being of children through chiropractic care.
- **https://icpa4kids.com/**

The ICA Pediatric Council, aka the **Pediatric Council of the International Chiropractors Association (ICA)**, is a division of the International Chiropractors Association that focuses on issues related to pediatric chiropractic care. The International Chiropractors Association is a professional organization that represents chiropractors worldwide.

The Pediatric Council within the ICA is dedicated to advancing the understanding and practice of chiropractic care for infants, children, and adolescents. It provides education, resources, and support for chiropractors who specialize in or have an interest in pediatric chiropractic. The council aims to promote the health and well-being of children through chiropractic interventions and to contribute to research and knowledge in the field.

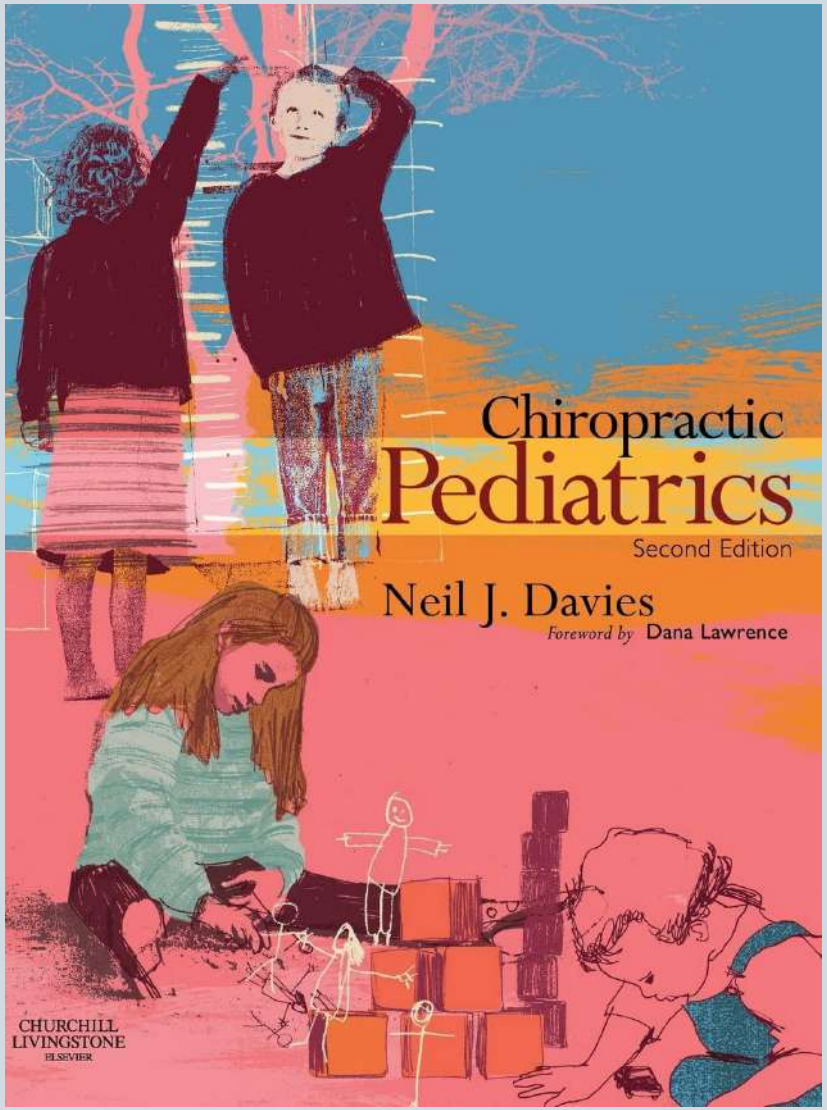
https://www.icapediatrics.com/

Textbooks



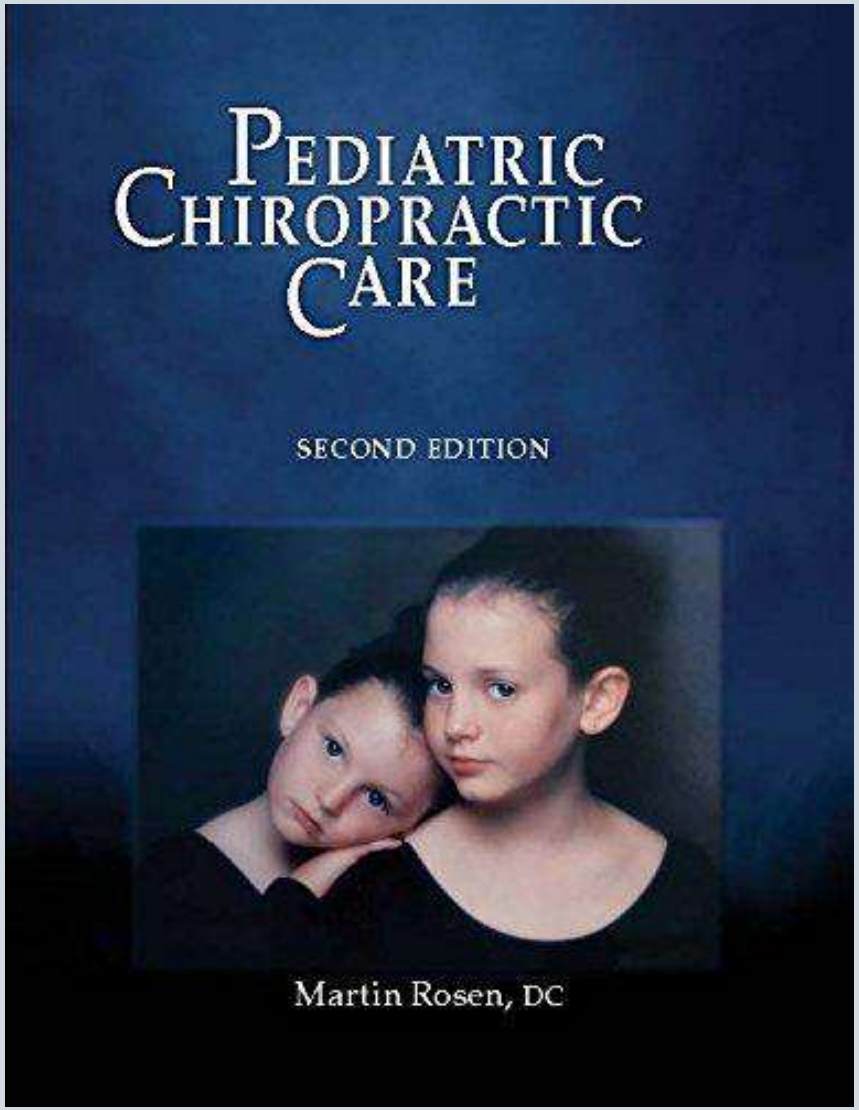
Pediatric Chiropractic

This textbook offers fundamental adjusting techniques as well as introductory presentations of several specialized techniques, including Sacro-Occipital, instrument adjusting, drop mechanism, Logan, Orthospinology, Atlas Orthogonal, and craniosacral therapy.



Chiropractic Pediatrics

This textbook by Neil Davies has in-depth descriptions of adjustment techniques, as well as a comprehensive coverage of pediatric concerns.



Pediatric Chiropractic Care

Written by Martin Rosen, this textbook focuses on Sacro-Occipital examination and treatment techniques.

Research in Pediatric Chiropractic

ICPA Research

The ICPA focuses on providing evidence-informed research in support of family chiropractic care.

They have a database of research that is organized by year of publication.

ICPA is actively generating new work through their Practice-Based Research Network.

https://icpa4kids.com/research/

ICA Journal

The *Journal of Clinical Chiropractic Pediatrics (JCCP*) is the official peer-reviewed journal of the ICA Council on Chiropractic Pediatrics. It publishes research, scientific and professional papers, literature reviews, case reports and clinical commentaries relevant to the health and treatment of the pregnant, postpartum and pediatric patient.

https://www.jccponline.com/about.html

Developmental Milestones

Developmental Milestones

These are important to know and understand, in the treatment of children.

Developmental milestones represent the behavioral indicators that signify different stages of usual growth.

Each child develops at a unique pace, but there are certain common changes that occur around the same age as they grow older.

These changes reflect the development of the child's brain, nervous system, and body.

If development is not unfolding according to plan, we need to know as soon as possible.

Recent changes

In response to the dramatic increase of developmental delays, the CDC presented new milestone guidelines in February of 2022

The new guidelines have an increased focus on social/emotional and language/communication guidelines

They also eliminate some milestones that many feel should remain, including crawling.

Milestone Categories

- Physical – Strength and physical skills, including gross and fine motor skills
- Cognitive- Thinking and problem solving
- Social/Emotional – emotions, their own and others, relationships
- Communication/Language – expressive and receptive

By Two Months...

Social/Emotional Milestones
Calms down when spoken to or picked up
Looks at your face
Seems happy to see you when you walk up to her
Smiles when you talk to or smile at her

Language/Communication Milestones
Makes sounds other than crying
Reacts to loud sounds

Cognitive Milestones
Watches you as you move
Looks at a toy for several seconds

Movement/Physical Development Milestones
Holds head up when on tummy
Moves both arms and both legs
Opens hands briefly

By 4 months....

Social/Emotional Milestones
Smiles on his own to get your attention
Chuckles (not yet a full laugh) when you try to make him laugh
Looks at you, moves, or makes sounds to get or keep your attention

Language/Communication Milestones
Makes sounds like “oooo”, “aahh” (cooing)
Makes sounds back when you talk to him
Turns head towards the sound of your voice

Cognitive Milestones
If hungry, opens mouth when he sees breast or bottle
Looks at her hands with interest

Movement/Physical Development Milestones
Holds head steady without support when you are holding him
Holds a toy when you put it in his hand
Uses his arm to swing at toys
Brings hands to mouth
Pushes up onto elbows/forearms when on tummy

By 6 months...

Social/Emotional Milestones
Knows familiar people
Likes to look at self in a mirror
Laughs

Language/Communication Milestones
Takes turns making sounds with you
Blows “raspberries” (sticks tongue out and blows)
Makes squealing noises

Cognitive Milestones
Puts things in her mouth to explore them
Reaches to grab a toy she wants
Closes lips to show she doesn’t want more food

Movement/Physical Development Milestones
Rolls from tummy to back
Pushes up with straight arms when on tummy
Leans on hands to support herself when sitting

By 9 months...

Social/Emotional Milestones

Is shy, clingy, or fearful around strangers

Shows several facial expressions, like happy, sad, angry, and surprised

Looks when you call her name

Reacts when you leave (looks, reaches for you, or cries)

Smiles or laughs when you play peek-a-boo

Language/Communication Milestones

Makes a lot of different sounds like “mamamama” and “babababababa”

Lifts arms up to be picked up

Cognitive Milestones

Looks for objects when dropped out of sight (like his spoon or toy)

Bangs two things together

Movement/Physical Development Milestones

Gets to a sitting position by herself

Moves things from one hand to her other hand

Uses fingers to “rake” food towards himself

Sits without support

By one year…

Social/Emotional Milestones
Plays games with you, like pat-a-cake

Language/Communication Milestones
Waves “bye-bye”
Calls a parent “mama” or “dada” or another special name
Understands “no” (pauses briefly or stops when you say it)

Cognitive Milestones
Puts something in a container, like a block in a cup
Looks for things he sees you hide, like a toy under a blanket

Movement/Physical Development Milestones
Pulls up to stand
Walks, holding on to furniture
Drinks from a cup without a lid, as you hold it
Picks things up between thumb and pointer finger, like small bits of food

By 15 months…

Social/Emotional Milestones

Copies other children while playing, like taking toys out of a container when another child does
Shows you an object she likes
Claps when excited
Hugs stuffed doll or other toy
Shows you affection (hugs, cuddles, or kisses you)

Language/Communication Milestones

Tries to say one or two words besides “mama” or “dada,” like “ba” for ball or “da” for dog
Looks at a familiar object when you name it
Follows directions given with both a gesture and words. For example, he gives you a toy when you hold out your hand and say, “Give me the toy.”
Points to ask for something or to get help

Cognitive Milestones

Tries to use things the right way, like a phone, cup, or book
Stacks at least two small objects, like blocks

Movement/Physical Development Milestones

Takes a few steps on his own
Uses fingers to feed herself some food

By 18 months…

Social/Emotional Milestones
Moves away from you, but looks to make sure you are close
Points to show you something interesting
Puts hands out for you to wash them
Looks at a few pages in a book with you
Helps you dress him by pushing arm through sleeve or lifting up foot

Language/Communication Milestones
Tries to say three or more words besides “mama” or “dada”
Follows one-step directions without any gestures, like giving you the toy when you say, “Give it to me.”

Cognitive Milestones
Copies you doing chores, like sweeping with a broom
Plays with toys in a simple way, like pushing a toy car

Movement/Physical Development Milestones
Walks without holding on to anyone or anything
Scribbles
Drinks from a cup without a lid and may spill sometimes
Feeds himself with his fingers
Tries to use a spoon
Climbs on and off a couch or chair without help

By two years…

Social/Emotional Milestones

Notices when others are hurt or upset, like pausing or looking sad when someone is crying

Looks at your face to see how to react in a new situation

Language/Communication Milestones

Points to things in a book when you ask, like “Where is the bear?”

Says at least two words together, like “More milk.”

Points to at least two body parts when you ask him to show you

Uses more gestures than just waving and pointing, like blowing a kiss or nodding yes

Cognitive Milestones

Holds something in one hand while using the other hand; for example, holding a container and taking the lid off

Tries to use switches, knobs, or buttons on a toy

Plays with more than one toy at the same time, like putting toy food on a toy plate

Movement/Physical Development Milestones

Kicks a ball

Runs

Walks (not climbs) up a few stairs with or without help

Eats with a spoon

By 30 months…

Social/Emotional Milestones

Plays next to other children and sometimes plays with them

Shows you what she can do by saying, “Look at me!”

Follows simple routines when told, like helping to pick up toys when you say, “It’s clean-up time.”

Language/Communication Milestones

Says about 50 words

Says two or more words together, with one action word, like “Doggie run”

Names things in a book when you point and ask, “What is this?”

Says words like “I,” “me,” or “we”

Cognitive Milestones

Uses things to pretend, like feeding a block to a doll as if it were food

Shows simple problem-solving skills, like standing on a small stool to reach something

Follows two-step instructions like “Put the toy down and close the door.”

Shows he knows at least one color, like pointing to a red crayon when you ask, “Which one is red?”

Movement/Physical Development Milestones

Uses hands to twist things, like turning doorknobs or unscrewing lid

Takes some clothes off by himself, like loose pants or an open jacket

Jumps off the ground with both feet

Turns book pages, one at a time, when you read to her

By three years…

Social/Emotional Milestones

Calms down within 10 minutes after you leave her, like at a childcare drop off

Notices other children and joins them to play

Language/Communication Milestones

Talks with you in conversation using at least two back-and-forth exchanges

Asks “who,” “what,” “where,” or “why” questions, like “Where is mommy/daddy?”

Says what action is happening in a picture or book when asked, like “running,” “eating,” or “playing”

Says first name, when asked

Talks well enough for others to understand, most of the time

Cognitive Milestones

Draws a circle, when you show him how

Avoids touching hot objects, like a stove, when you warn her

Movement/Physical Development Milestones

Strings items together, like large beads or macaroni

Puts on some clothes by himself, like loose pants or a jacket

Uses a fork

By four years...

Social/Emotional Milestones
Pretends to be something else during play (teacher, superhero, dog)
Asks to go play with children if none are around, like “Can I play with Alex?”
Comforts others who are hurt or sad, like hugging a crying friend
Avoids danger, like not jumping from tall heights at the playground
Likes to be a “helper”
Changes behavior based on where she is (place of worship, library, playground)

Language/Communication Milestones
Says sentences with four or more words
Says some words from a song, story, or nursery rhyme
Talks about at least one thing that happened during her day, like “I played soccer.”
Answers simple questions like “What is a coat for?” or “What is a crayon for?”

Cognitive Milestones
Names a few colors of items
Tells what comes next in a well-known story
Draws a person with three or more body parts

Movement/Physical Development Milestones
Catches a large ball most of the time
Serves herself food or pours water, with adult supervision
Unbuttons some buttons
Holds crayon or pencil between fingers and thumb (not a fist)

By five years...

Social/Emotional Milestones

Follows rules or takes turns when playing games with other children

Sings, dances, or acts for you

Does simple chores at home, like matching socks or clearing the table after eating

Language/Communication Milestones

Tells a story she heard or made up with at least two events. For example, a cat was stuck in a tree and a firefighter saved it

Answers simple questions about a book or story after you read or tell it to him

Keeps a conversation going with more than three back-and-forth exchanges

Uses or recognizes simple rhymes (bat-cat, ball-tall)

Cognitive Milestones

Counts to 10

Names some numbers between 1 and 5 when you point to them

Uses words about time, like “yesterday,” “tomorrow,” “morning,” or “night”

Pays attention for 5 to 10 minutes during activities. For example, during story time or making arts and crafts (screen time does not count)

Writes some letters in her name

Names some letters when you point to them

Movement/Physical Development Milestones

Buttons some buttons

Hops on one foot

Importance of milestones

Congratulations, you made it through the long list of milestones!

There have been some positive changes to milestones. The increased emphasis on social development does make it easier for caregivers and professionals to spot issues sooner.

A delay in social or emotional development needs to be taken as seriously as a delay in motor or language development.

The human brain is programmed to develop in a certain way, in a specific order. When these things don't happen, for whatever reason, we need to pay attention.

Changes to milestones

The concern about recent changes is this: rather than acknowledge the decline of skills in the population, the new milestones lower the bar so that what used to be considered abnormal or delayed is now normal.

Examples:

- Sitting without support used to begin at 6 months, now 9 months
- Walking used to be normal at 12 months, now 18 months
- First words used to come at 12 months, now 18 months
- At 30 months, babies are now expected to have 50 words, where it used to be 250

Milestone Checklist

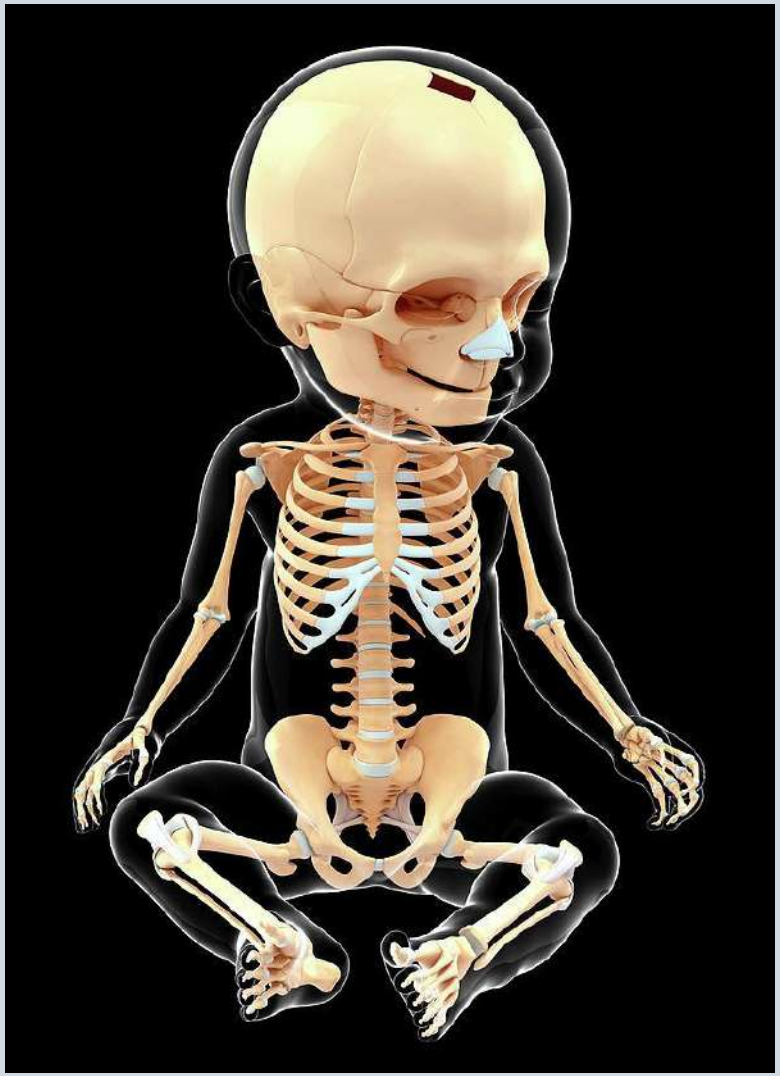
It is worth becoming very familiar with these milestones, reviewing them with caregivers during the intake, and observing the child directly.

The CDC milestones can be found here:

https://www.cdc.gov/ncbddd/actearly/milestones/index.html

This chart, from University of Alberta, is very handy:

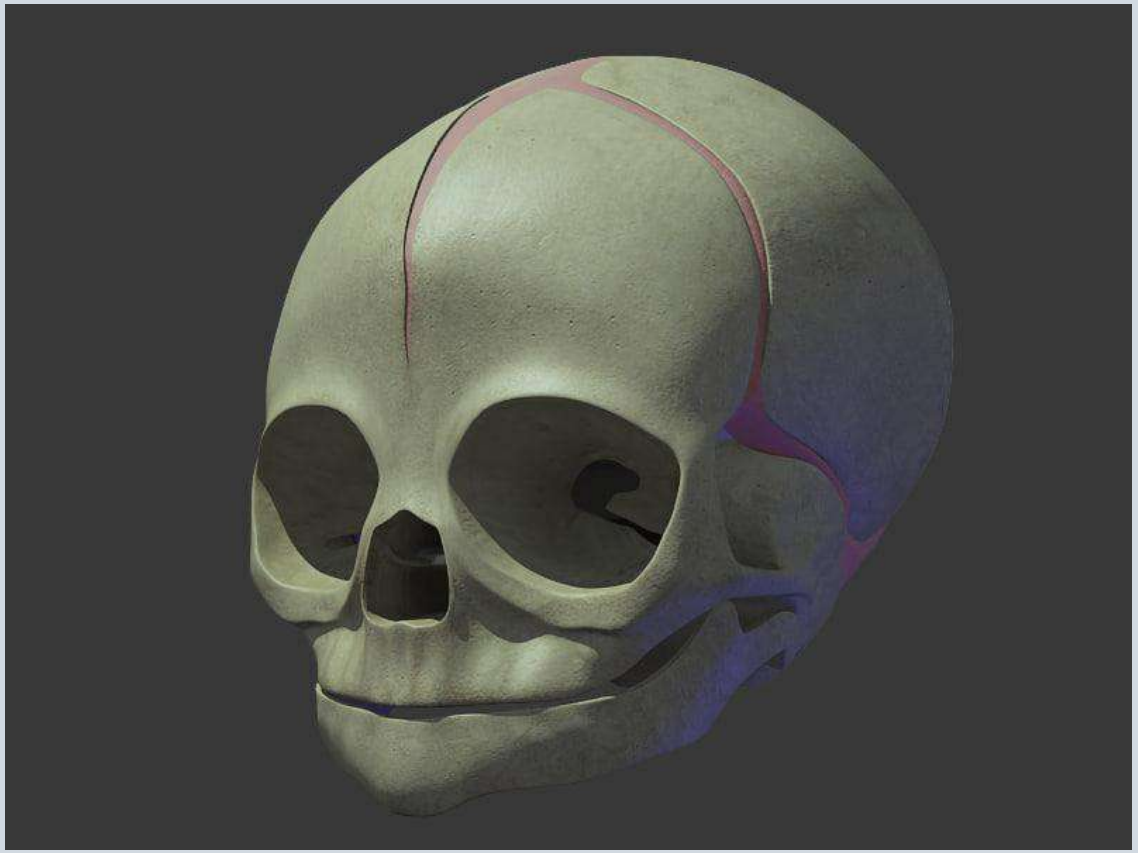
https://pedscases.com/sites/default/files/SNAPSHOTS_Developmental_Milestones_Chart_UPDATED_Aug_2014.pdf



Development of the Skeletal System

Starting at Birth

Cranium



The bones of the infant skull are not fused tightly together at birth.

Molding

The process of molding occurs due to the pressure and forces exerted on the baby's head during passage through the narrow birth canal. The bones of the skull, especially those in the areas of the fontanelles and sutures, can overlap and shift slightly, allowing the head to adapt to the shape of the birth canal. This process helps facilitate the baby's journey through the pelvis and into the world. Molding is a normal part of the birthing process and usually completes within a few days or weeks after birth.

Cranium Growth and Brain Growth

The development of the cranium is closely linked to the growth of the brain. As the brain expands and increases in size, the bones of the skull accommodate this growth. The skull undergoes changes in shape and size to provide adequate space for the developing brain.

Conversely, if there are issues with the cranium growth or shape, this will impact the development of the brain.

Fontanels

At birth, a baby's skull contains soft spots known as fontanels, where the bones are not fully fused.

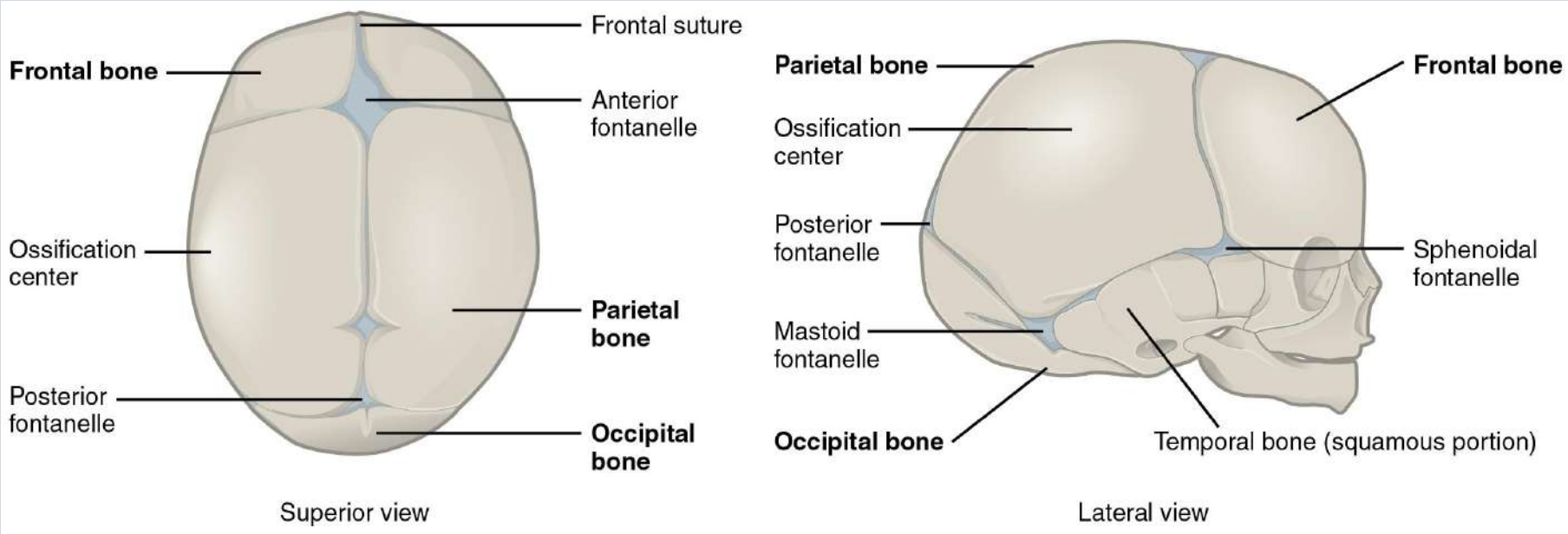
These fontanels allow for the flexibility of the skull during childbirth.

Over the first couple of years of life, these fontanels gradually close as the bones of the skull fuse.

The anterior fontanel, the largest fontanel located at the top of the head, typically closes by around 18 to 24 months, but the range is 1-3 years.

Fontanels

The two on the top of the head, anterior and posterior, are the most often assessed. Check to see that they are neither sunken (indicating dehydration) nor bulging (indicating hydrocephalus, a medical emergency)



Ages for Fontanel Closing

- Posterior Fontenelle: 2 – 3 months
- Sphenoidal Fontanelles: around 6 months
- Mastoid Fontanelles: 6 – 18 months
- Anterior Fontenelle: 1 – 3 years

14 month

4 month

Sutures

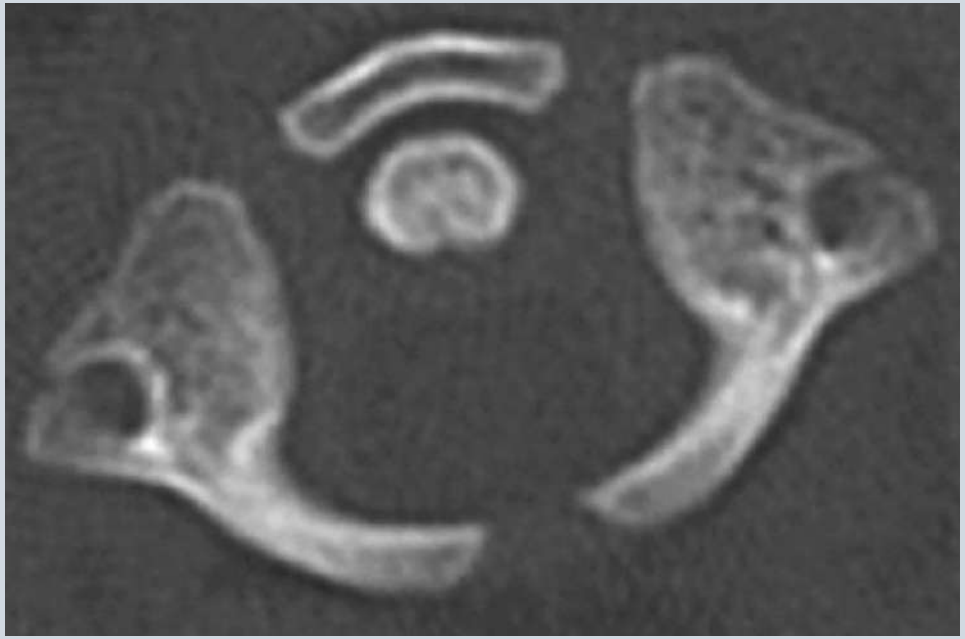
An infant's skull is made up of five bony plates connected by four sutures, fibrous joints that allow for some flexibility. As the infant grows, these sutures ossify, leading to the fusion of the skull bones. The process of suture closure continues throughout childhood and adolescence.

The metopic suture runs from the fontanelle, or "soft spot," on the top of the head down to the forehead.

It is the first suture in the skull to close, which sometimes happens as early as 3 months old. It is usually completely fused by 9 months old.

Note the presence of the metopic suture on the skull of the 4 month old in the slide above.

Atlas



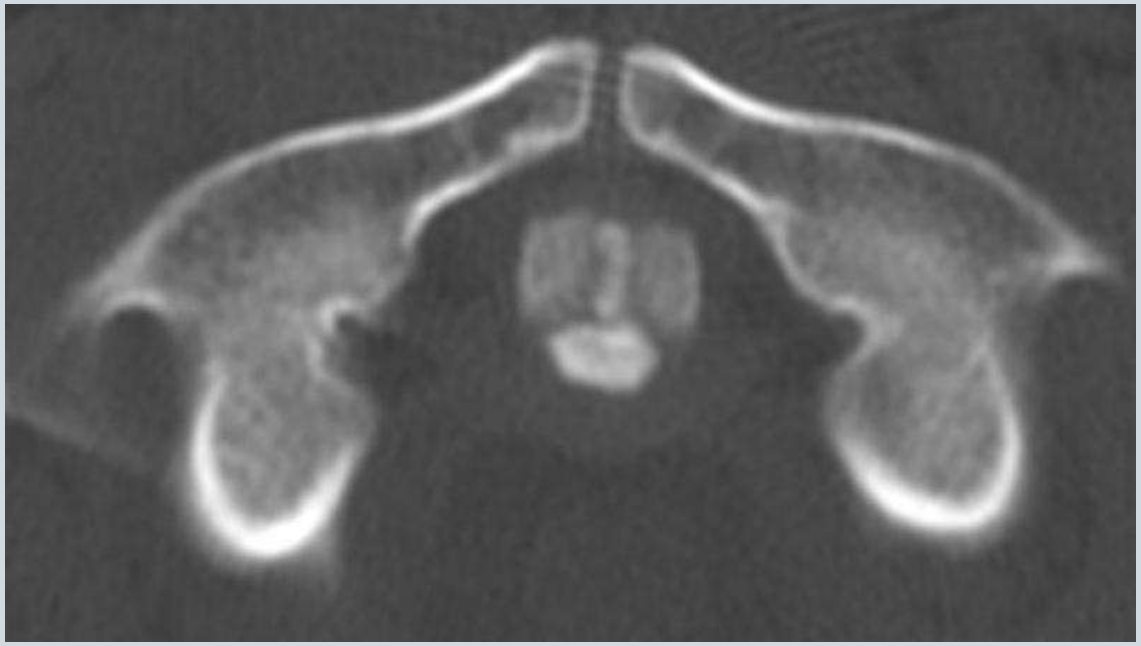
At birth, the atlas is two unfused bony masses, with articular facets on the superior and inferior surfaces. There is a groove for the vertebral artery.

For the first year of life, the altas bones grow in size but they do not ossify or fuse.

Ossification begins late in the first year of life, or in the second year.

The anterior arch begins to ossify in the second year, and is present by year 3-4

The junctions may not close until the 5^{th} or 6^{th} year.



Axis

The axis appears from six ossification centers, one for each half of the neural arch, one for the true centrum of the axis, and one for each half of the body of the dens. The final center, for the tip of the dens, does not appear until approximately two years of age.

The two halves of the neural arch as fused at birth

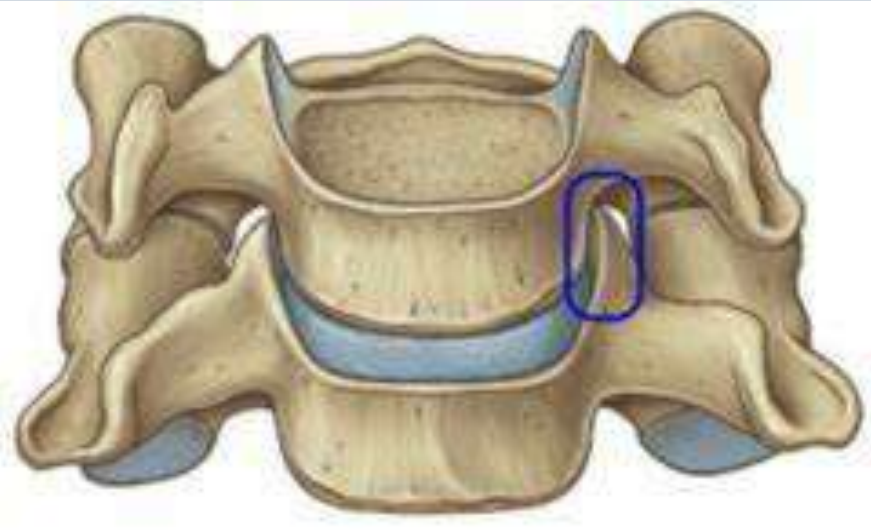
The centrum fuses with arches at 3-4 years and with the dens at 4-6 years

The posterior arch fuses at 4-6 years

The tip of the dens, the os terminale, appears at 2 years and does not fuse until 12 years old.

Cervical Vertebrae model 14-16 months

Cervical Vertebrae



A typical cervical vertebra has three ossification centers, present at birth.

The posterior laminae fuse by age 2

The anterior, central fusions take place between 3 and 4 years.

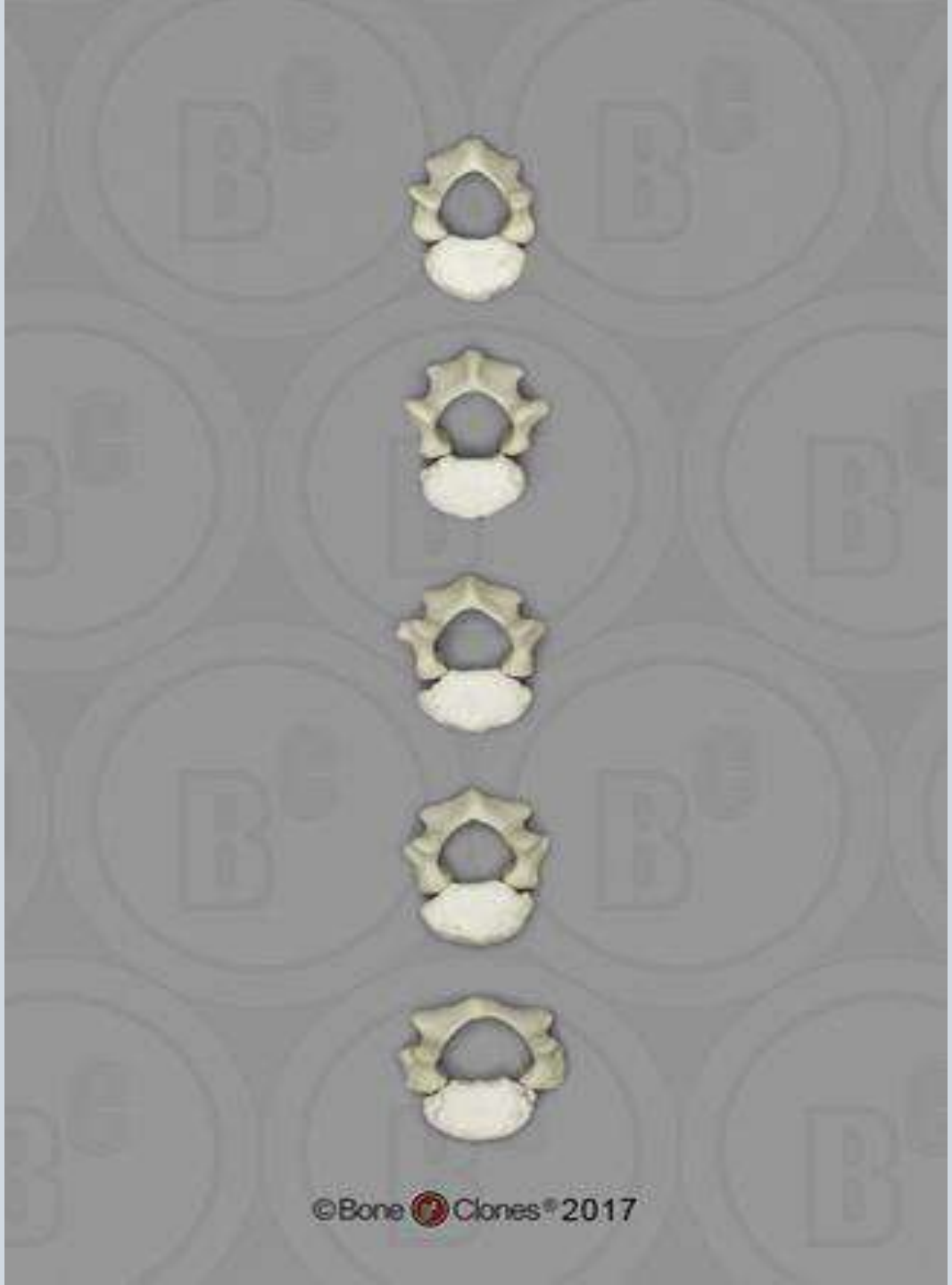
Once they do, then the synovial uncovertebral joints of Luschka can form on the anterior vertebral bodies of C3-C7. They will be developed by 6-9 years old. Their function is to protect the cervical spine from excessive movement.

Thoracic Vertebrae model 14-16 months

A typical thoracic vertebra has three ossification centers, present at birth.

The posterior laminae fuse from ages 1 to 2.

The anterior, central fusions take place between 3 and 5 years.



Lumbar model
14-16 months

At birth, a lumbar vertebra has three bony masses.

The laminae of L1-L4 fuse by the end of the first year, but L5 may not fuse until the 5th year.

It may not fuse at all, as spina bifida is common.

The anterior, central fusions take place between 2 and 3 years.

The synovial articular facets do not have vertical orientation until the child begins to walk, at about one year of age.

Sacral Vertebrae model Ages 14-16 months

The sacrum develops from 21 separate centers of ossification, so it is complex!

By age 6, all primary centers have fused.

The laminae fuse posteriorly between 7-15 years

Each sacral segment remains separate until puberty.

Development of the sacrum

At birth, the three ossification centers are present.

They grow rapidly during the first few months, then more slowly until puberty, when the adolescent growth spurt occurs.

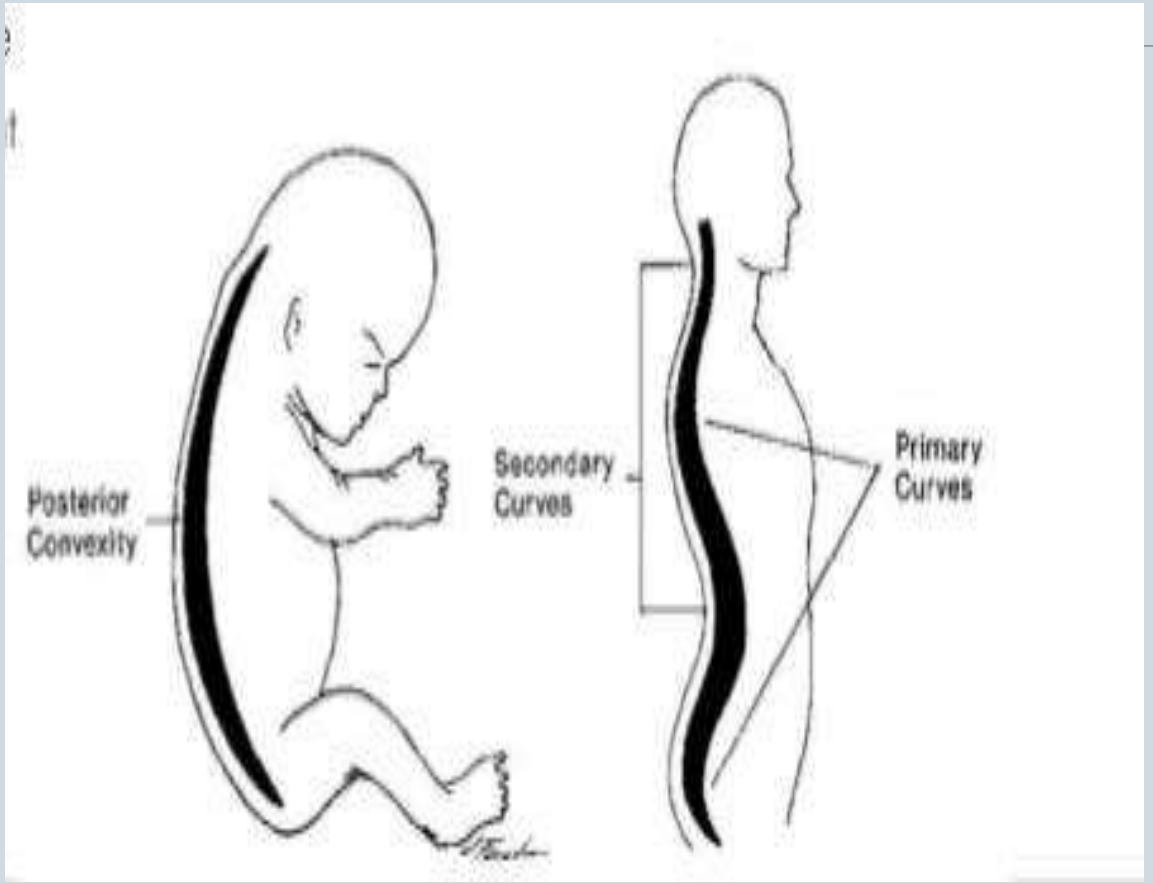
The ischium and pubis fuse first, between 5-8 years.

The ilia fuse to the ischia and pubis between 11-15 years (female) and 14-17 years (male)

Model of the Pelvic bones

14-16 months

Development of Spinal Curves



Primary curve emerges at 4 weeks in the embryo

1st Secondary Curve: Cervical lordotic curve, begins at 3-4 months, when infant can hold its head up

2nd Secondary Curve: Lumbar lordotic curve, emerges between 12-18 months, when the baby begins to walk

Growth Plates

Growth plates, also known as epiphyseal plates, are areas of cartilage located at the ends of long bones in children and adolescents. These plates are responsible for longitudinal bone growth, and their closure marks the end of the individual's potential for further increase in height. The timing of growth plate closure varies among individuals and can depend on factors such as genetics, sex, and overall development.

In general, growth plates close at different ages for different bones. As a broad guideline:

Girls: Growth plates often close earlier for girls than for boys. For most girls, the closure of growth plates occurs between the ages of 14 and 16.

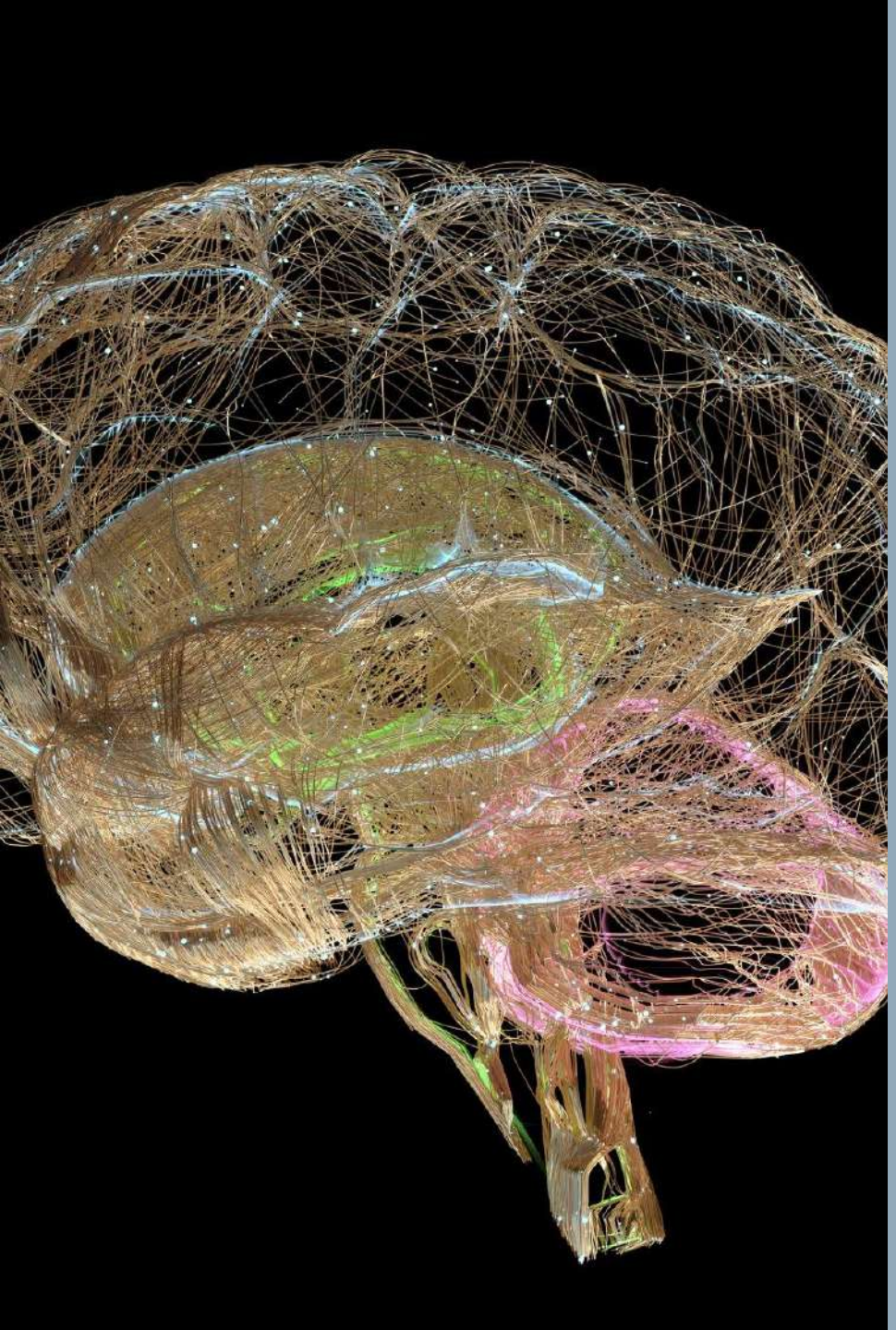
Boys: Boys typically experience growth plate closure later than girls. The closure of growth plates for most boys occurs between the ages of 16 and 18.

It's important to note that these age ranges are generalizations, and there can be considerable individual variation.

Development of the Nervous System

Development of the Nervous System

The development of the human nervous system is a highly complex and precisely orchestrated process that begins early in embryonic development and continues through postnatal life.



The Brain

The major structures of the brain, including the cerebrum, cerebellum, and brainstem, are present at birth.

- At birth, the average baby’s brain is about a quarter of the size of the average adult brain.
- It doubles in size in the first year.
- It is about 80% of adult size by age 3
- It is about 90% of adult size by age 5.

While the brain's structural development is largely complete by the mid-20s, lifelong neuroplasticity allows the brain to adapt, reorganize, and learn throughout life in response to experiences and environmental stimuli.

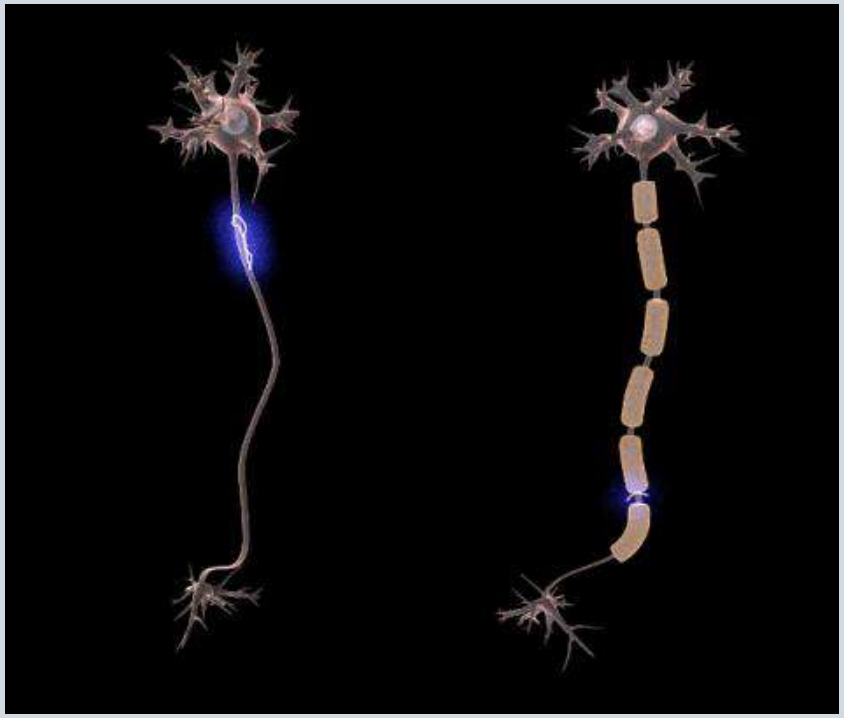
Synaptogenesis

At birth, a baby has a vast number of neurons, but the intricate connections between these neurons are still in the process of forming. This process, known as synaptogenesis, contributes to the establishment of neural circuits.

After birth, neurons continue to differentiate and mature, forming more specific connections.

Synaptic connections are strengthened or pruned based on experience, forming the neural circuits that underlie sensory perception, motor control, and cognitive functions.

The development of synaptic connections between neurons is influenced by sensory experiences, environmental stimuli, and early interactions.



https://brainmadesimple.com/postnatal-nervous-system-development/

Myelination

Myelination, the process of adding a myelin sheath to nerve fibers, continues after birth and throughout childhood. This process enhances the speed and efficiency of nerve impulse transmission.

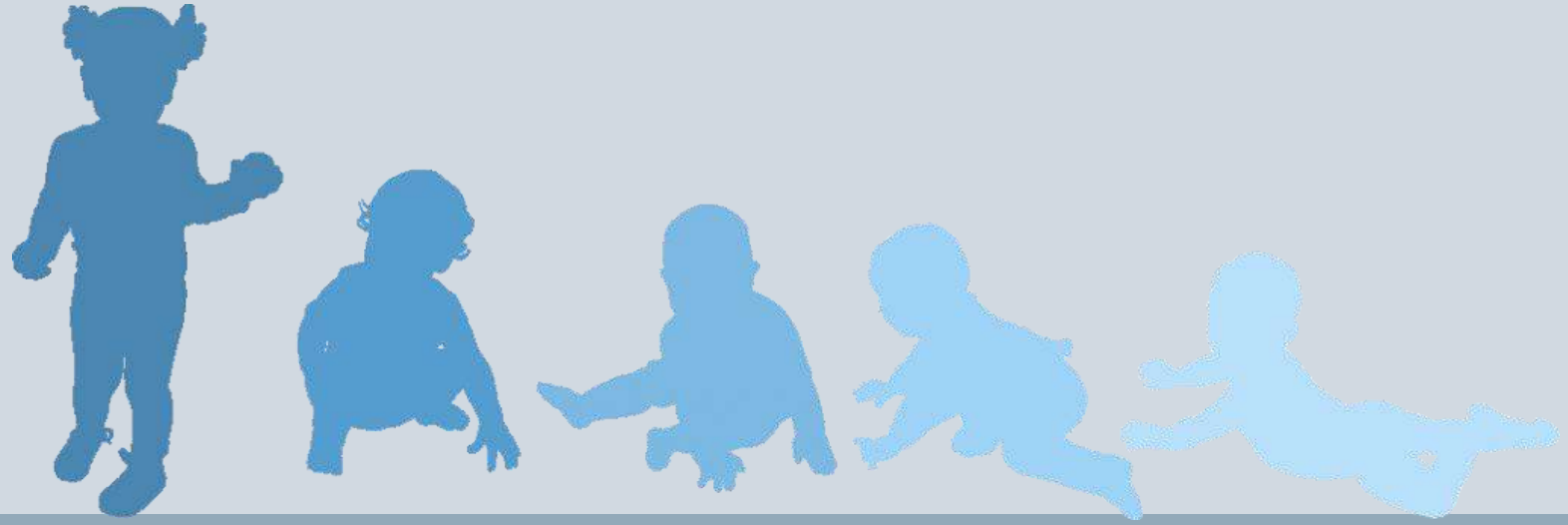
The initiation of myelination processes in the central nervous system predominantly occurs either at birth or shortly thereafter. This process begins with the brainstem, followed by the spinal cord, and progresses through various regions of the brain

It is particularly crucial for motor development, as myelinated nerves allow for more efficient transmission of signals. Milestones such as crawling, walking, and fine motor skills are associated with the maturation of myelinated pathways.

Critical pathways involved in sensory processing also continue to myelinate during the early postnatal period. This contributes to enhanced sensory processing.

Motor Development

Motor skills evolve in a predictable sequence during infancy and childhood. From primitive reflexes at birth, infants gradually gain voluntary control over movements. Gross motor skills, such as sitting and walking, develop in coordination with the maturation of the central nervous system.



Primitive Reflexes

These are present at birth or in utero, then gradually disappear over the first months of baby's life, as they are replaced by volitional movement.

Some help the baby navigate the birth process.

Others protect newborns from harm by enabling them to automatically respond to stimuli in their environment.

There is a range of ages when reflexes should appear, and when they should disappear. In general, in the infant, we check to see that they are present, while in the older child, we checking to make sure that they are absent.

Significance of Primitive Reflexes

As the child develops, primitive reflexes fade, and are replaced by voluntary movements.

Abnormal or persistent primitive reflexes can be an indicator of neurological or developmental problems, such as cerebral palsy or developmental delays.

Primitive Reflexes

Reflex	Appears	Disappears
Moro Reflex	Birth	5 months
Palmar grasp	Birth	4 months
Plantar grasp	Birth	8-15 months
Rooting & Sucking	Birth (sometimes over the first few weeks)	After 1st year
Tonic Neck	Birth	6 months
Galant	Birth	6 months
Parachute	8-9 months	Does not disappear

Primitive Reflexes

Testing for retained primitive reflexes in older children (and adults!) is not part of a general exam or a chiropractic practice, but some chiropractors incorporate this in their practices. Some good resources are:

https://www.solvelearningdisabilities.com/

The Symphony of Reflexes: Interventions for Human Development, Autism, ADHD, CP, and Other Neurological Disorders by Bonnie Brandes M.Ed.

Adolescence

During adolescence, the brain undergoes significant changes in structure and function.

The prefrontal cortex, responsible for decision-making and impulse control, continues to develop.

This period is characterized by increased cognitive abilities and the establishment of executive functions.

Common Infant Challenges

Nursing and Feeding

Common concerns:

a. Baby may have trouble latching on to the breast, or feeding continuously
b. Baby may prefer nursing on one side to the other
c. Nursing may be painful for the mother because of the baby's latch
d. Baby may have gassiness or fussiness, difficulty digesting
e. Baby may not be gaining weight appropriately

Chiropractic Care

Many common nursing and feeding challenges can be helped with chiropractic care.

Addressing subluxations in the cervical spine and TMJ, and soft tissue restrictions can be can solve many issues.

Cranial work can be extremely beneficial

Contribution of chiropractic therapy to resolving suboptimal breastfeeding: a case series of 114 infants

Joyce E Miller [1], Laura Miller, Ann-Kristin Sulesund, Andriy Yevtushenko

Objective: The purpose of this study was to describe the circumstances, clinical features, role, and results of chiropractic management of infants who were referred to a chiropractic clinic for failure to adequately feed at the breast.

Methods: Clinical case series of 114 infant cases of hospital-diagnosed or lactation consultant diagnosed feeding problems that were treated with chiropractic therapy in addition to routine care and followed to short-term result.

Results: The most common age of referral was 1 week (mean, 3 weeks; range, 2 days-12 weeks), and the most common physical findings were cervical posterior joint dysfunction (89%), temporomandibular joint imbalance (36%), and inadequate suck reflex (34%). Treatment was chiropractic therapy in addition to any support given elsewhere. All children showed some improvement with 78% (N = 89) being able to exclusively breast feed after 2 to 5 treatments within a 2-week time period.

Conclusion: Cooperative multidisciplinary care to support breastfeeding was demonstrated in this population. Chiropractic treatment may be a useful adjunct to routine care given by other professionals in cases of diagnosed breastfeeding problems with a biomechanical component.

Miller JE, Miller L, Sulesund AK, Yevtushenko A. Contribution of chiropractic therapy to resolving suboptimal breastfeeding: a case series of 114 infants. J Manipulative Physiol Ther. 2009 Oct;32(8):670-4. doi: 10.1016/j.jmpt.2009.08.023. PMID: 19836604.

Breastfeeding help

If the nursing process isn’t unfolding as desired, it is common for chiropractors to refer and co-treat with breastfeeding consultants.

There are a variety of certifications for lactation consultants.

Lactation Consultants

1. **International Board Certified Lactation Consultant (IBCLC):** The IBCLC credential is considered the gold standard for lactation consultants. To become an IBCLC, individuals must complete specific educational requirements, accumulate clinical experience in lactation consulting, and pass a rigorous examination administered by the International Board of Lactation Consultant Examiners (IBLCE).
2. **Certified Lactation Counselor (CLC):** This credential is offered by the Academy of Lactation Policy and Practice (ALPP) and requires completion of a training program. CLCs are trained to provide basic breastfeeding support, education, and counseling.
3. **Certified Breastfeeding Specialist (CBS):** The CBS credential is provided by Lactation Education Resources (LER). To attain this certification, individuals must complete LER's training program and pass the corresponding exam.
4. **Certified Professional Lactation Consultant (CPLC):** The Healthy Children Project's Center for Breastfeeding offers the CPLC credential. This certification involves completing an extensive lactation consultant training program and passing a comprehensive exam.
5. **Registered Lactation Consultant (RLC):** The International Lactation Consultant Association (ILCA) offers the RLC credential. Individuals can attain this certification by meeting specific educational and clinical requirements and passing the ILCA examination.

Infantile Colic

- Colic typically presents with a cry that is loud and continuous, persisting for several hours, commonly in the afternoon or evening
- Often starts a few weeks after birth, and generally improves at 3-4 months
- Baby tends to be tense, with legs drawn up, fists often balled
- Abdomen may be tight and/or distended

Possible Causes of Colic

The exact cause of infantile colic is not fully understood, but these factors may contribute:

- **Gastrointestinal Factors:** Immature digestive systems in newborns may contribute to difficulties in processing and digesting breast milk or formula, leading to the accumulation of gas and discomfort.
- **Overstimulation:** Some experts suggest that colic may be related to an infant's sensitivity to external stimuli, such as bright lights, loud noises, or excessive handling. Newborns are still adjusting to the sensory input of the outside world.
- **Maternal Diet:** In breastfed infants, certain components in the mother's diet, such as caffeine, dairy products, spicy foods, or certain vegetables, may contribute to colic.
- **Feeding Issues:** Problems with latching onto the breast, swallowing air during feeding, or a too-fast or too-slow flow of milk from the bottle can contribute to colic.
- **Hormonal Changes:** Changes in the levels of certain hormones, both in the infant and the mother, could play a role in colic, although this is not fully understood.

Efficacy of chiropractic manual therapy on infant colic: a pragmatic single-blind, randomized controlled trial

Joyce E Miller , David Newell, Jennifer E Bolton

Objective: The purpose of this study was to determine the efficacy of chiropractic manual therapy for infants with unexplained crying behavior and if there was any effect of parental reporting bias.

Results: One hundred four patients were randomized. In parents blinded to treatment allocation, using 2 or less hours of crying per day to determine a clinically significant improvement in crying time, **the increased odds of improvement in treated infants compared with those not receiving treatment were statistically significant at day 8** (adjusted odds ratio [OR], 8.1; 95% confidence interval [CI], 1.4-45.0) **and at day** 10 (adjusted OR, 11.8; 95% CI, 2.1-68.3). **The number needed to treat was 3**. In contrast, the odds of improvement in treated infants were not significantly different in blinded compared with nonblinded parents (adjusted ORs, 0.7 [95% CI, 0.2-2.0] and 0.5 [95% CI, 0.1-1.6] at days 8 and 10, respectively).

Miller JE, Newell D, Bolton JE. Efficacy of chiropractic manual therapy on infant colic: a pragmatic single-blind, randomized controlled trial. J Manipulative Physiol Ther. 2012 Oct;35(8):600-7. doi: 10.1016/j.jmpt.2012.09.010. PMID: 23158465.

Infantile Colic and Caregivers

When addressing colic in practice, it is extremely important to evaluate the well-being of the caregiver.

Colic tends to be frustrating and exhausting for parents.

Ask questions about parental support systems, encourage exhausted parents to find help.

Infantile Colic

It is important not to dismiss an irritable baby as having “colic”, but to carefully rule out underlying causes and disease

Colic is generally a self-limiting condition, meaning it typically resolves on its own with time.

However, babies are also prone to a variety of digestive issues that can and should be treated, rather than dismissed.

Spit up vs. Vomiting

Spit up - considered a normal part of infancy and is commonly related to immature digestive systems.

- Overfeeding, swallowing air during feeding, or a fast milk flow can contribute to spitting up.
- A small amount of milk or formula comes up, and doesn't appear cause distress

Vomiting – is also common in infants, but in excess may indicate a more serious problem.

- More forceful than spit up and larger quantity of milk or formula comes up.
- Can indicate infections, illnesses, food allergies, gastrointestinal issues, or other medical conditions.
- For example, forceful or excessive vomiting may indicate GERD

Gastroesophageal reflux disorder (GERD)

- Very common in infants because intra-abdominal segment of the esophagus is virtually nonexistent at birth and therefore no effective reflux barrier exists
- Over the first few months, the intra-abdominal segment of the esophagus lengthens
- Chiropractic care can be very helpful. Severe cases may require referral to a specialist

Severe Digestive Conditions

- **Pyloric stenosis** – Pyloric stenosis is a narrowing of the pylorus, the opening from the stomach to the small intestine, that causes projectile vomiting followed by observable reserve peristaltic waves.
  - Chiropractic care is not contraindicated, but referral is important, as most cases require surgical intervention

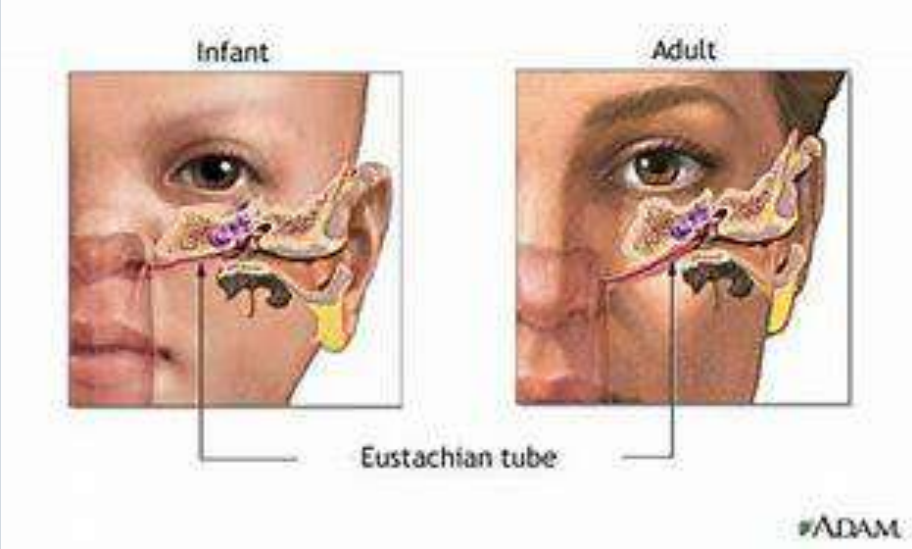
- **Intussusception** – serious condition in which part of the intestine slides into an adjacent part of the intestine. This telescoping action often blocks food or fluid from passing through. Intussusception also cuts off the blood supply to the part of the intestine that's affected
  - Immediate referral is required. Cases are characterized by severe, inconsolable crying, and abdominal pain. There may be a lump in the belly.

Ear Infections

Middle ear infections, or otitis media, are a common ailment of childhood, and one that prompts parents to seek chiropractic care.

In adults, the eustachian tube slopes down about 35 degrees.

In children, the eustachian tube only slopes about 10 degrees down, which makes drainage more difficult, and increases the potential for infection.



Ear Infections

Acute otitis media is accompanied with fever and ear pain, and the tympanic membrane will appear red, possibly bulging.

Chronic otitis media does not involve a fever, though mild pain or discomfort may be present. The tympanic membrane will be a dull blue, gray, or deep red, possibly with bubbles or spots.

In either case, chiropractic care can be helpful. Cranial techniques to improve drainage of the middle ear are especially helpful for chronic cases or recurrent acute infections. A common goal is to help the child avoid ear tubes, which are placed to help the ears drain when other methods fail.

The research, however, is scarce. A study below by Joan Fallon D.C., F.I.C.C.P. showed promise, but a later published literature review was more neutral.

The Role of the Chiropractic Adjustment in the Care and Treatment of 332 Children with Otitis Media

Joan Fallon D.C., F.I.C.C.P.

Participants: 332 children who presented consecutively with previously diagnosed otitis media, aged 27 days to 5 years Main outcome measures: A survey of the parent/guardian was used to determine historical data with respect to previous otitis media bouts, age of onset of initial otitis media, feeding history, history of antimicrobial therapy, referral patterns, and birth history. Otoscopic and tympanographic data was collected as well as data concerning the number of adjustments administered to produce resolution of the otitis media. Data with respect to recurrence rates over six months was also collected.

Results: The average number of adjustments administered by types of otitis media were as follows: acute otitis media (n=127) 4.0+/- 1.03, chronic/serous otitis media (n=104) 5.0 +/- 1.53, for the mixed type of bilateral otitis media (n=10) 5.3 +/- 1.35 and where no otitis was initially detected on otoscopic and tympanographic exam (but with history of multiple bouts) (n=74) 5.88 +/- 1.87. The number of days it took to normalize the otoscopic examination was for acute 6.67 +/- 1.9 chronic/serous 8.57 +/- 1.96 and mixed 8.3 +/- 1.00. The number of days it took to normalize the tympanographic examination: acute 8.35 +/- 2.88, chronic/serous 10.18 +/- 3.39, and mixed 10.9 +/- 2.02. The overall recurrence rate over a six month period from initial presentation in the office was for acute 11.02%, chronic/serous 16.34%, for mixed 30% and for none present 17.56%

Fallon JM. The Role of the Chiropractic Adjustment in the Care and Treatment of 332 Children with Otitis Media. *Journal of Clinical Chiropractic Pediatrics*. 1997; Volume 2, No. 2:167-183.

Otitis media and spinal manipulative therapy: a literature review

Katherine A. Pohlman, DC, MS, DICCP[a,*] and Monisa S. Holton-Brown, DC, DICCP[b]

Objective

Otitis media (OM) is one of the common conditions for doctor visits in the pediatric population. Spinal manipulation therapy (SMT) may be a potential conservative treatment of OM. The purpose of this study is to review the literature for OM in children, outlining the diagnosis of OM, SMT description, and adverse event notation.

Results

Forty-nine articles were reviewed: 17 commentaries, 15 case reports, 5 case series, 8 reviews, and 4 clinical trials. Magnitude of effect was lower in higher-quality articles. No serious adverse events were found; minor transient adverse effects were noted in 1 case series article and 2 of the clinical trials.

Conclusions

From the studies found in this report, there was limited quality evidence for the use of SMT for children with OM. There are currently no evidence to support or refute using SMT for OM and no evidence to suggest that SMT produces serious adverse effects for children with OM. It is possible that some children with OM may benefit from SMT or SMT combined with other therapies. More rigorous studies are needed to provide evidence and a clearer picture for both practitioner and patients.

Pohlman KA, Holton-Brown MS. Otitis media and spinal manipulative therapy: a literature review. J Chiropr Med. 2012 Sep;11(3):160-9. doi: 10.1016/j.jcm.2012.05.006. PMID: 23449823; PMCID: PMC3437347.

Fever

- A fever is defined as a rectal temperature over 100.4°F
- Rectal temperatures are more accurate, but now much less intrusive means are available.
- Most fevers result from infections, and the majority of these are from respiratory or gastrointestinal infections.
- Other sources of fever include teething and trauma.

Danger?

Fever serves a purpose, helping us to fight infection.

While the vast majority of fevers in children result from viral infections that are self limiting, it is important to recognize that certain viral infections and bacterial infections can be life threatening. These require immediate referral.

Factors in Assessing Severity of Illness

Age: Less than 28 days: Any fever in a neonate warrants referral. This is because illness can progress extremely rapidly to a serious or life-threatening condition.

State: Is the child alert or lethargic? Crying abnormally? Responsive to stimulus?

Color: Is the child pink? Or pale or ashen?

Breathing: Is the child struggling to breathe? In an infant, look for chest recession or nasal flaring

Hydration: Is the skin dry? Eyes normal?

Sepsis

Sepsis ensues when the body's reaction to an existing infection becomes uncontrolled, resulting in intense inflammation throughout the body, ultimately leading to potential tissue damage and organ failure.

Sepsis can affect any child, but premature babies and infants are particularly vulnerable because their immune systems are still developing.

The symptoms of sepsis can mimic those of whatever illness caused it, so it can be difficult to diagnose.

This is an extremely dangerous situation, and one reason why immediate referral is so important for the neonate.

Serious Signs and Symptoms of Babies that Require Immediate Medical Referral

Neonate	Since the health status of a neonate can change rapidly, any signs of illness require immediate referral.
Lethargy	Absence of interaction, hypotonia and/or crying
High Respiratory Rate	Rapid or difficult respirations not related to activity; respiration rate >60 breaths/minute with rib recession
Blue Lips or Tongue	May indicate reduced blood oxygen level
Dehydration	Common sequel to diarrhea or vomiting. Dry mouth, sunken fontanelle, tenting skin, <4 wet nappies/diapers (60-90 mL/4-6 TBS). Urine should be pale and mild smelling.
Pain and Tenderness	Child screams when touched or being moved; avoids being held. Sudden onset of groin pain in a boy may be a sign of testicular torsion; episodic screaming in young children may be a sign of intussusception
Tender Abdomen	Inability to tolerate 2 cm abdominal impression; bloated or rigid abdomen

Vallone SA, Miller J, Larsdotter A, Barham-Floreani J. Chiropractic approach to the management of children. Chiropr Osteopat. 2010 Jun 2;18:16. doi: 10.1186/1746-1340-18-16. PMID: 20525200; PMCID: PMC2887887.

Serious Signs and Symptoms of Children that Require Immediate Medical Referral

Inability to Walk	Refusal or inability to walk in child who previously was walking (or crawling); development of a limp requires attention
Bulging Fontanelle	Evident bulge and rigidity in anterior fontanelle in a quiet child in an upright position
Stiff or Rigid Neck	Refusal/inability to look toward their toes or at a toe placed on their chest may be an early sign of meningitis; very young infants may have meningitis with no obvious signs of neck stiffness
Petechiae	Purple or blood-red spots on the skin that do not blanch with pressure may be a sign of bloodstream infection. Exclude bruises that have an explanation
High Fever	Referral for consult: Neonates (<28days): ≥38 C (100F); 28-90 days >38 C with signs of toxicity or incessant crying; 91-36 months: >39 C (102.2F) and signs of toxicity [58].
Drooling	Sudden onset of drooling not associated with teething, especially when associated with difficult swallowing, may be a sign of epiglottal or pharyngeal infections

Vallone SA, Miller J, Larsdotter A, Barham-Floreani J. Chiropractic approach to the management of children. Chiropr Osteopat. 2010 Jun 2;18:16. doi: 10.1186/1746-1340-18-16. PMID: 20525200; PMCID: PMC2887887.

Common childhood concerns

Asthma

Asthma is the most common childhood respiratory disorder. According to the CDC, in 2021, 6.5% of children and 8.0% of adults had current asthma.

Chiropractic care is often associated with subjective improvement in symptoms and quality of life, according to research studies. Objective improvement has been less clear.

Many chiropractors have found that pediatric asthma can respond well to chiropractic care.

Because asthma has the potential to be life-threatening, it is important that medical support is also in place.

Chiropractic care for patients with asthma: A systematic review of the literature

Adrienne Kaminskyj, DC, Michelle Frazier, BA, DC, Kyle Johnstone, BGS, DC, and Brian J. Gleberzon, BA, DC*

Objective: To provide a review of the literature and rate the quality of published studies regarding chiropractic care, including spinal manipulation, for asthmatic patients.

Conclusion: Results of the eight retrieved studies indicated that chiropractic care showed improvements in subjective measures and, to a lesser degree objective measures, none of which were statistically significant. It is evident that some asthmatic patients may benefit from this treatment approach; however, at this time, the evidence suggests chiropractic care should be used as an adjunct, not a replacement, to traditional medical therapy.

Kaminskyj A, Frazier M, Johnstone K, Gleberzon BJ. Chiropractic care for patients with asthma: A systematic review of the literature. J Can Chiropr Assoc. 2010 Mar;54(1):24-32. PMID: 20195423; PMCID: PMC2829683.

Bedwetting

Bed-wetting, also known as ‘nocturnal enuresis’ is defined as the involuntary loss of urine at night, in the absence of disease, at an age when a child could be expected to be dry.

Primary enuresis can have many causes, including inherited predisposition, infection, blockages or tumors, physical trauma, and psychological issues.

Secondary, or regressive bedwetting applies to a child who has been dry at night for at least six months, but then begins bedwetting again. Psychological issues such as anxiety or familial stress are the most common cause, but other factors should be explored as well.

In all cases it is important to rule out pathological causes.

Chiropractic Treatment for Primary Nocturnal Enuresis: A Case Series of 33 Consecutive Patients

Ailsa J. van Poecke, MSc(Chiro), DC, MSc (Paeds) ; Christina Cunliffe, DC, PhD

Objective: The purpose of this study was to evaluate the effect of a specific type of chiropractic treatment on the wet night frequency of patients between the ages of 3 and 18 years who were treated for primary nocturnal enuresis (PNE) in the chiropractic setting.

Clinical Features: Thirty-three consecutive patient records, dating over a 3-year period, of children 3 to 18 years old who had been treated for PNE using a form of chiropractic treatment method (NeuroImpulse Protocol) were included.

Intervention and Outcome: All patient records were analyzed for a baseline wet night frequency and at 3, 6, 9, and 12 months after the commencement of treatment. Data were collected regarding the number of treatment visits over the 12-month period and the presence of constipation and/or positive family history at presentation. Data were analyzed using descriptive statistics, Friedman's test, and Dunn's Multiple Comparison test.

Of the 33 patient records analyzed, 22 showed resolution of PNE during the 12 months after commencement of chiropractic care**. The mean number of treatments in the responders group was 2.05 ± 1.33**. Ten responders presented with constipation and a further 8 with a positive family history of PNE. Resolution of constipation was noted to be essential to the successful response to treatment. A combination of constipation and positive family history at presentation represented a poor prognostic factor.

Conclusions: There was a 66.6% resolution rate within 1 year in 33 consecutive children and teenagers who experienced PNE. This study provides an indication for possible effectiveness of chiropractic treatment in patients with PNE.

DOI:https://doi.org/10.1016/j.jmpt.2009.08.019

Bedwetting Considerations

There is not a great deal of research on the efficacy of using chiropractic to treat enuresis, although many chiropractors have reported success. In the study above, a few key points emerge:

1. Constipation is frequently present in children with enuresis and should be addressed in order for enuresis to be successfully treated.

2. That positive family history may make it less likely that chiropractic treatment will be successful

3. That when chiropractic treatment is successful, this will be evident with just a few treatments, suggesting that longer treatment plans may not necessarily lead to better outcomes.

Headaches

- Tension-type headache occurs in 10% to 24% of children and adolescents but does not usually bring the child to medical attention because the attacks are mild and cause little disability.
- In population-based self-report studies, at least 1.5% of children report headaches several times per week or daily.
- Headaches are a very common and disabling problem for children and adolescents. Globally, nearly 60% of children and adolescents experience significant headache, and 7.7% to 9.1% have migraine.
- Children with migraine miss more school than their peers and have impaired school performance and impaired quality of life, similar to that of children with rheumatoid arthritis or cancer. This disability is complicated by the fact that migraine is a silent disease; no outward findings are visible, so the child's report of pain may be doubted, leading to shame and frustration.

Szperka C. Headache in Children and Adolescents. Continuum (Minneap Minn). 2021 Jun 1;27(3):703-731. doi: 10.1212/CON.0000000000000993. PMID: 34048400; PMCID: PMC9455826.

Effectiveness of chiropractic manipulation versus sham manipulation for recurrent headaches in children aged 7–14 years - a randomised clinical trial

Susanne Lynge, Kristina Boe Dissing, Werner Vach, Henrik Wulff Christensen & Lise Hestbaek

Background: To investigate the effectiveness of chiropractic spinal manipulation versus sham manipulation in children aged 7–14 with recurrent headaches.
Methods: *Design*: A two-arm, single-blind, superiority randomised controlled trial.
Participants: 199 children aged 7 to 14 years, with at least one episode of headache per week for the previous 6 months and at least one musculoskeletal dysfunction identified.
Interventions: All participants received standard oral and written advice to reduce headaches. In addition, children in the active treatment group received chiropractic spinal manipulation and children in the control group received sham manipulation for a period of 4 months.
Results: **Chiropractic spinal manipulation resulted in significantly fewer days with headaches** (reduction of 0.81 vs. 0.41, $p = 0.019$, NNT = 7 for 20% improvement) **and better global perceived effect** (dichotomized into improved/not improved, OR = 2.8 (95% CI: 1.5–5.3), NNT = 5) compared with a sham manipulation procedure. There was no difference between groups for pain intensity during headache episodes.

Lynge, S., Dissing, K.B., Vach, W. *et al.* Effectiveness of chiropractic manipulation versus sham manipulation for recurrent headaches in children aged 7–14 years - a randomised clinical trial. *Chiropr Man Therap* **29**, 1 (2021). https://doi.org/10.1186/s12998-020-00360-3

Headache Considerations

The most common types of headaches, including tension headaches, may respond well to chiropractic care.

Factors to consider include:

- Sinusitis
- Bruxism
- Eye or vision disorders
- Anxiety

More serious concerns include:

- Trauma or head injury
- Brain tumor
- Intracranial hypertension

Common Orthopedic Issues & Injuries

Orthopedic concerns in children can encompass a range of musculoskeletal issues that affect bones, joints, muscles, ligaments, and tendons.

Fractures and Sprains: Children are prone to fractures and sprains due to falls, sports injuries, or accidents. Fractures may involve any bone, and growth plate injuries are of particular concern in growing children.

Congenital Musculoskeletal Conditions: Conditions present at birth, such as torticollis, developmental dysplasia of the hip (DDH), and congenital scoliosis, are examples of orthopedic concerns that may require early intervention.

Overuse Injuries: Children involved in sports or physical activities may be susceptible to overuse injuries, such as stress fractures, tendonitis, or apophysitis (inflammation of a growth plate).

Nursemaid’s Elbow (Pulled Elbow)

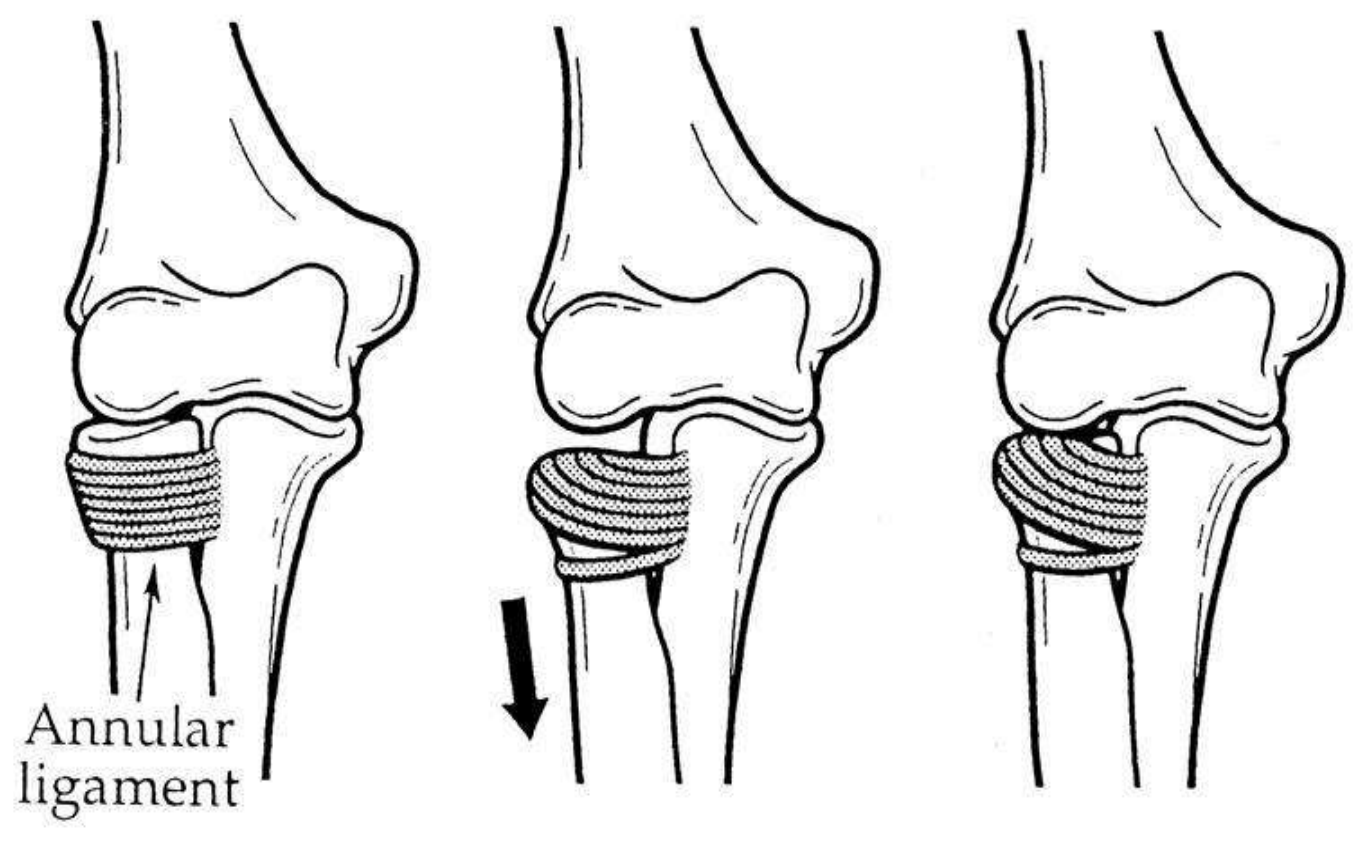
1. **Mechanism of Injury:** From ages 2-4, children are prone to subluxation of the radial head out of the annular ligament. Nursemaid's elbow usually occurs due to a sudden pull on a child's hand or arm, such as when an adult tries to lift the child by pulling on the hand or forearm.

2. **Common Signs and Symptoms:**
    1. Immediate pain in the affected arm.
    2. Reluctance or refusal to use the arm.
    3. The child may hold the affected arm close to the body with the elbow slightly bent.

3. **Diagnosis:** Tenderness over anteromedial aspect of the radial head and pain on supination of the forearm are indicators. X-rays are usually not necessary for diagnosis.

4. **Treatment:**
    1. Reduction: It is usually possible to correct nursemaid's elbow with a simple and gentle procedure called reduction. This involves manipulating the affected arm to guide the displaced bone back into its proper position.
    2. Relief: The child typically experiences relief from pain and regains normal use of the arm after reduction.

Nursemaid’s Elbow Reduction



Osgood Schlatter's Syndrome

- **Location of Pain:** The condition is characterized by pain and swelling at the tibial tuberosity, where the patellar tendon attaches.
- **Age Group:** Osgood-Schlatter disease typically occurs during periods of rapid growth, often between the ages of 9 and 15 for boys and 8 and 13 for girls.
- **Activity-Related:** The condition is often associated with physical activities that involve running, jumping, and bending, such as soccer, basketball, or gymnastics. Overuse of the quadriceps muscles can contribute to the strain on the patellar tendon.
- **Pain During Activity:** Pain is usually aggravated by activities such as running or jumping.
- **Usually self-limiting**, though the tibial tubercle may remain enlarged.

Chiropractic treatment can help reduce pain by addressing anterior tibial subluxation

Sever's Disease (Calcaneal Apophysitis)

- **Age Range:** Sever's disease is most commonly seen in preadolescent and adolescent children during growth spurts, typically between the ages of 8 and 14 for girls and 10 and 16 for boys.
- **Growth Plate Involvement:** The condition specifically affects the growth plate of the heel bone, where new bone is forming. This area is known as the calcaneal apophysis.
- **Causes:** Sever's disease is often associated with physical activities and sports that involve running and jumping, such as soccer, basketball, gymnastics, and track. Repetitive stress on the growth plate from these activities contributes to the development of the condition.
- **Symptoms:**
    1. Heel pain, particularly at the back or bottom of the heel.
    2. Pain that may increase with activity, especially during running or walking.
    3. Tenderness and swelling around the heel.

Usually self limiting, treatment usually consists of rest and possibly raising the heel ½ inch.

Scoliosis

Scoliosis is a medical condition characterized by an abnormal curvature of the spine. In individuals with scoliosis, the spine may curve sideways, forming an "S" or "C" shape. The curvature can occur in any part of the spine but is most commonly seen in the chest (thoracic) or lower back (lumbar) regions. Scoliosis often develops during the growth spurt that occurs just before puberty.

It is important that chiropractors assess for scoliosis, by 10 years old. Often schools will assess in middle school, but signs may be present much earlier.

Functional or Structural Scoliosis

Functional scoliosis: curve will disappear with Adam's test and with lateral flexion.

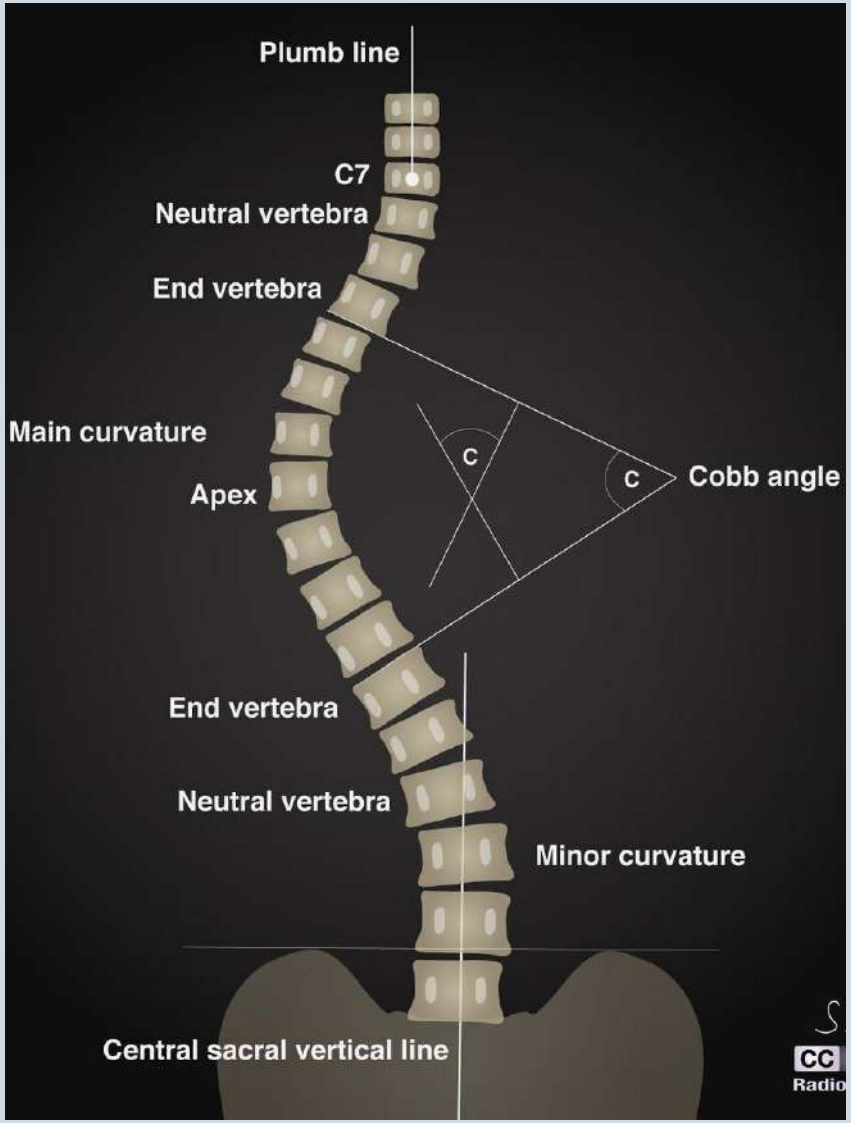
- Common causes are true anatomical short leg, pelvic asymmetery, foot pronation, or muscle spasm

Structural scoliosis: curve will not disappear with movement, and will often generate a hump.

Adams Test – Forward Flexion

Three stages:

- Patient bends forward 45 degrees, look for rib hump more pronounced on one side
- Patient bends forward farther, look at the thoracic spine
- Patient in full flexion, look at lumbar spine



Progression

Once structural scoliosis has been diagnosed, progression is not inevitable. Chiropractic management may be helpful, particularly if the curve measures less than 20°.

At 20° - 40°, co-management may be necessary, and bracing may be considered.

X-ray studies are critical to determine the degree of curve and the level of skeletal maturity.

If the patient has not yet reached skeletal maturity, it will be important to monitor progression periodically. Once the patient reaches skeletal maturity, progression is unlikely.

Chiropractic Rehabilitation for Adolescent Idiopathic Scoliosis: End-of-Growth and Skeletal Maturity Results

Mark W. Morningstar, Brian Dovorany, Clayton J. Stitzel, and Aatif Siddiqui

Abstract: The aim of this study was to evaluate the radiographic outcomes obtained in a sample of patients treated with a chiropractic scoliosis-specific exercise program for patients with adolescent idiopathic scoliosis. Patients were treated and subsequently followed through skeletal maturity, and their results were reported in accordance with the SOSORT Consensus Guidelines. A total of 60 patient charts were consecutively selected when they met inclusion criteria. Cobb angle measurements and Risser staging were collected on all images. Using SOSORT criteria, 51.7% of patients achieved curve correction and 38.3% achieved stabilization. In the curve correction group, average total correction was 12.75°. A small number of sampled patients' curves progressed, with a 13% failure rate based upon patients who dropped out before skeletal maturity combined with those who had progressed at skeletal maturity. Future studies are needed to corroborate these observations.

Clin Pract. 2017 Jan 11; 7(1): 911.
Published online 2017 Jan 12. doi: 10.4081/cp.2017.911

Special Populations

Learning Challenges

Learning challenges in school-aged children can manifest in various ways, impacting academic performance, social interactions, and overall well-being. Here are some common learning challenges that school-aged children may face:

- **Speech and Language Disorders:** Difficulty with articulation, language comprehension, or expressive language can impact communication and academic performance.
- **Auditory Processing Disorder:** Challenges in processing and interpreting auditory information, which can affect understanding spoken language and following instructions.
- **Visual Processing Issues:** Difficulty interpreting visual information, affecting tasks such as reading, writing, and math.
- **Executive Functioning Difficulties:** Challenges with skills like organization, planning, time management, and working memory.
- **Sensory Processing Disorders:** Over or under-reactivity to sensory stimuli, which can impact attention, behavior, and social interactions.

Many of these issues may be associated with a diagnosis such as ADD, ADHD, or Autism, but they may also appear independently.

Neurodevelopmental Disorders

There has been a substantial increase in the incidence of neurodevelopmental disorders in the past 20 years. The most common disorders are:

- Attention-Deficit/Hyperactivity Disorder (ADHD)
- Autism Spectrum Disorders

Others include:

- Developmental Coordination Disorder
- Tic Disorders like Tourette's Disorder
- Intellectual Disability
- Specific Learning Disorder
- Child-onset Fluency Disorder (Stuttering)

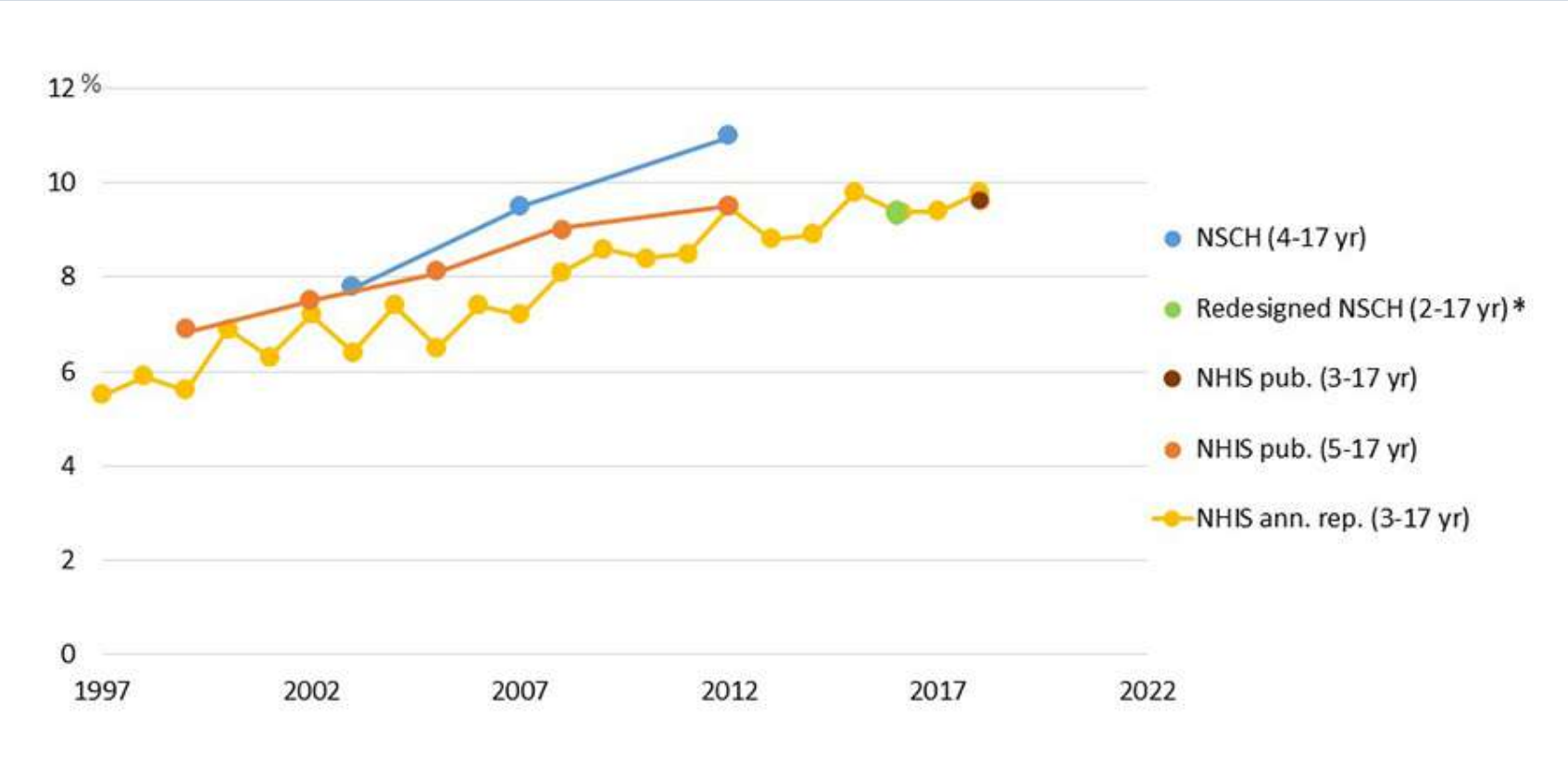
If you work with children, you will find many of these children in your practice, both because the incidence is increasing, and because they will be looking for help! It is important to be familiar with these conditions, so that you will be able to effectively support these children in your practice.

ADHD

According to the CDC : People with ADHD may have trouble paying attention, controlling impulsive behaviors (may act without thinking about what the result will be), or be overly active. A child with ADHD might:

- daydream a lot
- forget or lose things a lot
- squirm or fidget
- talk too much
- make careless mistakes or take unnecessary risks
- have a hard time resisting temptation
- have trouble taking turns
- have difficulty getting along with others

https://www.cdc.gov/ncbddd/adhd/facts.html



ADHD Through the Years

https://www.cdc.gov/ncbddd/adhd/data.html

ADHD Statistics

It is a huge problem! According to the CDC:

- The estimated number of children aged 3–17 years ever diagnosed with ADHD, according to a national survey of parents,[1] is 6 million (9.8%) using data from 2016-2019. This number includes
  - 3–5 years: 265,000 (2%)
  - 6–11 years 2.4 million (10%)
  - 12–17 years: 3.3 million (13%).
- Boys (13%) are more likely to be diagnosed with ADHD than girls (6%).

https://www.cdc.gov/ncbddd/adhd/data.html

Autism Spectrum Disorder – what CDC says

- Autism spectrum disorder (ASD) is a developmental disability caused by differences in the brain.
- People with ASD may behave, communicate, interact, and learn in ways that are different from most other people.
- The abilities of people with ASD can vary significantly. For example, some people with ASD may have advanced conversation skills whereas others may be nonverbal.
- People with ASD often have problems with social communication and interaction, and restricted or repetitive behaviors or interests.
- Some people with ASD need a lot of help in their daily lives; others can work and live with little to no support.

https://www.cdc.gov/ncbddd/autism/facts.html

Increase in Prevalence of ASD

Surveillance Year	Birth year	Prevalence per 1000	1 in X
2020	2012	27.6	1 in 36
2018	2010	23.0	1 in 44
2016	2008	18.5	1 in 54
2014	2006	16.8	1 in 59
2012	2004	14.5	1 in 69
2010	2002	14.7	1 in 68
2008	2000	11.3	1 in 88
2006	1998	9.0	1 in 110
2004	1996	8.0	1 in 125
2002	1994	6.6	1 in 150
2000	1992	6.7	1 in 150

https://www.cdc.gov/ncbddd/autism/data.html

Autism - Clinical Considerations

If at all possible, it's best to take this history for these children in private.

- Too often, they have to listen as their parents tell the doctor what is wrong with them
- This is especially a problem if they have behavioral issues
- Parents need to be able to speak freely
- Not all children know their diagnosis

It is important to understand that there is truly a spectrum, not only in terms of functionality but in individual traits. As clinicians around the country began grappling with the disorder, an expression emerged, "When you've seen one child with autism, you've seen one child with autism!"

Therefore, it may require time to understand each child's needs. Ask parents for guidance about what, as a rule, the child can or cannot tolerate.

There are a few things that you might encounter:

- Sensitivity to touch, or unwillingness to be touched
- Desire for deep pressure
- Need to prepare the child for what will happen, explain fully or demonstrate
- Child may not look at you or respond to you
- Child may make odd noises
- Child may repeat words or phrases over and over – this is called echolalia
- Child may repeat movements or flap body parts – this is called stimming, or self stimulatory behavior. This is often soothing.

Early Diagnosis

Many children with autism are diagnosed between 20 and 40 months of age. Some aren't diagnosed until much later.

Some children regress – that is, lose skills they had already attained, such as language or the ability to play and interact with others.

It is important to be aware that in many states, there are Early Intervention programs, and that these services eclipse once the child turns three, and responsibility goes to the school districts.

For this reason, it is important that parents move ahead with evaluation, if there are delays or any suspicions or concerns.

Later Diagnosis

Sometimes people are not diagnosed until much later in childhood or even in adulthood. In these cases, some people are relieved to finally have a better understanding of themselves, while others may feel burdened by a diagnosis.

Some older children, teens, and adults may not want for their differences to be considered a disease.

Neurodiversity

The word neurodiversity refers to the diversity of all people, but it is often used in the context of autism spectrum disorder (ASD), as well as other neurological or developmental conditions such as ADHD or learning disabilities. The neurodiversity movement emerged during the 1990s, aiming to increase acceptance and inclusion of *all* people while embracing neurological differences.

Neurodiversity describes the idea that people experience and interact with the world around them in many different ways; there is no one "right" way of thinking, learning, and behaving, and differences are not viewed as deficits.

https://www.health.harvard.edu/blog/what-is-neurodiversity-202111232645#SnippetTab

More Education

Want to learn more about working with neurodiverse pediatric populations AS A CHIROPRACTOR?

- ICPA offers a few classes on the subject, which can be taken as stand-alone classes:
  Neurodevelopmental Challenges: Brain Based Analysis and Adjusting,
  Developmental Neurobiology
  https://icpa4kids.com/training/seminar-schedule/
- Functional Developmental Behavioral Neuroimmunology is a 10-module program that thoroughly covers childhood development disorders, taught by Dr. Robert Melillo
  https://www.drrobertmelillo.com/courses/
- Focus Academy Dr. Amy Spoelstra
  https://dramyspoelstra.com/focus-academy/
- Academy of Neurodevelopmental Practices Dr. Monika Buerger
  https://www.ce4chiropractors.com/

Considerations in Adjusting Babies and Children

Office Space

Making your office appealing to kids lets ALL of your patients know that you welcome children.

Helpful to have a few books and toys that are safe and universally appealing.

Consider childproofing and eliminating dangers like sharp corners, poisonous plants, tall bookshelves, etc.

Rapport

It’s critical to connect with the child directly, as well as with the caregiver.

Remember that everything you do and say impacts their trust in you.

Be sensitive to their needs and interests.

Respect their space, ask permission, don’t overrun.

Rapport with an infant

Speak to the baby, chat while you are observing

Ask permission to touch, then touch the baby to allow them to get used to your touch

Babies' heads are very sensitive, don't start there

Be ready to conduct part of your treatment with baby in mom's arms.

Babies and young children can lie on the parent or caregiver.

Rapport with a child

Speak directly to the child

Ask them questions, if they have any pain anywhere, or if they have anything they want you to work on.

Tell them exactly what you are going to do, before you do it.

Demonstrate - on mom, a teddy bear, etc.

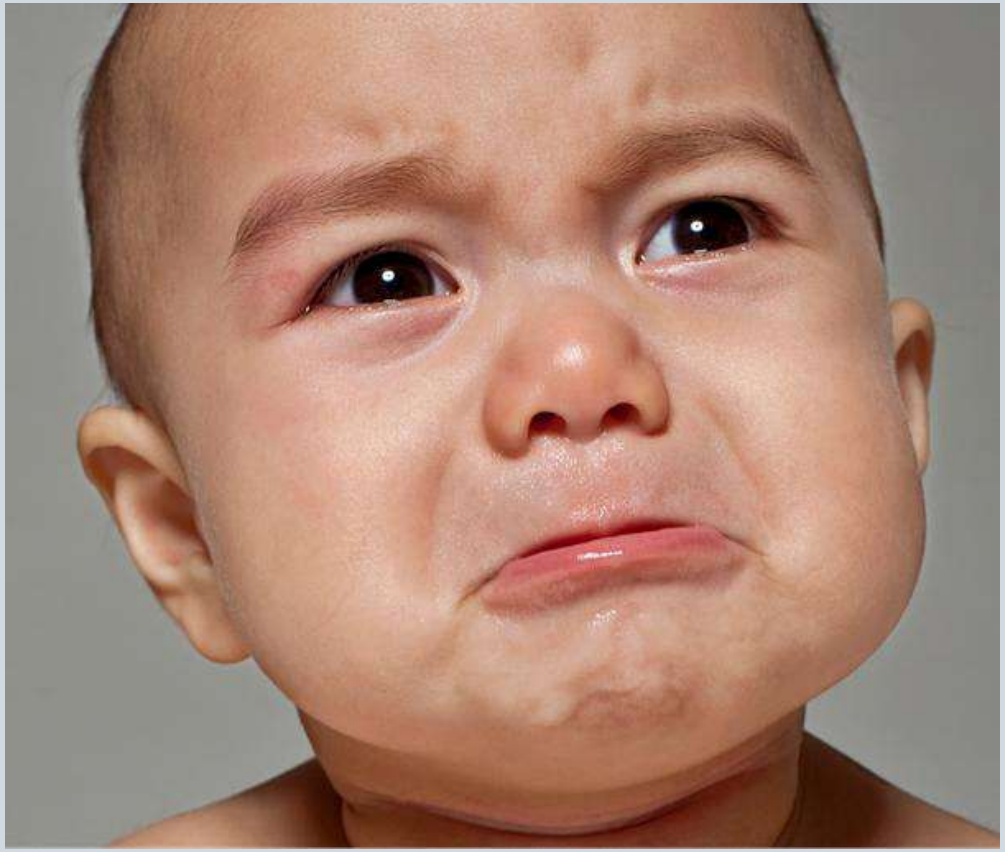
Establish a routine for treatment, so they will know what to expect.

Considerations in Adjusting Babies and Children

- Forces must be gentle. The amount is pressure to use on an infant has been described as the amount you would use to press on an eyeball, or to test a tomato for ripeness.

- Audible cavitation is not expected, as the joints are not fully developed (Remember the ages when vertebrae ossify and fuse)

- With babies and young children, little to no rotation or lateral flexion is required



Best not to force a child to be adjusted…

Better to meet the child where they are.

Be flexible in your methods.

Adjustments should NOT be scary or painful

Sometimes it takes patience at first, but then often the child becomes used to you.

Always thank the child for coming in.

Adjusting methods

Chiropractors often adjust with the tip of their index or little fingers

A “thrust” could be sustained contact, contact with vibration, or an impulse

For toddlers, a single sustained thrust can also be used

Infant toggle headpiece

In the 1980s, Dr. Larry Webster developed the infant toggle headpiece, a tool that makes it easier to do a gentle adjustment technique of the upper cervical region in infants and toddlers.

Instrument Adjusting

Use on lower setting

Use over finger for infants – best to avoid under 3 months of age

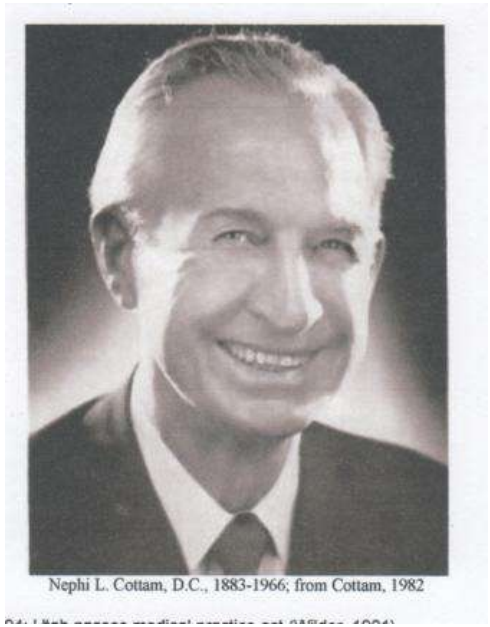
Demonstrate first, so kids are familiar with the activator and its sound

Cranial Adjusting

Pediatric chiropractic is well complimented by cranial work.

Many of the issues that we see with babies (Plagiocephaly, tongue-ties, nursing issues, etc.) require cranial techniques.

The plasticity of the infant's cranium puts real change within our reach, with the right techniques!



Nephi L. Cottam, D.C., 1883-1966; from Cottam, 1982

History of Cranial Manipulation

Cranial therapy has its origins in the 1920s, with the independent development of comprehensive cranial manipulation systems by osteopath William G. Sutherland and chiropractor Nephi Cottam.

Major B. DeJarnette

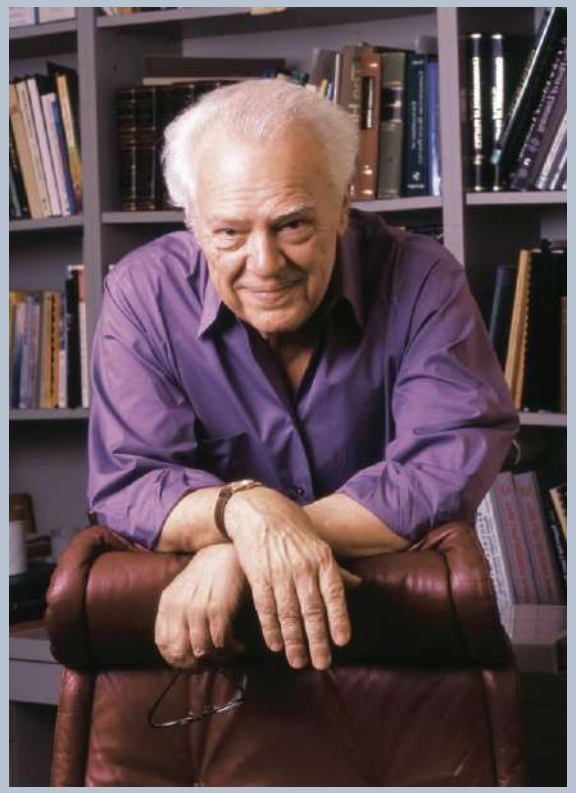
It was Major B. DeJarnette who advanced these ideas in the chiropractic field, developing and teaching cranial manipulation as a chiropractic technique.

He founded the Sacral Occipital Research Society International, which continues to promote S.O.T. and certify chiropractors.

Craniosacral Therapy

John Upledger D.O. developed the cranial work he was taught as an osteopath, and made it available to many other disciplines, including massage therapists, physical therapists, and manual therapists of all kinds.

He named his work Craniosacral Therapy, and it has become widely known.



Training in Cranial Work

Both the ICPA and the ICA certification and diplomate programs include cranial manipulation in their curriculum.

Two more places that offer instruction in cranial work that is **specific to pediatrics:**

Peak Potential Institute – Dr. Rosen was a student of Major DeJarnette and has been an SOT® instructor for decades.

https://peak-potential-institute.mykajabi.com/a/2147707547/fS6AnMFv

Upledger Institute – pediatric classes require prerequisite basic classes.

https://www.upledger.com/

Safety of Pediatric Chiropractic

By all accounts, adverse events in pediatric chiropractic are extremely rare.

Two main categories of adverse events:

- physical harm – this could include soreness or exacerbation of symptoms after treatment.

- harm by failure to diagnose or refer, thus delaying treatment

The safety and effectiveness of pediatric chiropractic: a survey of chiropractors and parents in a practice-based research network

Joel Alcantara , Jeanne Ohm, Derek Kunz

Results: The indicated primary reason for chiropractic care of children was "wellness care." With respect to condition-based presentations, musculoskeletal conditions were the most common, in addition to nonmusculoskeletal conditions of childhood. The most common techniques used were diversified technique, Gonstead technique, Thompson technique, and activator methods. Treatment-associated complications were not indicated by the chiropractic and parent responders**. Chiropractor responders indicated three adverse events per 5,438 office visits from the treatment of 577 children. The parent responders indicated two adverse events from 1,735 office visits involving the care of 239 children**. Both sets of 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.

Alcantara J, Ohm J, Kunz D. The safety and effectiveness of pediatric chiropractic: a survey of chiropractors and parents in a practice-based research network. Explore (NY). 2009 Sep-Oct;5(5):290-5. doi: 10.1016/j.explore.2009.06.002. PMID: 19733815.

Absolute Contraindications

Indication	Explanation
Withdrawal of consent by the parent or child	Potential for litigation
Hypermobility of the joints of the child	Increased flexibility of joint structures and less muscular resistance than the adult
Long-lever and high force manual procedures	Anatomically immature: no joint "lockup."
Occipito-atlantal & Atlanto-axial instability	Common in children with Down Syndrome, Juvenile Rheumatoid Arthritis, Marquio's, Klippel-Feil Syndrome
Brain or spinal tumors	Potential of neurologic damage or vascular compromise by the introduction of specific or non-specific force due to the pathophysiology or anatomical position of the tumor
Active metaphyseal growth tissue	Zone of provisional calcification- the transitional region between cartilage and newly formed metaphyseal bone is subject to separation and avascular necrosis when subject to force

Vallone SA, Miller J, Larsdotter A, Barham-Floreani J. Chiropractic approach to the management of children. Chiropr Osteopat. 2010 Jun 2;18:16. doi: 10.1186/1746-1340-18-16. PMID: 20525200; PMCID: PMC2887887.

Relative Contraindications/ Need for Caution

Vallone SA, Miller J, Larsdotter A, Barham-Floreani J. Chiropractic approach to the management of children. Chiropr Osteopat. 2010 Jun 2;18:16. doi: 10.1186/1746-1340-18-16. PMID: 20525200; PMCID: PMC2887887.

Indication	Explanation
Cervical Spine adjustments	Reduce the incidence of potential adverse event by refraining from over treating the sensitive structures of the cervical spine
Down Syndrome or other congenital anomalies	If you see an anomaly in one region, be suspicious of anomalies elsewhere.
Recent upper respiratory tract virus	Potential for inflammatory disruption to the atlanto-axial joint
Symptoms and signs incongruous with palpatory findings	Diagnosis requires corroboration of signs and symptoms with exam findings (including palpatory findings). When they are incongruous, further diagnostic studies should be ordered to rule out any potentially serious underlying pathology.
History of sleep-disorder in infants <12 weeks of age	Watchful waiting first 12 weeks (rule out Arnold Chiari Syndrome)
Inversion of neonate or young infant	Relative contraindication secondary to neonatal circulation and clotting factors, respiratory distress, cranial and cervical birth trauma, undiagnosed perinatal or postnatal stroke, undiagnosed hip dysplasia.

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