The Osteopathic Approach to the Pediatric Patient

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Objectives

• Understand and be able to discuss the philosophical approach to treating the pediatric patient with respect to the tenets of osteopathy
• Know the function of the musculoskeletal system with regard to pediatrics
• Be able to discuss changes in the development of the musculoskeletal system
Objectives

- Be able to discuss the aspects of structural diagnosis and treatment
- Be able to discuss the possible birth traumas related to cranial diagnostics
- Know the symptoms of mechanical stress in the infant
- Understand lift therapy in pediatric short leg syndrome and scoliosis screening
- Understand the approach to a pediatric hospitalized patient
Introduction

• A. T. Still used manipulative medicine in children for a variety of problems
  – Asthma and other pulmonary problems
  – Musculoskeletal problem
  – Disease resistant modern treatment
    • Meningitis
    • Cholera
    • Pneumonia
Introduction

• This approach is hololistic with the goal to help facilitate and maintain health
  – Patient
  – Family
  – Environmental elements

• Palpatory diagnosis very useful
  – Changes in child comes very rapidly
  – Tissues change
Diagnoses Characteristics of the Pediatric Patient Population
Pediatric Patient Characteristics

- 407 pts generated 1500 visits over 1 year
  - 3.7 visits per patient in 2007
  - % of total visits by age group
    - 0-11 months – 13.7%
    - 1-4 years – 33.3%
    - 5-12 years – 28.9%
    - > 12 years – 24.2%

Characteristics of Pediatric Patients Seen in Medical School-Based Osteopathic Manipulative medicine Clinics, JAOA Vol 110(7), July 2010, pp 376-380.
Pediatric Patient Characteristics

- Statistics from multiple sources
  - Center for Disease Control (CDC)
  - National Center for Health Statistics (NCHS)
  - US Department of Health and Human Services (HHS)
  - National Center for Complementary and Alternative Medicine (NCCAM)
Pediatric Patient Characteristics

• CDC/NCHS
  – 2.8 % of all children < 18 years treated with OMT or Chiropractic in last 12 months
  – 5.7 % in children of parents that use CAM modalities
  – AAP recommends physicians to speak to parents about CAM therapies usage

• Did not include visits with diagnosis of SD
  – Focus on generalizable clinical conditions

Characteristics of Pediatric Patients Seen in Medical School-Based Osteopathic Manipulative medicine Clinics, JAOA Vol 110(7), July 2010, pp 376-380.
## Diagnoses for Patients 0-11 Months (n= 196)

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Philosophical Approach

With Respect to the
Tenets of Osteopathic Medicine
The Body Functions as Whole

- The child’s body does function as a whole
  - Only in a given moment in time
    - Depends on the age of the child as to what degree of function is a whole
  - Systems grow and develop at different rates
    - They always have interaction with all systems but the functional levels alter as the systems mature
      - Example – regulatory mechanisms vary and coordination of these may change
Inherent Self – Regulating and Self- Healing

- These processes begin at very early developmental stages
- Inherent biological rhythms
  - Heart rate variability
  - Sleep-wake cycles
  - Circadian cycling
  - All are affected by exogenous and endogenous factors
Structure and Function
Interrelated

• Unique relationships in pediatrics
• Genetic errors may play a vital role in the structure and thus the function of the organ or the whole system
• Changes may or may not be life threatening
  – If not the function may be severely impaired
  – Example congenital heart anomalies
The Pediatric Musculoskeletal System
Functions

• Three Basic
  – Supporting all other organ systems
  – Transporting all systems throughout environment
  – Enabling the person to manipulate the environment
Functions

• Others
  – Heat production by interaction with the CNS
  – Storage of metabolic substrates
  – Takes part in proprioception

• Dysfunction of this system then may interfere with function of multiple systems and the interaction is via the nervous and vascular system
Development

• Infancy and Childhood
  – MS and Nervous systems very different from adult
• CNS and PNS incompletely myelinated
  – Steady progression until early 20’s
• Musculoskeletal is immature
  – Cartilaginous growth centers in membranous bone and long bones
  – Joint articulations are changing
Development

• Musculoskeletal continued
  – Skull changes
    • Fontanels
    • Sutures over-ride and are flexible
    • Radiographic evaluation of growth centers allow for accurate determination of bone age
Structural Diagnosis and Management

• As the child gets older changes in approach are necessary
• Barnes (1940) said easy to over treat babies and small children
• Heilig recommended gentleness and specificity in treating children
• Greenman stated that due to constant structural changes the palpatory experiences would also change constantly
Structural Diagnosis and Management

• Frymann worked with children for years at her Osteopathic Center for Children
  – Works with mentally, physically, and developmentally delayed children
  – Work with children early may enhance function of the child’s system later in life
  – Segmental motion is not appreciated until 6 months of age (JAOA, 1989)
• Appears to follow the progressive myelinization
Structural Diagnosis and Management

• History to obtain
  – Intrauterine life
    • Premature
    • Maternal drug and alcohol consumption
    • Preeclampsia
  – Birth
    • Weight
    • Length
    • Head circumference
    • APGAR scores
    • Gestational age by examination
    • Birth trauma – forceps, shoulder dystocia, etc.
Cranial Aspects Relating the Pediatrics
Birth Trauma

- Sphenoid is in 3 parts, Temporal is in 3 parts, Occiput is in 4 parts
- Cartilage is intervening between all of these
- Frontal, maxilla and mandible are in 3 parts
- These exist to help to protect the CNS during vaginal delivery
- The vault bones overlap at the sutures
- The cartilaginous base bends, torques, and rotates during labor and delivery
- They are vulnerable to dysfunction
Birth Trauma

- SBS strain patterns begin here and can be long lasting if not treated
- The infants first breaths, crying, kicking, and suckling all help to decompress the cranium
  - If these are not strong then patterns of dysfunction may persist
- Cranial dysfunctions are best treated in the first couple days of life
- Overlapping of the plates can lead to cranial synostosis and then to CNS dysfunction
Birth Trauma

- The occiput is a common site of dysfunction
  - Parts
    - Basilar
    - 2 condylar parts
    - Squama
  - Medulla oblongata is in the basilar portion
  - CN 9,10,11 and jugular veins in jugular foramen
  - CN12 in anterior condylar canals
    - Between condyles and basilar portion
Foramina of Cranial Base: Superior View

- Foramen cecum: Emissary vein to superior sagittal sinus
- Nasal slit: Anterior ethmoidal artery, vein and nerve
- Anterior ethmoidal foramen: Anterior ethmoidal artery, vein and nerve
- Foramina of cribriform plate: Olfactory nerve bundles
- Posterior ethmoidal foramen: Posterior ethmoidal artery, vein and nerve
- Optic canal: Optic nerve (II)
  - Ophthalmic artery
  - Oculomotor nerve (III)
  - Trochlear nerve (IV)
  - Lacrimal, frontal and nasociliary branches of ophthalmic nerve (V₁)
  - Abducens nerve (VI)
  - Superior ophthalmic vein
- Superior orbital fissure:
  - Maxillary nerve (V₂)
  - Mandibular nerve (V₃)
  - Accessory meningeal artery
  - Lesser petrosal nerve (occasionally)
- Foramen rotundum:
  - Middle meningeal artery and vein
  - Meningeal branch of mandibular nerve
- Foramen ovale:
  - Internal carotid artery
  - Internal carotid nerve plexus
- Foramen spinosum:
  - Lessr petrosal nerve
  - Greater petrosal nerve
- Foramen of Vesalius (inconstant):
  - Small emissary vein
- Foramen lacerum:
  - Facial nerve (VII)
  - Vestibulocochlear nerve (VIII)
  - Labyrinthine artery
- Hiatus of canal of:
  - Endolymphatic duct
- Mastoid foramen (inconstant):
  - Emissary vein (branch of occipital artery)
  - Inferior petrosal sinus
  - Glossopharyngeal nerve (IX)
  - Vagus nerve (X)
  - Accessory nerve (XI)
  - Sigmoid sinus
  - Posterior meningeal artery
- Condylar canal (inconstant):
  - Emissary vein and meningeal branch of ascending pharyngeal artery
- Hypoglossal canal:
  - Hypoglossal nerve (XII)
  - Medulla oblongata
  - Meninges
  - Vertebreal arteries
  - Meningeal branches of vertebral arteries
  - Spinal roots of accessory nerves

BONES AND LIGAMENTS  PLATE 7
Birth Trauma

• Symptoms indicating abnormal mechanical stress
  – Respiratory distress
  – Excessive crying
  – Poor suckling
  – Vomiting
  – Bradycardia or tachycardia
  – Tremors
  – Spasticity or flaccidity of limbs
  – Cyanosis
  – Torticollis
Birth Trauma

• Treatment is a very easily performed technique
  – Condylar decompression
    • Very similar to a gentle suboccipital release
Birth Trauma

• Temporal bones
  – Middle ear drainage through Eustachian tube
  – Changes in temporal position promotes changes in function
    • Tinnitus
    • Dizziness
    • Hearing changes
  – Otitis media, sinusitis, pharyngitis have been associated with temporal bone dysfunctions
    • JAOA 1968
    • A cranial study published evaluating this very issue
I get my good looks from my Grandpa
Issues for the Hospitalized Pediatric Patient
General Principles

• Newborns need treatment in the nursery
• Pneumonia
  – Treat utilizing same protocols as for adults
  – Modify your modalities to treat with
  – May need to play a game with little children to accomplish your goals
  – Myofascial or articular modalities are best used in the hospital
• Lymphatic techniques can be utilized very well in any respiratory disease or postoperative pediatric patient
Premature Infant Issues

• Premature newborns and infants must transition from gavage to nipple feeding (bottle/breast) prior to discharge
• Delay in this prolongs hospital stays
• Surgical placement of gastrostomy tubes often used to deliver nutrition with delayed transition

Premature Infant Issues

- AAP recommends exclusive nipple feeding and independence of supplemental O2 without apnea or bradycardia
- OMM as an adjunct in the treatment of these children
  - Not been critically studied as of yet
  - Case report

Premature Infant Issues

• Case report of twin girls delivered by C-Section at 25 6/7 weeks
  – Gestational diabetes, incompetent cervix (cerclage @ 19 weeks) & premature labor
  – By 41 1/7 weeks not nipple feeding & preparation for gastrostomy tube placement
  – On 41 2/7 days OMM consult

Premature Infant Issues

- Case report of twin girls delivered by C-Section at 25 6/7 weeks
  - Treated children with OMM
    - ST, BLT, MFR, ST Inhibition, Osteopathy in the Cranial Field
  - Looked at volume and type of feeding after daily treatment
Premature Infant Issues

• Case report of twin girls delivered by C-Section at 25 6/7 weeks

Results – Mean Nipple Feeding as % of total volume

• At end of week 1
  – Twin A – 7.9 to 26.6
  – Twin B – 38.7 – 42.3

• At end of week 2
  – Twin A & B - 68.1

Premature Infant Issues

• Case report of twin girls delivered by C-Section at 25 6/7 weeks Results – Mean Nipple Feeding as % of total volume
  • At end of week 3
    – Twin A – 91.7
    – Twin B – 82.3

Application to Clinical Diagnoses
Short Leg Syndrome

Pediatric Considerations
Lift Therapy Guidelines

- Compressive forces make bone grow faster
  - Lifts can stimulate growth in the short leg
  - Must closely monitor the child if lifts are utilized
- Frequent structural evaluations
- Periodic standing pelvic radiographs
- Height of lift may have to be adjusted
Scoliosis Screening
Screening

• Many children with scoliosis are asymptomatic
  – More importance on regular screening programs
• Should be able to pick up 10 degree curves
• Treat any dysfunctions you find if the curve is not moderate to severe (requires surgical consultation and bracing)
• Standing pelvis radiographs may be of use for consideration for lift therapy
• Females undergo more rapid progression of the curvatures
• An increase of a curve of 5 degrees is significant
Excessive Crying
Excessive Crying Infants

- Common Problem of unknown etiology
  - 5-40% of infants peak incidence at 6 weeks
- CRI at birth and at 2 weeks in 155 full term babies
- At 6 weeks blinded Survey done
  - Ames Crying score, diet, home remedies

Excessive Crying Infants

• Results
  – 41.7% had excessive crying
    • Associated with abnormal CRI at 2 weeks (p<.001) but not with abnormal CRI at birth
      – Abnormal CRI based on rate
    – Infants with abnormal CRI at 2 weeks were 6.8 times more likely to develop excessive crying compared to infants with normal CRI
    • 95% confidence interval 2.2-20.6

Excessive Crying Infants

- Results
  - CRI measurement
    - 93.1% sensitive & 33.3% specific for excessive crying at 6 weeks
  - CRI assessment
    - Good predictor for no excessive crying if it is negative but not a good screen test to predict its occurrence if positive

Excessive Crying Infants

• Results
  – Must acknowledge recall bias is possible using the Ames Cry score
  – Randomized clinical trial needed to see if Cranial manipulation reduces excessive crying in infants with abnormal CRI

Children with Acute Otitis Media
Standardized OMM Protocol for Children with Acute Otitis Media

• Middle Ear Effusion (MEE) with conductive hearing loss a common sequelae
• Myringotomy with tympanostomy is 2nd most common operation for children in US
  – Circumcision in Infancy #1
• Long history of OMM usage in Otitis Media with reported efficacy

Standardized OMM Protocol for Children with Acute Otitis Media

- Few peer-reviewed studies for efficacy of manual medicine of Pediatric AOM and MEE

- A dual site prospective randomized, blinded controlled clinical trial on the efficacy of manual medicine of Pediatric AOM and MEE
  - Designed and implemented

Standardized OMM Protocol for Children with Acute Otitis Media

• Goals of study
  – Determine if a Standardized weekly OMM protocol could reduce the duration of MEE after AOM
  – Test the clinical observation the changes in middle ear functioning can be demonstrated after OMM

• Compared standard care plus OMM to just standard care alone

Standardized OMM Protocol for Children with Acute Otitis Media

- Patients seen weekly over 30 days (5 visits)
- Parents performed daily Acoustic reflectometer and recorded
- Each visit MEE was evaluated with 3 tympanogram tracings
- OMM treatment group went through protocol on visits 1-3; control did not
  - No shame treatment used

Standardized OMM Protocol for Children with Acute Otitis Media

• Treatment providers were blinded to the clinical course of the subjects
• No adverse events relative to the OMM techniques used in any subject

Standardized OMM Protocol for Children with Acute Otitis Media

- BLT of SI Joints
  - Patients supine with doc at side of table
  - Doc contact the sacrum medial to SI joint with 1 hand and other contacts the ASIS
  - Stabilize the sacrum as you move the Ilium in anterior/posterior rotation/inflare/outflare until balanced ligamentous tension noted
  - Maintain until tissue relaxation

Standardized OMM Protocol for Children with Acute Otitis Media

- MFR to thoracolumbar junction
  - Patient supine doc at side of table
  - One hand contacts the SP of T12 and L1 other hand contacts the chondral masses of lower ribs anteriorly
  - Move in 3 planes of motion (direct or indirect) and wait for the creep or tissue relaxation

Standardized OMM Protocol for Children with Acute Otitis Media

• MFR of Rib cage
  – Patient is supine or seated
  – Doc contacts the angle of rib with one hand and the other contacts the anterior aspect of rib. Thumbs over the body of rib
  – Anterior/posterior force induced to find indirect barrier, induce a lateral traction force and follow tissue creep

Standardized OMM Protocol for Children with Acute Otitis Media

• BLT of rib
  – Patient supine doc at side of table
  – One hand contacts the rib angle while the other contacts the SP of the 2 corresponding vertebra
  – Induce a rotation force indirectly on SP’s while the other hand induces a traction on the rib angle
  – Balance the tissues and maintain until tissue release

Standardized OMM Protocol for Children with Acute Otitis Media

- Release of thoracic inlet with MFR
  - Patient supine with doc at head of table
  - Place hands over top of shoulders with tips of fingers contacting upper ribs and posterior with thumbs
  - Induce a fascial torque with hands directly into barrier
  - Follow tissue creep

Standardized OMM Protocol for Children with Acute Otitis Media

• BLT of cervical spine
  – Patient supine with doc at head of bed
  – On hand contacts the PTP of named vertebra and the other contacts the TP of the lower vertebra on the opposite side
  – Move vertebra in rotation toward balanced tension
  – Maintain until release of tension

Standardized OMM Protocol for Children with Acute Otitis Media

• Suboccipital Inhibition
  – Patient supine with doc at head of table
  – Contact the suboccipital tissues with the tips of the fingers of both hands
  – Lift the fingers anterior and allow the tissues to relax over your fingers

Standardized OMM Protocol for Children with Acute Otitis Media

• Venous Sinus Drainage Technique
  – Patient is supine with doc at head of table
  – Align fingertips along the nuchal ridge with the fifth finger at the inion. Apply a slight lateral and anterior pressure until tissue texture change
  – Align fingertips along the sup/inf axis on both sides of the occiput. Apply a slight lateral and anterior pressure until tissue texture change

Standardized OMM Protocol for Children with Acute Otitis Media

• Venous Sinus Drainage Technique
  – Now cross the thumbs across the sagittal suture starting at the parietal bones
  – Induce an inf/lat force until tissue texture change
  – Repeat this from lambda moving anteriorly along the sagittal suture towards bregma
  – Continue this process over the metopic suture

Standardized OMM Protocol for Children with Acute Otitis Media

• Occipital Decompression Technique
  – Patient is supine with doc at head of table
  – Contact the mastoid portion of the occiput with the fingertips of the index fingers and the middle finger over the occipital condyle, and the ring fingers over the suboccipital tissues
  – Apply gentle traction posterior and then lateral resisting motion of the mastoid portion
  – Maintain until a slight change in tissue tension

Standardized OMM Protocol for Children with Acute Otitis Media

- Sphenobasilar symphysis decompression technique
  - Patient is supine with doc at head of table
  - Contact the cranium with a frontal-occipital hold
  - Gently decompress the SBS by moving the sphenoid wings anterior and inferior and the occiput posterior and inferior
  - Hold until a change in tissue texture

Summary

• Osteopathic diagnostics and therapeutics
  – Primary, secondary, and tertiary prevention modalities
• The future is more studies to be done to further show efficacy of treating children
• Since many adult disease processes may begin in childhood treatment today may have an impact on the health of these individuals years from now
THANKS FOR HANGING AROUND THROUGHOUT THE WORKSHOP QUESTIONS?