“Correction is a Poor Substitute For Prevention!”

The
“Mostly Biomechanical”
Pediatric
H&P
PICA 2016

Louis J. DeCaro, D.P.M.
President, ACFAP

www.DeCaroPodiatry.com
louisdecaro@decaropodiatry.com
The APMA's only recognized clinical interest group for the management of pediatric foot and ankle pathologies.

As an Affiliate Clinical Interest Group, under the APMA, our goal is to educate both our colleagues and the general public on the importance of caring for children’s feet.
The American College of Foot and Ankle Pediatrics (ACFAP) strives to disseminate new and advanced information on the latest techniques in pediatric foot and ankle care. The feet are the foundation of the body, and even before a child takes their first step, deficiencies in the lower extremity begin to create a destructive domino effect on the rest of the human body. It is our job as foot and ankle specialists to make sure the feet are taken care of.
H&P Intake Forms

Click on the Button Below to Download the Doctor Intake Form

Practitioner Intake Form

Click on the Button Below to Download the Patient Intake Form

Patient Intake Form
What Should You get out of this?

• Basic Evaluating Concepts
• KEY things to always think about & not miss
• Pearls, Pearls, Pearls!
The keys to Working Up The Pediatric Patient Biomechanically

1. Understanding **Rearfoot vs. Forefoot** (age specifics)

2. Understanding how **feet affect muscle strength and posture**

2. Understanding **genetics**.

1. Understanding **limb length discrepancies** (functional vs. structural) and their impact on foot types and the rest of the body.

1. Understanding that **“pain” is not the only reason to treat!**

2. Understanding **“growing pains”**

3. Understanding the **origin of rotational concerns**

4. Understanding **the long-term** implications of poor foot biomechanics

5. Understanding **“other” factors** that lead to gait difficulties
Pediatric Orthopedic Intake
Parent/Guardian Form 1 of 5

Patient Name: Age: DOB:

Persons With Patient Today: Age & Relationship: List Everyone & relationship!

IS your child adopted: GENETICS IS your child a multiple:

Height: Weight: BMI (Because of feet?) Shoe Size:

Medical History:

Current Medications:

Previous Surgeries/In-utero/Birthing Concerns: Position/Birth Type/Complications

Drug and Food Allergies:

Pediatrician:

Who Actually Referred You:

Other Medical Specialists: Important!
Please describe your child’s current foot and ankle issue:

When did the problem or concern start:

Is the problem getting worse/better/same?

Does the problem involve one or both sides of the body?

Torticollis-LLD-Scoliosis

Is there leg or foot or other orthopedic pain in rest and/or with certain activities?

Any current or past treatment for leg or foot pain or has your child outgrown any leg or foot pain?
Pediatric Orthopedic Intake
Parent/Guardian Form 3 of 5

Does the patient have siblings? If yes Age & Sex

Any other family members (including siblings) have a similar problem?

If yes, were they treated & how?

Has mom or dad ever been treated with special shoes, braces, or orthotics throughout their lifetime? Big Clues!
Pediatric Orthopedic Intake
Parent/Guardian Form 4 of 5

Any significant medical problems: including medications, trauma or surgery involving the mother during the time of the pregnancy?

How was the child born (Vaginal vs. C-section) & any significant issues during delivery or positional issues prior to delivery?

Did your child have any issues meeting any of developmental milestones at the appropriate time? (Refer to attached milestone form if needed)

Does your child have any issues with school, speech, writing and/or learning?

Does your child have certain difficulties with different surfaces or textures?
Pediatric Orthopedic Intake
Parent/Guardian Form 5 of 5

From a parent’s perspective have you ever been concerned at all with any part of your child’s lower extremity/type of walk/look of feet prior to today’s visit?

Does your child have any issues with fatigue, endurance, speed, posture, or general strength?
Developmental History:

When did child begin walking: >18 months?

History of TOE WALKING: How long & Progression? Where from?

History of IN/OUT TOE WALKING: How long & Progression? Where from?

History of Impaired Balance or Clumsiness: How long & from where?

History of GROWING PAINS: How long? Really?


As a Parent What do you seen notice/compare: Forget what everyone else says

General Pain: The Whole Body!
Current Status:

Complaints of Concern or Pain:

Speed: Endurance: Important!

Current Treatments:

Orthotics and Splints (patient):

Any prior/current devices used to treat this child?
Were they helpful? Were/are they necessary?

Orthotics and Splints (parent):

Any prior devices used to treat either parent?
Were they helpful? Were/are they necessary?

Foot Type of Patient: How old tells us what to look for

Foot Type of Parent/s: Shoes & Socks off all siblings/parents!
Orthopedic Physical Exam Findings:

Hip:

Knee:

Tib/Fib:

Ankle: Is it really the ankle that is collapsing?

STJ/Foot:

Limb Length

In/out - toeing & Why: From Where!! GP for intoeing ALWAYS

Toe-Walking & Why: Surface Dependent?/Gaze Dependent?
Current Recommendations: (make these check boxes with lines for notes afterwards)

Stretching Program: Night splints
**Physical Therapy:** Refer & Suggest
Night Splints: Many Times! Proper Assessment
Prefab vs. custom Orthotics: Goals? Ins.?
Gait Plates: When?
SMO’s: Is it really an issue above the ankle?
AFO’s:

Follow-up / Plan:
Gait Exam

- Narrows down possibilities
- Overall Body Position
- Type of Walk
- Eyes Closed vs. Open / looking up vs. down
- Rotational Issues (origin)
- Muscle **Atrophy/Tightness**
- Foot Positioning
- Whipping/Compensation
- Tactile Issues

**Everyone Walks!**

You all know
How fast someone
Can be foot typed

Everyone Takes There shoes Off
Knowing Your Allies & Growing

• Early Intervention PT’s, OT’s, ST’s!
  “Kids don’t just talk, they also walk!”

• Physiatrists (Pediatric)

• Developmental Optometrists

• Your Current Adult Patients
Genetics!
The Levels Of Support

- No Support
- Over The Counter
- UCBL
- SMO
What is causing this In-toeing?
Is there really such thing as Out-toeing?

Age Dependent / Genetic Dependent / FF dependent!!

Once again: What level is it coming from?
Strengthening the Hip/Core

Today we went over exercises to promote lateral/external rotator hip musculature. Pt. was advised that PT was still the best option but in my experience there were things to practice at home that could be beneficial. First of all, W sitting should be strongly discouraged. Fun and engaging activities such as the crab walk (can hold a ball gently between the legs without letting it fall), bear walk, wheelbarrow races, twister (yes the game), “Superman’s” on belly, "swimming on a pillow", climbing, aquatic swimming, and trampoline are good. Best are bike riding (especially up hills) as well as sideways walking on pretend/real balance beam (with orthotics on). When walking, practicing heel strike as much as possible is encouraged. The goal and focus with these exercises are to strengthening the core, and outside/back of hips to prevent increased "knock knee" posture and over pronation of the feet. Performing at least 15-30 minutes of any combination of the above exercises daily is recommended.

Core exercises

- Tummy time: Playing while laying on the tummy is a great way to develop shoulder strength and stability.
  - Try coloring, working on puzzles, playing with toys, while on your tummy.
- Scooter board while on your tummy sliding around to pick items up off the floor or to pull yourself along by "climbing" a rope.
- Wheelbarrow walking
- Crawl on all fours: forward, backward, sideways or change direction on command.
  - Climb on and off furniture.
  - Climb over pillows or a mattress.
  - Crawl through an obstacle course.
  - A crab walking.
  - Squatting pretending to be a frog.
- Strengthen the arms on the playground: ladders, climb up the slide in a crawling position.
  - Play tug of war.
  - Pour water from a pitcher or sand from buckets.
  - Sitting on a small ball.
  - Wheelbarrow walking, support at hips or knees.
Unresolved Torsional Issues
Why do kids toe walk?
A 1999 study evaluated 1000 kids 4-13 years old. An abnormally high % of flatfooted children were overweight.

A 2006 study evaluated 800 3-6 year olds. An increase of flatfoot was seen in overweight children.

A 2001 study of 243 children 8-10 years old. 16% “low arch/flexible flatfoot” non-overweight, 24% prevalence in the overweight children.

A 2001 study on 377 children that they performed tasks poorly and worked more slowly.

Other Studies have revealed correlations between BMI and arch height.
Limb Length Discrepancy

Scanogram
Sitting Measurement
Pelvic twist
Low muscle tone
Circumduction

Take Home Messages

You really don’t know how to measure!

90% of LLD is functional

Find a PT in your area that can figure out the complexity of functional LLD and cling on!

Important to start orthotic therapy first!

Correction does not need to be 100%
Age Specific Parameters for Pediatric Foot Development

- A child begins to walk around 10-14 months of age, at which time up to 6° heel valgus is considered normal.
- Calcaneal valgus diminishes by 1° per year until age 6 at which time the heel should be vertical.
- By age 13 a youths foot will take on its final adult form and the calcaneus will ideally be inverted 4-5°.
- 10-15% of the population will end up with excessively inverted heels (Pes Cavus).

Louis J. DeCaro, DPM • drlouisjames@aol.com
Oh it’s just growing Pains….
Oh it’s just over Activity….
Pain is the only reason to treat……

I disagree!
1-4 year olds
Have You Considered?

- Balance
- Coordination
- Posture
- Strength
For age ranges 1-4 years old a child most likely will have a flat looking foot. This is considered normal. The two treatable "foot" issues for this age range involve not the fact that someone is flatfooted or not, but a) the degree of calcaneal valgus or heel eversion and/or b) the milestone/gross motor impairment created from significant flatfoot.
3 Questions

Ask Yourself & The Parents

1. How Flat is it?

1. Is there a Family Hx. / Parent Involvement?

1. Does the foot impair the child? AT ALL!!!!!
Coordinated Efficient Functional Activity Requires Appropriate Tone, Motor Planning, Alignment
Cerebral palsy
Intraventricular hemorrhage
Genetic syndromes
Structural abnormalities of the brain

**Sensory Processing Disorder (SPD)** – the brain is confused by sensory inputs thus affecting children’s appropriate responses and routines (can be over or under)
Sensory processing difficulties associated with autism spectrum disorders.

**Postural Disorders** – they can’t trust they won’t fall
**Dyspraxia** – Can’t figure out fine motor movement
Motor planning or sequencing deficits
Delayed integration of primitive reflexes
Poor trunk control
decreased dynamic balance
Decreased core strength
Difficulty moving in rotation / rotary planes
Sensory aversion
Tactile defensiveness

**Hypotonia**
Hypertonia
Seeks or avoids vestibular input
Seeks or avoids **proprioceptive** input – the way joints and muscles send messages to the brain to help coordinate movement
Expressive language delay
Receptive language delay
Language processing disorder
Apraxia of speech
Lack of joint attention/ social reciprocity
Torticollis or retrocollis
Plagiocephaly
Scoliosis

“*Kids don’t just talk, they also walk*”
# Developmental Milestones

<table>
<thead>
<tr>
<th>Gross Motor Skills</th>
<th>1.5 - 2.0 years</th>
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<tbody>
<tr>
<td></td>
<td>pushes wheel toys</td>
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<tr>
<td></td>
<td>walks up stairs, not alternating feet</td>
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<tr>
<td></td>
<td>runs without failing</td>
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<tr>
<td></td>
<td>throws a ball</td>
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<thead>
<tr>
<th></th>
<th>2.0 - 2.5 years</th>
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<tbody>
<tr>
<td></td>
<td>jumps in place</td>
</tr>
<tr>
<td></td>
<td>walks down stairs, not alternating feet</td>
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<tr>
<td></td>
<td>runs</td>
</tr>
<tr>
<td></td>
<td>kicks a large ball</td>
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<tr>
<th></th>
<th>2.5 - 3.0 years</th>
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<tbody>
<tr>
<td></td>
<td>climbs well</td>
</tr>
<tr>
<td></td>
<td>walks up/down stairs with assistance, alternating feet</td>
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<tr>
<td></td>
<td>walks on tiptoes</td>
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<tr>
<td></td>
<td>hops on both feet</td>
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<tr>
<td></td>
<td>rides a tricycle</td>
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<tr>
<td></td>
<td>catches a large ball</td>
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<tr>
<th></th>
<th>3.0 - 4.0 years</th>
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<tbody>
<tr>
<td></td>
<td>hops on one foot</td>
</tr>
<tr>
<td></td>
<td>balances on one foot</td>
</tr>
<tr>
<td></td>
<td>walks heel to toe</td>
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<tr>
<td></td>
<td>walks up/down stairs without assistance, alternating feet</td>
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<tr>
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<th>4.0 - 5.0 years</th>
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<tbody>
<tr>
<td></td>
<td>rides a bicycle with training wheels</td>
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<tr>
<td></td>
<td>skips, alternating feet</td>
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<td></td>
<td>throws a ball overhand</td>
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</table>
5-9 Years Old

“Developmental Flatfoot”

“Flat is not Normal!!!!!!!”
At What Age is Forefoot Post Necessary?

8-10 +
• Reduces from 12-15 to 5-6 degrees in the first year. Then, as with the valgus reduction 1 degree per year to 5 or 6 years old – **Ask About In Untero Position**

• **Remember:** Of the frontal plane deficiencies present at birth, the most destructive is forefoot varus. Compensation for forefoot varus requires calcaneal eversion beyond the vertical to allow the forefoot to come down to the weightbearing surface. Hence, FF varus is capable of producing severe subtalar and midtarsal joint pronation in the development of the flexible foot condition

• *****Look at the parents.
Father
40ish
Can’t walk for more
Than 3 hours without
pain
Since 1989
Heel Pain
Back Pain
Destructive FF Varus

Son
3yo
Unstable Running
Unstable Jumping
Destructive FF Varus

Too Young??

Note: Not Much Rearfoot Valgus/Varus. But a Destructive Forefoot.

Forefoot Varus Acquired Rigidity
Osgood Schlatters
Severs Disease/Heel Pain
Shin Pain/Tibial Stress Fx’s
Almost all of the conditions that affect the bones and joints of people with Down syndrome arise from the abnormal collagen found in Down syndrome. Collagen is the major protein that makes up ligaments, tendons, cartilage, bone and the support structure of the skin. One of the types of collagen (type VI) is encoded by a gene found on the 21st chromosome. The resulting effect in people with DS is increased laxity, or looseness, of the ligaments that attach bone to bone and muscle to bone. The combination of this ligamentous laxity and low muscle tone contribute to orthopedic problems in people with Down syndrome.
Thank You

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Louis J DeCaro, D.P.M.  www.decaropodiatry.com

drlouisjames@aol.com