Orthopaedic Surgery

2015 Highlights
Improving Outcomes through Novel Hip Preservation Procedures

Through a cutting-edge procedure that uses surgical hip dislocation with recontouring of the femoral head and neck, our surgeons are able to correct acute and chronic deformities resulting from slipped capital femoral epiphysis—an obesity-related hip condition that leads to impingement in young adults—while minimizing the risk of avascular necrosis. Adolescents and young adults with hip dysplasia also benefit from our surgeons’ use of the Bernese periacetabular osteotomy, a novel procedure that allows patients to return to activity far sooner than with previous forms of osteotomy.

Minimizing Surgical Intervention for Early-Onset Scoliosis

We are reducing the need for surgery in young children with early-onset scoliosis by applying new approaches to traditional treatments. For example, casting has gotten a second life, thanks to the application of techniques and materials that improve compliance and new research proving its efficacy. For patients with more severe deformity, our surgeons can now implant magnetically controlled growing rods that allow us to “grow” the spine with an external magnet, minimizing the need for repeat anesthesia and surgery in this vulnerable population.

Improving Quality of Life for Children with Cerebral Palsy

Correcting musculoskeletal problems in children with cerebral palsy has traditionally required multiple surgeries. Through single-event multilevel surgery—which addresses many of these challenges at once—our surgeons are minimizing the risks associated with anesthesia and surgical interventions while significantly improving function and performance in these children.
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In-Toeing and Out-Toeing: What is All the Fuss About

Norman Y. Otsuka, MSc, MD, FRCSC, FAAP, FACS
Chief, Pediatric Orthopaedics
Professor of Clinical Orthopaedic Surgery and Pediatrics
Learning Objectives

• Understand the normal posture of the lower extremities in children
• Common variations
• How the lower extremities change and grow
• Pathological conditions
There is a lot of fuss

- Three of the most common diagnoses on my clinic:
  - Bowed legs
  - Intoeing
  - Flatfeet
• Kids generally make very little fuss about these problems...

• ...but parents make a LOT of fuss
All the fuss

- Children trip over their own feet
- Stigma of “looking different”
- Consequences: arthritis?
- Expectations for future athletics
- Previously treated generations
Predictable Growth

- Rotational profiles vary widely among healthy children
- Differences in foot position during walk or running are most often not pathologic
Development of the tibio-femoral angle during growth

Varus + Valgus −
Foot Progression is a summation of factors

- **Version**: Tilt or inclination within a bone
- **Contracture of a joint capsule**: restricts motion
- **Laxity of joint capsule**: increases motion
- **Muscle balance**: opposing forces affect alignment
- **Muscle coordination**: often age dependent
Etiologies

In-toeing
- Increased femoral anteversion
- Internal tibial torsion
- Metatarsus adductus

Out-toeing
- External tibial torsion
- External rotation contracture of the hips
- Calcaneovalgus foot
- External tibial torsion
- Flexible flatfoot
NEWBORNS

[Two images of newborns]
NEWBORNS

• HIPS - flexion/external rotation contracture
• KNEES - varus or straight
• TIBIAE - internal rotation or external rotation
• FEET - adductus or other
NEWBORNS

- Variations in postures are not necessarily deformities
- Intra-uterine positioning = “packaging”
  - Metatarsus Adductus
  - Calcaneovalgus
  - PM bowing
Metatarsus Adductus

- Medial deviation of the forefoot on the hindfoot
- Hindfoot in neutral
- Convex lateral border
Metatarsus Adductus

- 1 in 1000 live births
- More common in twins
- Consider other “packaging” conditions (DDH, torticollis)
- Variable severity
- >90% flexible and spontaneously correct
Calcaneovalgus

- Marked dorsiflexion of the entire foot at the ankle
- Mild and flexible eversion of subtalar joint
- Dorsal foot rests on anterior shin
- Dorsal tissues of ankle can be contracted
Calcaneovalgus

• 1 in 1000 live births
• More common in females, first-born
• Spontaneously resolve
  – Stretching
  – Casting

Winter and Lovell
Posteromedial Bowing

- Resolves with stretching of anterior compartment muscles
Variations in alignment are generally benign if all joints are supple
Beware of clubfeet!

- Congenital Talipes Equinovarus (Idiopathic)
- More rigid deformity
- Casting
- Surgery

globalclubfoot.com
INFANTS
INFANTS

- HIPS - External rotation contracture
- KNEES - Varus or straight
- TIBIAE - Internal torsion
- FEET - Metatarsus adductus
Bowlegs and Internal Tibial Torsion

- Legs usually show a persisting varus and/or internal rotation posture
- Posture more apparent as:
  - Pull-to-stand
  - Cruising
Metatarsus Adductus

- Spontaneously resolves in infancy
- Observe
- Stretching exercises
- Splints/casts
- Shoes
- Braces
TODDLERS

- HIPS - Femoral anteversion
- KNEES - Varus, straight or valgus
- TIBIAE - Internal or external torsion
- FEET - Flat
Knocked Knees and Bowed Legs
Natural History

- Birth: Varus legs
- 24m: Straighten
- 3y: Valgus legs
- 3y - 6y: Obvious “knock-knees”
- 7y - 8y: Develop “normal” adult posture with mild valgus
Cause for Concern

• Unilateral
• Persistent
• Very Severe
• Occurring out of sequence
Beware of Blounts Disease!

- Disturbance of proximal tibia growth plate
- Presents at age 2y - 4y
- Looks like physiologic bowing but
  - Progressive
  - Severe
In-Toeing
and
Out-Toeing
Natural History

• Most children
  – born with flexible **metatarsus adductus** - *spontaneously corrects by 6m*
  – born with **internal tibial torsion** - spontaneously **corrects by 2-3y**
  – **Femoral anteversion** becomes apparent in early childhood – spontaneously **corrects by early teen years**
Internal Tibial Torsion vs Genu Vara

• Appear similar
• Genu vara: bowing with knees and ankles pointing in same direction
• Internal tibial torsion: Knees and ankle pointing in different direction
Thigh Foot Angle

- Assess **tibial torsion**
- Axial plane
- Prone position
- Knees and ankles at neutral
- Measure relationship of long axis of thigh and long axis of sole of foot
Flatfeet in Toddlers

- Hypermobile
- Arch develops by age 6y
- Observe unless painful
  - Shoe inserts help pain
- Development of arch is independent of external forces
  - Corrective shoes
  - Exercises
EARLY CHILDHOOD

- HIPS - Femoral anteversion
- KNEES - Resolving valgus
- TIBIAE - Occasional persisting internal torsion
- FEET - Developing arches
Femoral Anteversion

- Increased anteversion of the neck compared to the femoral shaft
- Compensatory internal rotation of the thigh
- Seen in early childhood (3-6y) average 30-40 degrees
- Spontaneously corrects at 10-14y average 15 degrees
- Bilateral
- F>M
Femoral Anteversion

- dreaded “W” position
- In-toeing gait
- Knee pain (rare)

Exam

- Patella internally rotated during gait exam
- >70 degrees internal rotation when prone
Femoral Anteversion

- Resolves with observation
- Reassure parents
- Avoid “W” position
  - Cause
  - Consequence
  - “criss cross applesauce”
Femoral Version

A little less Britney

A little more Buddha

kaykeyyay.wordpress.com

www.johnworldpeace.com
Flatfeet

- 1 in 400 children with hypermobile flat feet end up with **symptomatic** flat feet as adults
- Flexible flat feet correct with standing on tip-toes
Beware of rigid flatfeet!

- Tight heel cords
- Coalition
- Ankle sprains
- Painful
LATE CHILDHOOD

centerforpediatrictherapy.com

www.amhs.org

montekids.org
LATE CHILDHOOD

- HIPS - Resolving anteversion
- KNEES - Straight
- TIBIAE - Straight
- FEET - Straight
ADOLESCENCE

- HIPS - Straight
- KNEES - Straight
- TIBIAE - Straight
- FEET – Straight

STRAIGHT = “NORMAL”? 
Beware of Miserable Malalignment!

- Femoral anteversion
- External tibial torsion (compensatory)
- Legs can appear straight due to compensation
- Increased risk for patellar instability and pain
Development is UNIQUE
REVIEW
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ADOLESCENCE

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- KNEES - Straight
- TIBIAE - Straight
- FEET - Straight
In Practice

• Know the natural history so you can
  • Offer reassurance
  • Avoid treating postures that will self correct
  • Relieve parent anxiety
  • Recognize the “abnormal”
Thank you!

“I WOULD RATHER ENTERTAIN AND HOPE THAT PEOPLE LEARNED SOMETHING THAN EDUCATE PEOPLE AND HOPE THEY WERE ENTERTAINED.”

WALT DISNEY

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