Equinus, Pes Cavus and Dropfoot

- Video Gait Analysis -

Craig A. Camasta, DPM, FACFAS
Atlanta, Georgia, USA
Equinus = “Toe Walker”

- **Soft Tissue**
  - Static – fixed contracture
  - Dynamic – spastic, hypertonic

- **Bone**
  Procurvatum, Post-Traumatic
  Remodeled / Arthritic Post-Contracture

- **Location**
  - Leg, Ankle, Foot

- **Bone v. Soft Tissue v. Combination**
Cavus = High Arch

- Forefoot Plantarflexed on Rearfoot
- Normal Ankle ROM
- Familial Tendency
- Inherited Neuromuscular Dx
  (Charcot-Marie-Tooth)
Dropfoot

- Weak Dorsiflexion
- Nerve Injury
  - CVA
  - Crush/Laceration
- Neuromuscular Dx
  - CMT
Equinus vs. Cavus

Equinus = Ankle or Above  Cavus = Below Ankle
Pes Cavus = Forefoot Equinus
“Pseudo Equinus”
Dropfoot (spinal injury)
Dropfoot + Equinus (CMT)
Dropfoot - CP Nerve Injury
Pre
TPTT/STJ Fusion
Equinus Contracture

- Gastrocnemius
  - Crosses Knee
  - Tight With Knee Extension
- Gastro-Soleal
  - Tight With Knee Flexion
- Static vs. Hypertonic/Spastic
  - Clonus
  - Hyper-reflexia
Equinus Assessment
Testing For Equinus...

- Observation Stance & Gait
- Manual Assessment
- TEST WITH FOOT “NEUTRALIZED…”
  - 1. Reduce Deformity & Maintain Position
  - 2. Dorsiflex Forefoot While Pulling Down Heel
- Hubshire Maneuver
  - Patient may need to step forward…
- Toe Raise
  - Heel Inversion?
  - Arch Reduction?
Neutralized Dorsiflexion
Neutralized Dorsiflexion
Hubshire & Toe Raise
Heel Cord Lengthening

- When is it INDICATED?
- Heel Pitch Inclined
  - Never Indicated
- Heel Pitch Flat or Declinated
  - Always Indicated
TAL vs. Gastroc Recession

- **TAL**
  - GastroSoleal Equinus
  - Long-standing Deformity
  - Severe Contracture
  - Older Patients

- **Gastrocnemius Recession**
  - Gastrocnemius Equinus
  - Lesser Degree of Equinus
  - Young Patients
  - Easier Recovery
TendoAchilles Lengthening

- Many Approaches…

- Tenotomy
  - Open or Percutaneous

- Percutaneous
  - Series of Stabs
  - 18 Ga. Needle

- Open Frontal “Z”
  - Controled Length
Gastroc Recession

- Many Approaches…
  - Limited Open Tenotomy
    - Contained System
  - Open
    - Tenotomy
    - Tongue / Groove
Compensation

- Ability of Limb to Accommodate Deformity
- Available ROM
- Plane of Deformity
  - Sagittal primary
  - Transverse & Frontal secondary
- Beyond Available ROM

RESIDUAL DEFORMITY
Equinus Compensation

- Fully-Compensated
  - Heel Contacts Ground

- UnCompensated
  - Heel Floating
Compensated Equinus

- Pes Valgus
- Hammertoes / HAV
- Genu Recurvatum
- Increased Pressure Forefoot
- Diabetic Trophic Ulcers
Foot Compensation

- Pes Planovalgus - Hammertoes / HAV
Foot Compensation

- Diabetic Ulcers ...
Foot Compensation

- Neuropathic - Charcot Arthropathy
Manual Reducibility
Eliminate Equinus
17 F Clubfoot Sx Age 1
17 F Clubfoot
Equinus: Stance & Gait

- Compensated Equinus
  - Pes Planovalgus / Abducted Gait
  - Early Heel-Off
  - Forward Leaning Posture / Genu Recurvatum
  - Prolonged Limb Support in Gait
  - Lack of Full Knee Extension in Gait
Compensated Equinus
Stance / Posture
Compensated Equinus: Genu Recurvatum
Gait - Compensated Equinus
Compensated (?) Equinus

POY 6
Equinus-Compensated Flatfoot

7 / F Severe Pes planovalgus / Vertical Talus
Compensated Equinus Gait - CVA
Equinus-Compensated Flatfoot
Gait - Compensated Equinus
Equinus Flatfoot

PO Y2 TN Fusion / TAL
Equinus Flatfoot Gait
Gastroc / Evans / Medial Arch
9 yo F Equinus / Vertical Talus
TAL & Spring Ligament Plication
Young’s Tenosuspension
TAL Repair + Result
Pre and Post Reduction of Equinus
Spastic Equinus & Gait
Spastic Equinus – M Gravis
Spastic Gait

Pre-Op

Post-Op TA, TP, Achilles
Compensated Equinus - MVA
Equinus: Stance & Gait

- UnCompensated Equinus
  - Pes Equinus or EquinoVarus
    or EquinoAdductoVarus
  - Increased Angle & Base
  - Residual Knee Flexion
  - Lateral Ankle Instability
  - Circumductory Gait
  - Shortened Limb Support in Gait
  - LLD – longer leg

- Combination Deformities
  - Talipes equinovarus = clubfoot
Bony Equinus – Residual Deformity
Uncompensated Equinus – Pes Valgus
Gait - Uncompensated Equinus
Spastic Equinus - CVA
23 Year Post MVA, CP Nerve Paralysis, Dropfoot Equinovarus
Post-Op TAL / AJC
Pre and Post Gait
Pre and Post With Shoe
Uncompensated Equinus – Brain Tumor

Pre-Op  X-Ray  Post TAL/AJC
Pre and Post Pan Talar Arthrodesis
Uncompensated Equinus Gait

Before

After
Uncompensated Equinus – 1.5 Year Post MVA, Talus AVN, Flap/Graft
Pre and Post - TAL/AJC, PanTalar Arthrodesis
Pre and Post Y 1 & Gait
Equinus - Surgical Principles

- Assess Bone & Soft Tissue
- Staged Approach
  - TAL, AJC
  - Bone Resection
- One Stage
  - More Bone Resection
  - Loss Limb Length…
52 M  Equinus + Cavus
Gait Analysis

- Equinus ?
- Pes Cavus ?
- Dropfoot ???
- Combination Deformity …
Equinus

- Gastrocnemius or GastroSoleal
- Assess With Foot NEUTRALIZED

- TAL vs. Gastroc Recession
  - Compensated
    - Heel on Ground
  - Uncompensated
    - Toe Walker
Dropfoot & Equinus & Cavus

- All Limited Dorsiflexion…
- Dropfoot
  - Weakness of Dorsiflexion
- Equinus
  - Primary Deformity At / Above Ankle
  - Compensation Above (genu recurvatum) & Below Ankle (pes valgus, HAV, HT)
- Cavus
  - Primary Deformity Below Ankle (foot)
  - Compensation Distal (toes) & Proximal (ankle)