Osteotomy Planning for Flexible Flatfoot Surgery

Mark D. Dollard, DPM
Sterling, VA
The Evan’s Calcaneal Osteotomy for Flexible Flatfoot Repair
Dollard, M, Marcinko M, Lazerson, A,
Journal of Foot Surgery, 1984

The Silver Calcaneal Osteotomy for Flexible Flatfoot Repair
Marcinko, D., Lazerson, A., Dollard M.
Journal of Foot Surgery 1985
The Osteotomies:
Evans, Cotton, Silver, Scarf, Chevron
Bone Source: Freeze Dried Allograft (Patella)
Demineralized Bone Matrix (Injectable)

DBX® Synthes™
When did I decide that the foot can withstand multiple osteotomies with bone grafts?

1986 Triple Arthrodesis for Middle Facet STJ Coalition
Here’s When Multiple Osteotomies w/ allografts proved themselves

1987 Silver & Cotton Osteotomies w/ Allograft

1 yr, s/p Triple Arthrodesis

Silver

Cotton

Screws removed s/p Triple Arthrodesis
1989 Freeze Dried Allografts, Incorporation 1 year post-op
20 year f/u Silver, Cotton Osteotomies with Freeze Dried Allograft
Medial Column Fusion vs Extra-articular Repair
Associated procedures

Gastroc. Lengthening,
Medial Column Tendo - suspension

Gastrocnemius Recession
remove Equinis effect

Kldner

Medial Column Suspension

Split Tibialis Tendon Transfer
Gastrocnemius recession

Tongue and groove
Split Tibialis Anterior Tendon Transfer to the Lateral Arm of the Tibialis Posterior Tendon

Tension comparisons
Youngs Tenosuspension

35 yr f/u (2007 48 y/o, w/f, Sx @13 y/o)
Youngs Tenosuspension
35 yr f/u (2007 47 y/o, w/f)
The Evan’s Calcaneal Osteotomy
*Transverse Plane Correction*

Anterior Calcaneous Opening Wedge Osteotomy

Lateral Column Lengthening

2nd Toe - Tibial Axis
Evan’s Pre-op Review

Criteria

1) High Transverse plane forefoot motion
2) Unstable MTJ Locking mechanism
3) Lateral forefoot abductus position
4) High Calcaneal – Cuboid abductus angle
5) Usually medial column breaches or sags

Calcaneal - Cuboid Abductus Angle
Evan’s or Posterior Calcaneal Osteotomy
Which to Choose? The MTJ Locking Mechanism

If Hupshire Maneuver Succeeds:
- Midtarsal Joint Stability Intact
- Posterior Calcaneal Osteotomy

If Hupshire Maneuver Fails:
- Midtarsal Jt. Complex Unstable
- Evan’s Calcaneal Osteotomy
Valgus Rearfoot - Ankle Axis

Helbing Sign

Severe Rearfoot Valgus
Evan’s Calcaneal Osteotomy

Evan’s Bone Wedge
Fixation with K-Wire

IA: 48 y/o, male **5 years post**
Evans Osteotomy,

IA: 53 y/o, w/male **11 years** post op
Evans’ Calcaneal Osteotomy
Evan’s Procedure: Lateral Post-op Pain
Peroneal Tendonitis from outstretching the lateral column (Joint pain or tendonitis?)

Rule of Thumb: Children do well, but in adults: 1) Expect peroneal tendonitis, 2) anticipate peroneal tendonitis recovery to take 1 additional month of recovery for every decade of life after 30 yrs old, beyond the typical 2.5 months of cast immobilization. By four months, begin physical therapy aimed at Peroneal tendons
CT Scan with 3-D Formatting

Evan’s Osteotomy w/ graft
AV: 56 y/o w/f : 1.5 year f/u

Evans, Posterior Calcaneal Osteotomy, Cotton, Gastroc Recession, Medial Tenosuspension
Evan’s Calcaneal Osteotomy Procedure
20 year f/u case study
KG 8/14/87
3 mos. post op

KG 2/4/88
7 mos. Post op

Evan’s Allograft
Evan’s procedure- 7 yr **Results**

(KG) Sx: 1986, 7y/o => 14 y/o

**Pre-Operative**

7 Year Post-op Result
KG: 1994  7yr f/u

Evan’s Allograft
KG 18 year F/U 7/6/05
Evan’s Osteotomy with Freeze Dried Allograft
Full Incorporation
KG 18 Yr flu: 7y/o => 26 y/o

Evans, Gastroc, Medial column tenosuspension

No DJD
s/p Evan’s
20 year f/u KG 26 y/o: Evans, Gastroc recession, Medial Column suspension
KG: 20 year F/U
Evans, Gastroc Rescession, Medial Column Tenosuspension
1) (B) Evan’s Calcaneal Osteotomy
2) (B) Gastroc Recession
3) (B) Medial Column Suspension

(KG: 26 ylo w/f) 20 year f/u
Cotton Osteotomy w/ graft

Allograft Bone wedge impacted into the 1st Cuneiform to plantarflex the 1st ray

Johnson, , jour, int tech. ft & ankl srgy 2004
Cotton 1st Cuneiform Osteotomy

Bone Graft

Elevatus

Tarsal/metatarsal sag

Interposition of corticocancellous bone graft
Screw
Talar/first metatarsal axis
Pre-op feet: Evans, Cotton Surgery
CW 8 y/o, 1988
Pre-op x-rays: CW 1988

Evan’s with Cotton Procedure
Evans with Cotton Procedure
CW 1988 8y/o b/f
14 year follow up: (CW) 2002 “Rt. foot doing just fine”

“(Rt) Evan’s, Cotton, Gastroc, Medial Tenosuspension
Ankle on (L) non-surgical side tends to click a lot
2004, “When can we do the left foot, it hurts”
14 yrs F/U Observation: The right foot with Flatfoot surgery is **Longer** than the left foot which did not have surgery.

1) Evan’s
2) Cotton
3) Kidner
4) Split Tib. Anterlor
5) Gastroc. Recess.

Longer Right foot
CW: (Rt) Evan’s, Cotton, Gastroc Recession, Mod. Young’s/ Kidner

3/12/02 (Right)

14 year Follow-up

3/12/02 (left)
CW 14 year f/u, Rt Evans, Cotton, Gastroc, Youngs Kidner
Posterior Calcaneal Osteotomies

Aligning the rear-foot / ankle axis
POSTERIOR CALCANEAL OSTEOTOMIES

- POSTERIOR CALCANEAL OSTEOTOMY (TUBEROSITY)
  1. Displaces insertion of Achilles tendon from lateral to medial.
  2. Eliminates deforming pronatory forces.
  3. Creates an active supinatory moment about the STJ.
Valgus Rearfoot - Ankle Axis

Helbing Sign

Severe Rearfoot Valgus
Silver Calcaneal Osteotomy
“Varusization”

Silver w/ Bone Graft
Modified Koutsagianous Calcaneal Scarf, Chevron Osteotomies

SCARF (Weil, Jr DPM)

CHEVRON
Scarf Osteotomy
(Weil, Jr., DPM)
Avoiding Neurovascular Bundle

Lateral

Medial
Creating Chevron Arms parallel to the Posterior Facet
Adult Chevron Calcaneal Osteotomy

Smaller Cannulated 4.0 Screw
Calcaneal Chevron w/ Varus bone graft

Varus Allograft
Evan’s, Cotton, Silver Combo
Pre-op X-rays

Pes Planus

Subtalar Jt. normal
Evans, Cotton, Silver Osteotomies

Intra-operative X-Ray View

Cotton

Silver
Evan’s, Cotton, Silver:
1st Surgery 2000, right foot 2 year f/u (CU)

Complaint: Left Foot pain

Post-op, 2 yrs >90% Symptom free
Evan’s, Cotton, Silver Combo Allograft Bone Incorporation

1 years post-op
Evans, Cotton, Silver
Results: Rt. Foot, 2 Yrs Post op
Pre-op Left Foot 2002
Plan: **Calcaneal Chevron**, Evan’s, Cotton Osteotomies
Evans, Cotton, Calcaneal Chevron w/graft
Pre-op: 2nd Surgery 2002, Left Foot
Pre-op X-rays: Evans, Cotton
Calcaneal Chevron w/ graft
*Varusation*

Allograft Varus
Bone Wedge
Implanted
Into
Calcaneal
Chevron
Osteotomy
Fixation for the Calcaneal Chevron Osteotomy w/ *Varus Allograft*
Post-op 3 mos (CU), Left Foot: Evans, Cotton, Calcaneal Chevron w/ graft
Post-op 3 mos (CU):
Evans, Cotton
Calcaneal Chevron w/ graft
Relaxed Calcaneal Stance Position

Inverted Calcaneal Stance Position

Relatively symptom free 90% of the time with only some mild soreness after highly excessive periods of activity
KP: 14 y/o, w/f 2005
KP: 14 y/o, w/f, 2005

Fully advanced Evan’s osteotomy w/ allograft
"...This is a procedure that we have generally shied away from, due to its difficulty and suspect for non-union... however having myself watched Dr. Grumbine perform the talar head osteotomy at the Baja Crippled Children’s Program, its successful results are certainly worth paying attention to over the next few years...”

Marc Benard DPM
Lastly, What Major Challenge Remains? The Subluxing Talo-Navicular Joint with Adapted Cartilage surface

Is Talar Head Osteotomy Ever Indicated?
Dollard - Reverse Baruch Opening
Navicular osteotomy w/ graft
Thank You!

“You’ve Been a Wonderful Crowd”

Mark D. Dollard
DPM
Sterling VA
mdollard@erols.com